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(54) **MOLECULES HAVING PESTICIDAL UTILITY, COMPOSITIONS AND PEST CONTROLLING PROCESS RELATED THERETO**

MOLEKÜLE MIT PESTIZIDER WIRKUNG, ZUSAMMENSETZUNGEN UND SCHÄDLINGSBEKÄMPFUNGSVERFAHREN IM ZUSAMMENHANG DAMIT

MOLÉCULES AYANT UNE UTILITÉ PESTICIDE, ET INTERMÉDIAIRES, COMPOSITIONS ET PROCÉDÉ ASSOCIÉ DE LUTTE CONTRE LES PHYTORAVAGEURS

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Description

Cross-reference to related applications

[0001] This Application the benefit of, and priority from, U.S. provisional application serial number 62/651747; which was filed on April 3, 2018.

Field of this disclosure

[0002] This disclosure relates to the field of molecules having pesticidal utility against pests in Phyla Arthropoda, Mollusca, and Nematoda, processes to produce such molecules, intermediates used in such processes, pesticidal compositions containing such molecules, and processes of using such pesticidal compositions against such pests. These pesticidal compositions may be used, for example, as acaricides, insecticides, miticides, molluscicides, and nematicides. The present invention is directed to the benzamide derivatives of Formula One, composition thereof and process for pest control therewith as indicated in the appended set of claims. Any method of treatment of the human or animal body is excluded from the present invention.

Background of this disclosure

[0003] Molecules having pesticidal utility against pests in Phyla Arthropoda, Mollusca, and Nematoda are described in WO 2016/168059 A1 and US 2017/0208806 A1.

[0004] "Many of the most dangerous human diseases are transmitted by insect vectors" (Rivero et al.). "Historically, malaria, dengue, yellow fever, plague, filariasis, louse-borne typhus, trypanomiasis, leishmaniasis, and other vector borne diseases were responsible for more human disease and death in the 17th through the early 20th centuries than all other causes combined" (Gubler). Vector-borne diseases are responsible for about 17% of the global parasitic and infectious diseases. Malaria alone causes over 800,000 deaths a year, 85% of which occur in children under five years of age. Each year there are about 50 to about 100 million cases of dengue fever. A further 250,000 to 500,000 cases of dengue hemorrhagic fever occur each year (Matthews). Vector control plays a critical role in the prevention and control of infectious diseases. However, insecticide resistance, including resistance to multiple insecticides, has arisen in all insect species that are major vectors of human diseases (Rivero et al.). Recently, more than 550 arthropod species have developed resistance to at least one pesticide (Whalon et al.). Furthermore, the cases of insect resistance continue to exceed by far the number of cases of herbicide and fungicide resistance (Sparks et al.).

[0005] Each year insects, plant pathogens, and weeds, destroy more than 40% of all food production. This loss occurs despite the application of pesticides and the use of a wide array of non-chemical controls, such as, crop rotations, and biological controls. If just some of this food could be saved, it could be used to feed the more than three billion people in the world who are malnourished (Pimental).

[0006] Plant parasitic nematodes are among the most widespread pests, and are frequently one of the most insidious and costly. It has been estimated that losses attributable to nematodes are from about 9% in developed countries to about 15% in undeveloped countries. However, in the United States of America a survey of 35 States on various crops indicated nematode-derived losses of up to 25% (Nicol et al.).

[0007] It is noted that gastropods (slugs and snails) are pests of less economic importance than other arthropods or nematodes, but in certain places, they may reduce yields substantially, severely affecting the quality of harvested products, as well as, transmitting human, animal, and plant diseases. While only a few dozen species of gastropods are serious regional pests, a handful of species are important pests on a worldwide scale. In particular, gastropods affect a wide variety of agricultural and horticultural crops, such as, arable, pastoral, and fiber crops; vegetables; bush and tree fruits; herbs; and ornamentals (Speiser).

[0008] Termites cause damage to all types of private and public structures, as well as to agricultural and forestry resources. In 2005, it was estimated that termites cause over US$50 billion in damage worldwide each year (Korb).

[0009] Consequently, for many reasons, including those mentioned above, there is an on-going need for the costly (estimated to be about US$256 million per pesticide in 2010), time-consuming (on average about 10 years per pesticide), and difficult, development of new pesticides (CropLife America).

Certain references cited in this disclosure

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Definitions used in this disclosure

[0021] The examples given in these definitions are generally non-exhaustive and must not be construed as limiting this disclosure. It is understood that a substituent should comply with chemical bonding rules and steric compatibility constraints in relation to the particular molecule to which it is attached. These definitions are only to be used for the purposes of this disclosure.

[0022] The phrase **"active ingredient"** means a material having activity useful in controlling pests, and/or that is useful in helping other materials have better activity in controlling pests, examples of such materials include, but are not limited to, acaricides, algicides, antifeedants, avicides, bactericides, bird repellents, chemosterilants, fungicides, herbicide safeners, herbicides, insect attractants, insect repellents, insecticides, mammal repellents, mating disrupters, molluscicides, nematicides, plant activators, plant growth regulators, rodenticides, synergists, and virucides (see alanwood.net). Specific examples of such materials include, but are not limited to, the materials listed in active ingredient group alpha.

[0023] The phrase **"active ingredient group alpha"** (hereafter **"AIGA")** means collectively the following materials:

(1) (3-ethoxypropyl)mercury bromide, 1,2-dibromoethane, 1,2-dichloroethane, 1,2-dichloropropane, 1,3-dichloropropene, 1-MCP, 1-methylcyclopropene, 1-naphthol, 2-(octylthio)ethanol, 2,3,3-TPA, 2,3,5-tri-iodobenzoic acid, 2,3,6-TBA, 2,4,5-T, 2,4,5-TB, 2,4,5-TP, 2,4-D, 2,4-DB, 2,4-DEB, 2,4-DEP, 2,4-DES, 2,4-DP, 2,4-MCPA, 2,4-MCPB, 2iP, 2-methoxyethylmercury chloride, 2-phenylphenol, 3,4-DA, 3,4-DB, 3,4-DP, 3,6-dichloropicolinic acid, 4-aminopyridine, 4-CPA, 4-CPB, 4-CPP, 4-hydroxyphenethyl alcohol, 8-hydroxyquinoline sulfate, 8-phenylmercurioxyquinoline, abamectin, abamectin-aminomethyl, abscisic acid, ACC, acephate, acequinocyl, acetamiprid, acethion, acetochlor, acetofenate, acetophos, acetoprole, acibenzolar, acifluorfen, aclonifen, ACN, acrep, acrinathrin, acrolein, acrylonitrile, acynonapyr, acypetacs, afidopyropen, afoxolaner, alachlor, alanap, alanycarb, albendazole, aldicarb, aldicarb sulfone, aldimorph, aldoxycarb, aldrin, allethrin, allicin, allidochlor, allosamidin, alloxydim, allyl alcohol, allyxycarb, alorac, *alpha*-cypermethrin, *alpha*-endosulfan, alphamethrin, altretamine, aluminium phosphide, aluminum phosphide, ametoctradin, ametridione, ametryn, ametryne, amibuzin, amicarbazone, amicarthiazol, amidithion, amidoflumet, amidosulfuron, aminocarb, aminocyclopyrachlor, aminopyralid, aminopyrifen, aminotriazole, amiprofos-methyl, amiprophos, amiprophos-methyl, amisulbrom, amiton, amitraz, amitrole, ammonium sulfamate, amobam, amorphous silica gel, amorphous silicon dioxide, ampropylfos, AMS, anabasine, ancymidol, anilazine, anilofos, anisuron, anthraquinone, antu, apholate, aramite, arprocarb, arsenous oxide, asomate, aspirin, asulam, athidathion, atraton, atrazine, aureofungin, avermectin B1, AVG, aviglycine, azaconazole, azadirachtin, azafenidin, azamethiphos, azidithion, azimsulfuron, azinphosethyl, azinphos-ethyl, azinphosmethyl, azinphos-methyl, aziprotryn, aziprotryne, azithiram, azobenzene, azocyclotin, azothoate, azoxystrobin, bachmedesh, barban, barbanate, barium hexafluorosilicate, barium polysulfide, barium silicofluoride, barthrin, basic copper carbonate, basic copper chloride, basic copper sulfate, BCPC, beflubutamid, beflubutamid-M, benalaxyl, benalaxyl-M, benazolin, bencarbazone, benclothiaz, bendaqingbingzhi, bendiocarb, bendioxide, benefin, benfluralin, benfuracarb, benfuresate, benmihuangcaoan, benodanil, benomyl, benoxacor, benoxafos, benquinox, bensulfuron, bensulide, bensultap, bentaluron, bentazon, bentazone, benthiavalicarb, benthiazole, benthiocarb, bentranil, benzadox, benzalkonium chloride, benzamacril, benzamizole, benzamorf, benzene hexachloride, benzfendizone, benzimine, benzipram, benzobicyclon, benzoepin, benzofenap, benzofluor, benzohydroxamic acid, benzomate, benzophosphate, benzothiadiazole, benzovindiflupyr, benzoximate, benzoylprop, benzpyrimoxan, benzthiazuron, benzuocaotong, benzyl benzoate, benzyladenine, berberine, beta-cyfluthrin, beta-cypermethrin, bethoxazin, BHC, bialaphos, bicyclopyrone, bifenazate, bifenox, bifenthrin, bifujunzhi, bilanafos, binapacryl, bingqingxiao, bioallethrin, bioethanomethrin, biopermethrin, biores-

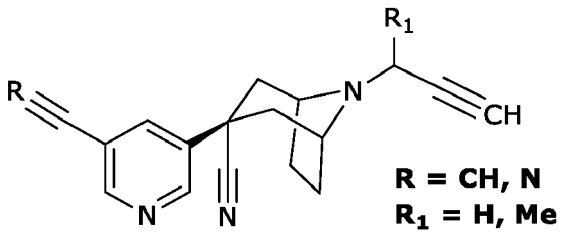
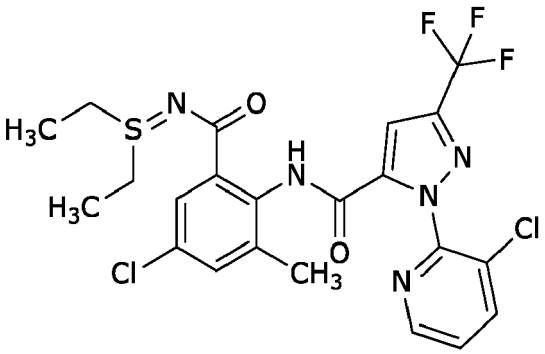
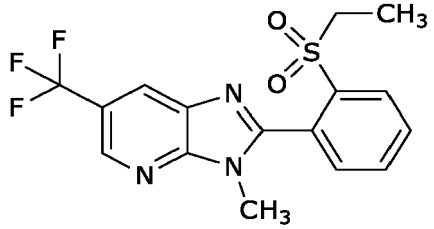
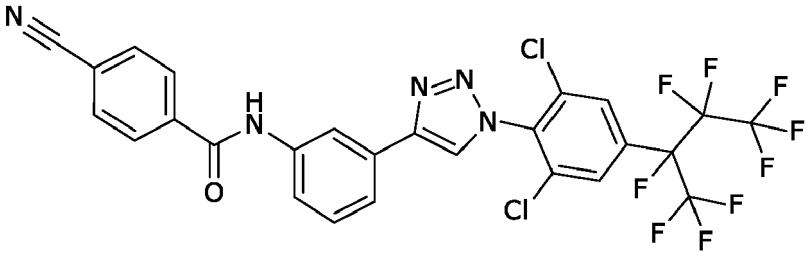
methrin, biphenyl, bisazir, bismerthiazol, bismerthiazol-copper, bisphenylmercury methylenedi(x-naphthalene-y-sulphonate), bispyribac, bistrifluron, bisultap, bitertanol, bithionol, bixafen, bixlozone, blasticidin-S, borax, Bordeaux mixture, boric acid, boscalid, BPPS, brassinolide, brassinolide-ethyl, brevicomin, brodifacoum, brofenprox, brofenvalerate, broflanilide, brofluthrinate, bromacil, bromadiolone, bromchlophos, bromethalin, bromethrin, bromfenvinfos, bromoacetamide, bromobonil, bromobutide, bromociclen, bromocyclen, bromo-DDT, bromofenoxim, bromofos, bromomethane, bromophos, bromophos-ethyl, bromopropylate, bromothalonil, bromoxynil, brompyrazon, bromuconazole, bronopol, BRP, BTH, bucarpolate, bufencarb, buminafos, bupirimate, buprofezin, Burgundy mixture, busulfan, busulphan, butacarb, butachlor, butafenacil, butam, butamifos, butane-fipronil, butathiofos, butenachlor, butene-fipronil, butethrin, buthidazole, buthiobate, buthiuron, butifos, butocarboxim, butonate, butopyronoxyl, butoxycarboxim, butralin, butrizol, butroxydim, buturon, butylamine, butylate, butylchlorophos, butylene-fipronil, cacodylic acid, cadusafos, cafenstrole, calciferol, calcium arsenate, calcium chlorate, calcium cyanamide, calcium cyanide, calcium polysulfide, calvinphos, cambendichlor, camphechlor, camphor, captafol, captan, carbam, carbamorph, carbanolate, carbaril, carbaryl, carbasulam, carbathion, carbendazim, carbendazol, carbetamide, carbofenotion, carbofuran, carbon disulfide, carbon tetrachloride, carbonyl sulfide, carbophenothion, carbophos, carbosulfan, carboxazole, carboxide, carboxin, carfentrazone, carpropamid, cartap, carvacrol, carvone, CAVP, CDAA, CDEA, CDEC, cellocidin, CEPC, ceralure, cerenox, cevadilla, Cheshunt mixture, chinalphos, chinalphos-methyl, chinomethionat, chinomethionate, chiralaxyl, chitosan, chlobenthiazone, chlomethoxyfen, chloralose, chloramben, chloramine phosphorus, chloramphenicol, chloraniformethan, chloranil, chloranocryl, chlorantraniliprole, chlorazifop, chlorazine, chlorbenside, chlorbenzuron, chlorbicyclen, chlorbromuron, chlorbufam, chlordane, chlordecone, chlordimeform, chlorempenthrin, chloretazate, chlorethephon, chlorethoxyfos, chloreturon, chlorfenac, chlorfenapyr, chlorfenazole, chlorfenethol, chlorfenidim, chlorfenprop, chlorfenson, chlorfensulphide, chlorfenvinphos, chlorfenvinphos-methyl, chlorfluazuron, chlorflurazole, chlorflurecol, chlorfluren, chlorflurenol, chloridazon, chlorimuron, chlorinate, chlor-IPC, chlormephos, chlormequat, chlormesulone, chlormethoxynil, chlornidine, chlornitrofen, chloroacetic acid, chlorobenzilate, chlorodinitronaphthalenes, chlorofenizon, chloroform, chloromebuform, chloromethiuron, chloroneb, chlorophacinone, chlorophos, chloropicrin, chloropon, chloroprallethrin, chloropropylate, chlorothalonil, chlorotoluron, chloroxifenidim, chloroxuron, chloroxynil, chlorphonium, chlorphoxim, chlorprazophos, chlorprocarb, chlorpropham, chlorpyrifos, chlorpyrifos-methyl, chlorquinox, chlorsulfuron, chlorthal, chlorthiamid, chlorthiophos, chlortoluron, chlozolinate, chitosan, cholecalciferol, choline chloride, chromafenozide, cicloheximide, cimectacarb, cimetacarb, cinerin I, cinerin II, cinerins, cinidon-ethyl, cinmethylin, cinosulfuron, cintofen, ciobutide, cisanilide, cismethrin, clacyfos, clefoxydim, clenpirin, clenpyrin, clethodim, climbazole, cliodinate, clodinafop, cloethocarb, clofencet, clofenotane, clofentezine, clofenvinfos, clofibric acid, clofop, clomazone, clomeprop, clonitralid, cloprop, cloproxydim, clopyralid, cloquintocet, cloransulam, closantel, clothianidin, clotrimazole, cloxyfonac, cloxylacon, clozylacon, CMA, CMMP, CMP, CMU, codlelure, colecalciferol, colophonate, copper 8-quinolinolate, copper acetate, copper acetoarsenite, copper arsenate, copper carbonate, basic, copper hydroxide, copper naphthenate, copper oleate, copper oxychloride, copper silicate, copper sulfate, copper sulfate, basic, copper zinc chromate, coumachlor, coumafene, coumafos, coumafuryl, coumaphos, coumatetralyl, coumethoxystrobin, coumithoate, coumoxystrobin, CPMC, CPMF, CPPC, credazine, cresol, cresylic acid, crimidine, crotamiton, crotoxyfos, crotoxyphos, crufomate, cryolite, cue-lure, cufraneb, cumyleron, cumyluron, cuprobam, cuprous oxide, curcumenol, CVMP, cyanamide, cyanatryn, cyanazine, cyanofenphos, cyanogen, cyanophos, cyanthoate, cyantraniliprole, cyanuric acid, cyazofamid, cybutryne, cyclafuramid, cyclanilide, cyclaniliprole, cyclethrin, cycloate, cycloheximide, cycloprate, cycloprothrin, cyclopyranil, cyclopyrimorate, cyclosulfamuron, cycloxaprid, cycloxydim, cycluron, cyenopyrafen, cyflufenamid, cyflumetofen, cyfluthrin, cyhalodiamide, cyhalofop, cyhalothrin, cyhexatin, cymiazole, cymoxanil, cyometrinil, cypendazole, cypermethrin, cyperquat, cyphenothrin, cyprazine, cyprazole, cyproconazole, cyprodinil, cyprofuram, cypromid, cyprosulfamide, cyromazine, cythioate, cytrex, daimuron, dalapon, daminozide, dayoutong, dazomet, DBCP, *d*-camphor, DCB, DCIP, DCPA (Japan), DCPA (USA), DCPTA, DCU, DDD, DDPP, DDT, DDVP, debacarb, decafentin, decamethrin, decarbofuran, deet, dehydroacetic acid, deiquat, delachlor, delnav, deltamethrin, demephion, demephion-O, demephion-S, demeton, demeton-methyl, demeton-O, demeton-O-methyl, demeton-S, demeton-S-methyl, demeton-S-methyl sulphone, demeton-S-methylsulphon, DEP, depalléthrine, derris, desmedipham, desmetryn, desmetryne, d-fanshiluquebingjuzhi, diafenthiuron, dialifor, dialifos, diallate, di-allate, diamidafos, dianat, diatomaceous earth, diatomite, diazinon, dibrom, dibutyl phthalate, dibutyl succinate, dicamba, dicapthon, dichlobenil, dichlobentiazox, dichlofenthion, dichlofluanid, dichlone, dichloralurea, dichlorbenzuron, dichlorfenidim, dichlorflurecol, dichlorflurenol, dichlormate, dichlormid, dichloromethane, dichlorophen, dichlorprop, dichlorprop-P, dichlorvos, dichlozolin, dichlozoline, diclobutrazol, diclocymet, diclofop, diclomezine, dicloran, dicloromezotiaz, diclosulam, dicofol, dicophane, dicoumarol, dicresyl, dicrotophos, dicryl, dicumarol, dicyclanil, dicyclonon, dieldrin, dienochlor, diethamquat, diethatyl, diethion, diéthion, diethofencarb, dietholate, diéthon, diethyl pyrocarbonate, diethyltoluamide, difenacoum, difenoconazole, difenopenten, difenoxuron, difenzoquat, difethialone, diflovidazin, diflubenzuron, diflufenican, diflufenicanil, diflufenzopyr, diflumetorim, dikegulac, dilor, dimatif, dimefluthrin, dimefox, dimefuron, dimehypo, dimepiperate, dimetachlone, dimetan, dimethacarb, dimethachlone, dimethachlor, dimethametryn, dimethenamid, dimethenamid-P, dimethipin, dimethirimol, dimethoate, dimethomorph, dimethrin, dimethyl carbate, dimethyl disulfide, dimethyl phthalate, dimethylvinphos, dimetilan, dimexano, dimidazon, dimoxystrobin, dimpropyridaz, dimpylate, dimuron,

dinex, dingjunezuo, diniconazole, diniconazole-M, dinitramine, dinitrophenols, dinobuton, dinocap, dinocap-4, dinocap-6, dinocton, dinofenate, dinopenton, dinoprop, dinosam, dinoseb, dinosulfon, dinotefuran, dinoterb, dinoterbon, diofenolan, dioxabenzofos, dioxacarb, dioxathion, dioxation, diphacin, diphacinone, diphenadione, diphenamid, diphenamide, diphenyl sulfone, diphenylamine, diphenylsulphide, diprogulic acid, dipropalin, dipropetryn, dipterex, dipymetitrone, dipyrithione, diquat, disodium tetraborate, disosultap, disparlure, disugran, disul, disulfiram, disulfoton, ditalimfos, dithianon, dithicrofos, dithioether, dithiométon, dithiopyr, diuron, dixanthogen, d-limonene, DMDS, DMPA, DNOC, dodemorph, dodicin, dodine, dofenapyn, doguadine, dominicalure, doramectin, DPC, drazoxolon, DSMA, d-trans-allethrin, d-trans-resmethrin, dufulin, dymron, EBEP, EBP, ebufos, ecdysterone, echlomezol, EDB, EDC, EDDP, edifenphos, eglinazine, emamectin, EMPC, empenthrin, enadenine, endosulfan, endothal, endothall, endothion, endrin, enestroburin, enilconazole, enoxastrobin, ephirsulfonate, EPN, epocholeone, epofenonane, epoxiconazole, eprinomectin, epronaz, epsilon-metofluthrin, epsilon-momfluorothrin, EPTC, erbon, ergocalciferol, erlujixiancaoan, esdépalléthrine, esfenvalerate, ESP, esprocarb, etacelasil, etaconazole, etaphos, etem, ethaboxam, ethachlor, ethalfluralin, ethametsulfuron, ethaprochlor, ethephon, ethidimuron, ethiofencarb, ethiolate, ethion, ethiozin, ethiprole, ethirimol, ethoate-methyl, ethobenzanid, ethofumesate, ethohexadiol, ethoprop, ethoprophos, ethoxyfen, ethoxyquin, ethoxysulfuron, ethychlozate, ethyl formate, ethyl pyrophosphate, ethylan, ethyl-DDD, ethylene, ethylene dibromide, ethylene dichloride, ethylene oxide, ethylicin, ethylmercury 2,3-dihydroxypropyl mercaptide, ethylmercury acetate, ethylmercury bromide, ethylmercury chloride, ethylmercury phosphate, etinofen, ETM, etnipromid, etobenzanid, etofenprox, etoxazole, etridiazole, etrimfos, étrimphos, eugenol, EXD, famoxadone, famphur, fenac, fenamidone, fenaminosulf, fenaminstrobin, fenamiphos, fenapanil, fenarimol, fenasulam, fenazaflor, fenazaquin, fenbuconazole, fenbutatin oxide, fenchlorazole, fenchlorphos, fenclofos, fenclorim, fenethacarb, fenfluthrin, fenfuram, fenhexamid, fenidin, fenitropan, fenitrothion, fénizon, fenjuntong, fenobucarb, fenolovo, fenoprop, fenothiocarb, fenoxacrim, fenoxanil, fenoxaprop, fenoxaprop-P, fenoxasulfone, fenoxycarb, fenpiclonil, fenpicoxamid, fenpirithrin, fenpropathrin, fenpropidin, fenpropimorph, fenpyrazamine, fenpyroximate, fenquinotrione, fenridazon, fenson, fensulfothion, fenteracol, fenthiaprop, fenthion, fenthion-ethyl, fentiaprop, fentin, fentrazamide, fentrifanil, fenuron, fenuron-TCA, fenvalerate, ferbam, ferimzone, ferric phosphate, ferrous sulfate, fipronil, flamprop, flamprop-M, flazasulfuron, flocoumafen, flometoquin, flonicamid, florasulam, florpyrauxifen, florylpicoxamid, fluacrypyrim, fluazaindolizine, fluazifop, fluazifop-P, fluazinam, fluazolate, fluazuron, flubendiamide, flubenzimine, flubrocythrinate, flucarbazone, flucetosulfuron, fluchloralin, flucofuron, flucycloxuron, flucythrinate, fludioxonil, fluénéthyl, fluenetil, fluensulfone, flufenacet, flufenerim, flufenican, flufenoxuron, flufenoxystrobin, flufenprox, flufenpyr, flufenzine, flufiprole, fluhexafon, fluindapyr, flumethrin, flumetover, flumetralin, flumetsulam, flumezin, flumiclorac, flumioxazin, flumipropyn, flumorph, fluometuron, fluopicolide, fluopimomide, fluopyram, fluorbenside, fluoridamid, fluoroacetamide, fluoroacetic acid, fluorochloridone, fluorodifen, fluoroglycofen, fluoroimide, fluoromide, fluoromidine, fluoronitrofen, fluoroxypyr, fluothiuron, fluotrimazole, fluoxapiprolin, fluoxastrobin, flupoxam, flupropacil, flupropadine, flupropanate, flupyradifurone, flupyrimin, flupyrsulfuron, fluquinconazole, fluralaner, flurazole, flurecol, flurenol, fluridone, flurochloridone, fluromidine, fluroxypyr, flurprimidol, flursulamid, flurtamone, flusilazole, flusulfamide, flutenzine, fluthiacet, fluthiamide, flutianil, flutolanil, flutriafol, fluvalinate, fluxametamide, fluxapyroxad, fluxofenim, folpel, folpet, fomesafen, fonofos, foramsulfuron, forchlorfenuron, formaldehyde, formetanate, formothion, formparanate, fosamine, fosetyl, fosmethilan, fospirate, fosthiazate, fosthietan, frontalin, fthalide, fuberidazole, fucaojing, fucaomi, fujunmanzhi, fulumi, fumarin, funaihecaoling, fuphenthiourea, furalane, furalaxyl, furamethrin, furametpyr, furan tebufenozide, furathiocarb, furcarbanil, furconazole, furconazole-cis, furethrin, furfural, furilazole, furmecyclox, furophanate, furyloxyfen, *gamma-BHC, gamma*-cyhalothrin, *gamma-HCH,* genit, gibberellic acid, gibberellin A3, gibberellins, gliftor, glitor, glucochloralose, glufosinate, glufosinate-P, glyodin, glyoxime, glyphosate, glyphosine, gossyplure, grandlure, griseofulvin, guanoctine, guazatine, halacrinate, halauxifen, halfenprox, halofenozide, halosafen, halosulfuron, haloxydine, haloxyfop, haloxyfop-P, haloxyfop-R, HCA, HCB, HCH, hemel, hempa, HEOD, heptachlor, heptafluthrin, heptenophos, heptopargil, herbimycin, herbimycin A, heterophos, hexachlor, hexachloran, hexachloroacetone, hexachlorobenzene, hexachlorobutadiene, hexachlorophene, hexaconazole, hexaflumuron, hexafluoramin, hexaflurate, hexalure, hexamide, hexazinone, hexylthiofos, hexythiazox, HHDN, holosulf, homobrassinolide, huancaiwo, huanchongjing, huangcaoling, huanjunzuo, hydramethylnon, hydrargaphen, hydrated lime, hydrogen cyanamide, hydrogen cyanide, hydroprene, hydroxyisoxazole, hymexazol, hyquincarb, IAA, IBA, IBP, icaridin, imazalil, imazamethabenz, imazamox, imazapic, imazapyr, imazaquin, imazethapyr, imazosulfuron, imibenconazole, imicyafos, imidacloprid, imidaclothiz, iminoctadine, imiprothrin, inabenfide, indanofan, indaziflam, indoxacarb, inezin, infusorial earth, inpyrfluxam, iodobonil, iodocarb, iodofenphos, iodomethane, iodosulfuron, iofensulfuron, ioxynil, ipazine, IPC, ipconazole, ipfencarbazone, ipfentrifluconazole, ipflufenoquin, iprobenfos, iprodione, iprovalicarb, iprymidam, ipsdienol, ipsenol, IPSP, IPX, isamidofos, isazofos, isobenzan, isocarbamid, isocarbamide, isocarbophos, isocil, isocycloseram, isodrin, isofenphos, isofenphos-methyl, isofetamid, isoflucypram, isolan, isomethiozin, isonoruron, isopamphos, isopolinate, isoprocarb, isoprocil, isopropalin, isopropazol, isoprothiolane, isoproturon, isopyrazam, isopyrimol, isothioate, isotianil, isouron, isovaledione, isoxaben, isoxachlortole, isoxadifen, isoxaflutole, isoxapyrifop, isoxathion, isuron, ivermectin, ixoxaben, izopamfos, izopamphos, japonilure, japothrins, jasmolin I, jasmolin II, jasmonic acid, jiahuangchongzong, jiajizengxiaolin, jiaxiangjunzhi, jiecaowan, jiecaoxi, Jinganmycin A, jodfenphos, juvenile hormone I, juvenile hormone II, juvenile hormone III, kadethrin, kappa-bifenthrin, kappa-tefluthrin, karbutilate, karetazan,

kasugamycin, kejunlin, kelevan, ketospiradox, kieselguhr, kinetin, kinoprene, kiralaxyl, kresoxim-methyl, kuicaoxi, lactofen, lambda-cyhalothrin, lancotrione, latilure, lead arsenate, lenacil, lepimectin, leptophos, lianbenjingzhi, lime sulfur, lindane, lineatin, linuron, lirimfos, litlure, looplure, lotilaner, lufenuron, lüfuqingchongxianan, lüxiancaolin, lvdingjunzhi, lvfumijvzhi, lvxiancaolin, lythidathion, M-74, M-81, MAA, magnesium phosphide, malathion, maldison, maleic hydrazide, malonoben, maltodextrin, MAMA, mancopper, mancozeb, mandestrobin, mandipropamid, maneb, matrine, mazidox, MCC, MCP, MCPA, MCPA-thioethyl, MCPB, MCPP, mebenil, mecarbam, mecarbinzid, mecarphon, mecoprop, mecoprop-P, medimeform, medinoterb, medlure, mefenacet, mefenoxam, mefenpyr, mefentrifluconazole, mefluidide, megatomoic acid, melissyl alcohol, melitoxin, MEMC, menazon, MEP, mepanipyrim, meperfluthrin, mephenate, mephosfolan, mepiquat, mepronil, meptyldinocap, mercaptodimethur, mercaptophos, mercaptophos thiol, mercaptothion, mercuric chloride, mercuric oxide, mercurous chloride, merphos, merphos oxide, mesoprazine, mesosulfuron, mesotrione, mesulfen, mesulfenfos, mesulphen, metacresol, metaflumizone, metalaxyl, metalaxyl-M, metaldehyde, metam, metamifop, metamitron, metaphos, metaxon, metazachlor, metazosulfuron, metazoxolon, metcamifen, metconazole, metepa, metflurazon, methabenzthiazuron, methacrifos, methalpropalin, metham, methamidophos, methasulfocarb, methazole, methfuroxam, methibenzuron, methidathion, methiobencarb, methiocarb, methiopyrisulfuron, methiotepa, methiozolin, methiuron, methocrotophos, métholcarb, methometon, methomyl, methoprene, methoprotηn, methoprotryne, methoquin-butyl, methothrin, methoxychlor, methoxyfenozide, methoxyphenone, methyl apholate, methyl bromide, methyl eugenol, methyl iodide, methyl isothiocyanate, methyl parathion, methylacetophos, methylchloroform, methyldithiocarbamic acid, methyldymron, methylene chloride, methyl-isofenphos, methylmercaptophos, methylmercaptophos oxide, methylmercaptophos thiol, methylmercury benzoate, methylmercury dicyandiamide, methylmercury pentachlorophenoxide, methylneodecanamide, methylnitrophos, methyltriazothion, metiozolin, metiram, metiram-zinc, metobenzuron, metobromuron, metofluthrin, metolachlor, metolcarb, metometuron, metominostrobin, metosulam, metoxadiazone, metoxuron, metrafenone, metriam, metribuzin, metrifonate, metriphonate, metsulfovax, metsulfuron, metyltetraprole, mevinphos, mexacarbate, miechuwei, mieshuan, miewenjuzhi, milbemectin, milbemycin oxime, milneb, mimanan, mipafox, MIPC, mirex, MNAF, moguchun, molinate, molosultap, momfluorothrin, monalide, monisuron, monoamitraz, monochloroacetic acid, monocrotophos, monolinuron, monomehypo, monosulfiram, monosulfuron, monosultap, monuron, monuron-TCA, morfamquat, moroxydine, morphothion, morzid, moxidectin, MPMC, MSMA, MTMC, muscalure, myclobutanil, myclozolin, myricyl alcohol, *N*-(ethylmercury)-p-toluenesulphonanilide, NAA, NAAm, nabam, naftalofos, naled, naphthalene, naphthaleneacetamide, naphthalic anhydride, naphthalophos, naphthoxyacetic acids, naphthylacetic acids, naphthylindane-1,3-diones, naphthyloxyacetic acids, naproanilide, napropamide, napropamide-M, naptalam, natamycin, NBPOS, neburea, neburon, nendrin, neonicotine, nichlorfos, niclofen, niclosamide, nicobifen, nicosulfuron, nicotine, nicotine sulfate, nifluridide, nikkomycins, NIP, nipyraclofen, nipyralofen, nitenpyram, nithiazine, nitralin, nitrapyrin, nitrilacarb, nitrofen, nitrofluorfen, nitrostyrene, nitrothal-isopropyl, nobormide, nonanol, norbormide, norea, norflurazon, nornicotine, noruron, novaluron, noviflumuron, NPA, nuarimol, nuranone, OCH, octachlorodipropyl ether, octhilinone, o-dichlorobenzene, ofurace, omethoate, o-phenylphenol, orbencarb, orfralure, orthobencarb, ortho-dichlorobenzene, orthosulfamuron, oryctalure, orysastrobin, oryzalin, osthol, osthole, ostramone, ovatron, ovex, oxabetrinil, oxadiargyl, oxadiazon, oxadixyl, oxamate, oxamyl, oxapyrazon, oxapyrazone, oxasulfuron, oxathiapiprolin, oxaziclomefone, oxazosulfyl, oxine-copper, oxine-Cu, oxolinic acid, oxpoconazole, oxycarboxin, oxydemeton-methyl, oxydeprofos, oxydisulfoton, oxyenadenine, oxyfluorfen, oxymatrine, oxytetracycline, oxythioquinox, PAC, paclobutrazol, paichongding, palléthrine, PAP, para-dichlorobenzene, parafluron, paraquat, parathion, parathion-methyl, parinol, Paris green, PCNB, PCP, PCP-Na, p-dichlorobenzene, PDJ, pebulate, pedinex, pefurazoate, pelargonic acid, penconazole, pencycuron, pendimethalin, penfenate, penflufen, penfluron, penoxalin, penoxsulam, pentachlorophenol, pentachlorophenyl laurate, pentanochlor, penthiopyrad, pentmethrin, pentoxazone, perchlordecone, perfluidone, permethrin, pethoxamid, PHC, phenamacril, phenamacril-ethyl, phénaminosulf, phenazine oxide, phenetacarbe, phenisopham, phenkapton, phenmedipham, phenmedipham-ethyl, phenobenzuron, phenothiol, phenothrin, phenproxide, phenthoate, phenylmercuriurea, phenylmercury acetate, phenylmercury chloride, phenylmercury derivative of pyrocatechol, phenylmercury nitrate, phenylmercury salicylate, phorate, phosacetim, phosalone, phosametine, phosazetim, phosazetin, phoscyclotin, phosdiphen, phosethyl, phosfolan, phosfolan-methyl, phosglycin, phosmet, phosnichlor, phosphamide, phosphamidon, phosphine, phosphinothricin, phosphocarb, phosphorus, phostin, phoxim, phoxim-methyl, phthalide, phthalophos, phthalthrin, picarbutrazox, picaridin, picloram, picolinafen, picoxystrobin, pimaricin, pindone, pinoxaden, piperalin, piperazine, piperonyl butoxide, piperonyl cyclonene, piperophos, piproctanly, piproctanyl, piprotal, pirimetaphos, pirimicarb, piriminil, pirimioxyphos, pirimiphos-ethyl, pirimiphos-methyl, pival, pivaldione, plifenate, PMA, PMP, polybutenes, polycarbamate, polychlorcamphene, polyethoxyquinoline, polyoxin D, polyoxins, polyoxorim, polythialan, potassium arsenite, potassium azide, potassium cyanate, potassium ethylxanthate, potassium naphthenate, potassium polysulfide, potassium thiocyanate, pp'-DDT, prallethrin, precocene I, precocene II, precocene III, pretilachlor, primidophos, primisulfuron, probenazole, prochloraz, proclonol, procyazine, procymidone, prodiamine, profenofos, profluazol, profluralin, profluthrin, profoxydim, profurite-aminium, proglinazine, prohexadione, prohydrojasmon, promacyl, promecarb, prometon, prometryn, prometryne, promurit, pronamide, pronitridine, propachlor, propafos, propamidine, propamocarb, propanil, propaphos, propaquizafop, propargite, proparthrin, propazine, propetamphos, propham, propiconazole,

propidine, propineb, propisochlor, propoxur, propoxycarbazone, propyl isome, propyrisulfuron, propyzamide, proquinazid, prosuler, prosulfalin, prosulfocarb, prosulfuron, prothidathion, prothiocarb, prothioconazole, prothiofos, prothoate, protrifenbute, proxan, prymidophos, prynachlor, psoralen, psoralene, pydanon, pydiflumetofen, pyflubumide, pymetrozine, pyracarbolid, pyraclofos, pyraclonil, pyraclostrobin, pyraflufen, pyrafluprole, pyramat, pyrametostrobin, pyraoxystrobin, pyrapropoyne, pyrasulfotole, pyraziflumid, pyrazolate, pyrazolynate, pyrazon, pyrazophos, pyrazosulfuron, pyrazothion, pyrazoxyfen, pyresmethrin, pyrethrin I, pyrethrin II, pyrethrins, pyribambenz-isopropyl, pyribambenz-propyl, pyribencarb, pyribenzoxim, pyributicarb, pyriclor, pyridaben, pyridachlometyl, pyridafol, pyridalyl, pyridaphenthion, pyridaphenthione, pyridate, pyridinitril, pyrifenox, pyrifluquinazon, pyriftalid, pyrimétaphos, pyrimethanil, pyrimicarbe, pyrimidifen, pyriminobac, pyriminostrobin, pyrimiphos-éthyl, pyrimiphos-méthyl, pyrimisulfan, pyrimitate, pyrinuron, pyriofenone, pyriprole, pyripropanol, pyriproxyfen, pyrisoxazole, pyrithiobac, pyrolan, pyroquilon, pyroxasulfone, pyroxsulam, pyroxychlor, pyroxyfur, qincaosuan, qingkuling, quassia, quinacetol, quinalphos, quinalphos-methyl, quinazamid, quinclorac, quinconazole, quinmerac, quinoclamine, quinofumelin, quinomethionate, quinonamid, quinothion, quinoxyfen, quintiofos, quintozene, quizalofop, quizalofop-P, quwenzhi, quyingding, rabenzazole, rafoxanide, R-diniconazole, rebemide, reglone, renriduron, rescalure, resmethrin, rhodethanil, rhodojaponin-III, ribavirin, rimsulfuron, rizazole, R-metalaxyl, rodéthanil, ronnel, rotenone, ryania, sabadilla, saflufenacil, saijunmao, saisentong, salicylanilide, salifluofen, sanguinarine, santonin, sarolaner, S-bioallethrin, schradan, scilliroside, sebuthylazine, secbumeton, sedaxane, selamectin, semiamitraz, sesamex, sesamolin, sesone, sethoxydim, sevin, shuangjiaancaolin, shuangjianancaolin, S-hydroprene, siduron, sifumijvzhi, siglure, silafluofen, silatrane, silica aerogel, silica gel, silthiofam, silthiopham, silthiophan, silvex, simazine, simeconazole, simeton, simetryn, simetryne, sintofen, S-kinoprene, slaked lime, SMA, S-methoprene, S-metolachlor, sodium arsenite, sodium azide, sodium chlorate, sodium cyanide, sodium fluoride, sodium fluoroacetate, sodium hexafluorosilicate, sodium naphthenate, sodium o-phenylphenoxide, sodium orthophenylphenoxide, sodium pentachlorophenate, sodium pentachlorophenoxide, sodium polysulfide, sodium silicofluoride, sodium tetrathiocarbonate, sodium thiocyanate, solan, sophamide, spinetoram, spinosad, spirodiclofen, spiromesifen, spiropidion, spirotetramat, spiroxamine, stirofos, streptomycin, strychnine, sulcatol, sulcofuron, sulcotrione, sulfallate, sulfentrazone, sulfiram, sulfluramid, sulfodiazole, sulfometuron, sulfosate, sulfosulfuron, sulfotep, sulfotepp, sulfoxaflor, sulfoxide, sulfoxime, sulfur, sulfuric acid, sulfuryl fluoride, sulglycapin, sulphosate, sulprofos, sultropen, swep, tau-fluvalinate, tavron, tazimcarb, TBTO, TBZ, TCA, TCBA, TCMTB, TCNB, TDE, tebuconazole, tebufenozide, tebufenpyrad, tebufloquin, tebupirimfos, tebutam, tebuthiuron, tecloftalam, tecnazene, tecoram, tedion, teflubenzuron, tefluthrin, tefuryltrione, tembotrione, temefos, temephos, tepa, TEPP, tepraloxydim, teproloxydim, terallethrin, terbacil, terbucarb, terbuchlor, terbufos, terbumeton, terbuthylazine, terbutol, terbutryn, terbutryne, terraclor, terramicin, terramycin, tetcyclacis, tetflupyrolimet, tetrachlorantraniliprole, tetrachloroethane, tetrachlorvinphos, tetraconazole, tetradifon, tetradisul, tetrafluron, tetramethrin, tetramethylfluthrin, tetramine, tetranactin, tetraniliprole, tetrapion, tetrasul, thallium sulfate, thallous sulfate, thenylchlor, theta-cypermethrin, thiabendazole, thiacloprid, thiadiazine, thiadifluor, thiamethoxam, thiameturon, thiapronil, thiazafluron, thiazfluron, thiazone, thiazopyr, thicrofos, thicyofen, thidiazimin, thidiazuron, thiencarbazone, thifensulfuron, thifluzamide, thimerosal, thimet, thiobencarb, thiocarboxime, thiochlorfenphim, thiochlorphenphime, thiocyanatodinitrobenzenes, thiocyclam, thiodan, thiodiazole-copper, thiodicarb, thiofanocarb, thiofanox, thiofluximate, thiohempa, thiomersal, thiometon, thionazin, thiophanate, thiophanate-ethyl, thiophanate-methyl, thiophos, thioquinox, thiosemicarbazide, thiosultap, thiotepa, thioxamyl, thiram, thiuram, thuringiensin, tiabendazole, tiadinil, tiafenacil, tiaojiean, TIBA, tifatol, tiocarbazil, tioclorim, tioxazafen, tioxymid, tirpate, TMTD, tolclofos-methyl, tolfenpyrad, tolprocarb, tolpyralate, tolyfluanid, tolylfluanid, tolylmercury acetate, tomarin, topramezone, toxaphene, TPN, tralkoxydim, tralocythrin, tralomethrin, tralopyril, transfluthrin, transpermethrin, tretamine, triacontanol, triadimefon, triadimenol, triafamone, triallate, triallate, triamiphos, triapenthenol, triarathene, triarimol, triasulfuron, triazamate, triazbutil, triaziflam, triazophos, triazothion, triazoxide, tribasic copper chloride, tribasic copper sulfate, tribenuron, tribufos, tributyltin oxide, tricamba, trichlamide, trichlopyr, trichlorfon, trichlormetaphos-3, trichloronat, trichloronate, trichlorotrinitrobenzenes, trichlorphon, triclopyr, triclopyricarb, tricresol, tricyclazole, tricyclohexyltin hydroxide, tridemorph, tridiphane, trietazine, trifenmorph, trifenofos, trifloxystrobin, trifloxysulfuron, trifludimoxazin, triflumezopyrim, triflumizole, triflumuron, trifluralin, triflusulfuron, trifop, trifopsime, triforine, trihydroxytriazine, trimedlure, trimethacarb, trimeturon, trinexapac, triphenyltin, triprene, tripropindan, triptolide, tritac, trithialan, triticonazole, tritosulfuron, trunc-call, tuoyelin, tyclopyrazoflor, uniconazole, uniconazole-P, urbacide, uredepa, valerate, validamycin, validamycin A, valifenalate, valone, vamidothion, vangard, vaniliprole, vernolate, vinclozolin, vitamin D3, warfarin, xiaochongliulin, xinjunan, xiwojunan, xiwojunzhi, XMC, xylachlor, xylenols, xylylcarb, xymiazole, yishijing, zarilamid, zeatin, zengxiaoan, zengxiaolin, zeta-cypermethrin, zinc naphthenate, zinc phosphide, zinc thiazole, zinc thiozole, zinc trichlorophenate, zinc trichlorophenoxide, zineb, ziram, zolaprofos, zoocoumarin, zoxamide, zuoanjunzhi, zuocaoan, zuojunzhi, zuomihuanglong, α-chlorohydrin, α-ecdysone, α-multistriatin, α-naphthaleneacetic acids, and β-ecdysone;

(2) the following molecules in Table A

Table A - Structure of M# - active ingredients	
M#	Structure
M1	
M2	
M3	
M4	

[0024] As used in this disclosure, each of the above is an active ingredient. For more information consult the **"Compendium of Pesticide Common Names"** located at **Alanwood.net** and various editions, including the on-line edition, of **"The Pesticide Manual"** located at **bcpcdata.com.**

[0025] A particularly preferred selection of active ingredients are 1,3-dichloropropene, chlorantraniliprole, chlorpyrifos, hexaflumuron, methomyl, methoxyfenozide, noviflumuron, oxamyl, spinetoram, spinosad, sulfoxaflor, and triflumezopyrim (hereafter **"AIGA-2")** .

[0026] Additionally, another particularly preferred selection of active ingredients are acequinocyl, acetamiprid, acetoprole, avermectin, azinphos-methyl, bifenazate, bifenthrin, carbaryl, carbofuran, chlorfenapyr, chlorfluazuron, chromafenozide, clothianidin, cyfluthrin, cypermethrin, deltamethrin, diafenthiuron, emamectin benzoate, endosulfan, esfenvalerate, ethiprole, etoxazole, fipronil, flonicamid, fluacrypyrim, *gamma*-cyhalothrin, halofenozide, indoxacarb, *lambda*-cyhalothrin, lufenuron, malathion, methomyl, novaluron, permethrin, pyridalyl, pyrimidifen, spirodiclofen, tebufenozide, thiacloprid, thiamethoxam, thiodicarb, tolfenpyrad, and *zeta*-cypermethrin (hereafter **"AIGA-3").**

[0027] The term **"alkenyl"** means an acyclic, unsaturated (at least one carbon-carbon double bond), branched or unbranched, substituent consisting of carbon and hydrogen, for example, vinyl, allyl, butenyl, pentenyl, and hexenyl.

[0028] The term **"alkenyloxy"** means an alkenyl further consisting of a carbon-oxygen single bond, for example, allyloxy, butenyloxy, pentenyloxy, hexenyloxy.

[0029] The term **"alkoxy"** means an alkyl further consisting of a carbon-oxygen single bond, for example, methoxy, ethoxy, propoxy, isopropoxy, butoxy, isobutoxy, and *tert*-butoxy.

[0030] The term **"alkyl"** means an acyclic, saturated, branched or unbranched, substituent consisting of carbon and hydrogen, for example, methyl, ethyl, propyl, isopropyl, butyl, and tert-butyl.

[0031] The term **"alkynyl"** means an acyclic, unsaturated (at least one carbon-carbon triple bond), branched or unbranched, substituent consisting of carbon and hydrogen, for example, ethynyl, propargyl, butynyl, and pentynyl.

[0032] The term **"alkynyloxy"** means an alkynyl further consisting of a carbon-oxygen single bond, for example, pentynyloxy, hexynyloxy, heptynyloxy, and octynyloxy.

[0033] The term **"aryl"** means a cyclic, aromatic substituent consisting of hydrogen and carbon, for example, phenyl, naphthyl, and biphenyl.

[0034] The term **"biopesticide"** means a microbial biological pest control agent that, in general, is applied in a similar manner to chemical pesticides. Commonly they are bacterial, but there are also examples of fungal control agents, including *Trichoderma* spp. and *Ampelomyces quisqualis.* One well-known biopesticide example is *Bacillus* species, a bacterial disease of Lepidoptera, Coleoptera, and Diptera. Biopesticides include products based on entomopathogenic fungi (*e.g. Metarhizium anisopliae*), entomopathogenic nematodes (*e.g. Steinernema feltiae*), and entomopathogenic viruses (*e.g. Cydia pomonella* granulovirus). Other examples of entomopathogenic organisms include, but are not limited to, baculoviruses, protozoa, and Microsporidia. For the avoidance of doubt, biopesticides are active ingredients.

[0035] The term **"cycloalkenyl"** means a monocyclic or polycyclic, unsaturated (at least one carbon-carbon double bond) substituent consisting of carbon and hydrogen, for example, cyclobutenyl, cyclopentenyl, cyclohexenyl, norbornenyl, bicyclo[2.2.2]octenyl, tetrahydronaphthyl, hexahydronaphthyl, and octahydronaphthyl.

[0036] The term **"cycloalkenyloxy"** means a cycloalkenyl further consisting of a carbon-oxygen single bond, for example, cyclobutenyloxy, cyclopentenyloxy, norbornenyloxy, and bicyclo[2.2.2]octenyloxy.

[0037] The term **"cycloalkyl"** means a monocyclic or polycyclic, saturated substituent consisting of carbon and hydrogen, for example, cyclopropyl, cyclobutyl, cyclopentyl, norbornyl, bicyclo[2.2.2]octyl, and decahydronaphthyl.

[0038] The term **"cycloalkoxy"** means a cycloalkyl further consisting of a carbon-oxygen single bond, for example, cyclopropyloxy, cyclobutyloxy, cyclopentyloxy, norbornyloxy, and bicyclo[2.2.2]octyloxy.

[0039] The term **"halo"** means fluoro, chloro, bromo, and iodo.

[0040] The term **"haloalkoxy"** means an alkoxy further consisting of, from one to the maximum possible number of identical or different, halos, for example, fluoromethoxy, trifluoromethoxy, 2,2-difluoropropoxy, chloromethoxy, trichloromethoxy, 1,1,2,2-tetrafluoroethoxy, and pentafluoroethoxy.

[0041] The term **"haloalkyl"** means an alkyl further consisting of, from one to the maximum possible number of, identical or different, halos, for example, fluoromethyl, trifluoromethyl, 2,2-difluoropropyl, chloromethyl, trichloromethyl, and 1,1,2,2-tetrafluoroethyl.

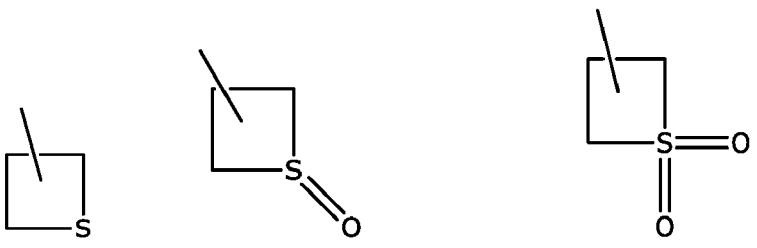
[0042] The term **"heterocyclyl"** means a cyclic substituent that may be aromatic, fully saturated, or partially or fully unsaturated, where the cyclic structure contains at least one carbon and at least one heteroatom, where said heteroatom is nitrogen, sulfur, or oxygen. Examples are:

(1) aromatic heterocyclyl substituents include, but are not limited to, benzofuranyl, benzoisothiazolyl, benzoisoxazolyl, benzothienyl, benzothiazolyl, benzoxazolyl, cinnolinyl, furanyl, imidazolyl, indazolyl, indolyl, isoindolyl, isoquinolinyl, isothiazolyl, isoxazolyl, oxadiazolyl, oxazolinyl, oxazolyl, phthalazinyl, pyrazinyl, pyrazolinyl, pyrazolyl, pyridazinyl, pyridyl, pyrimidinyl, pyrrolyl, quinazolinyl, quinolinyl, quinoxalinyl, tetrazolyl, thiazolinyl, thiazolyl, thienyl, triazinyl, and triazolyl;

(2) fully saturated heterocyclyl substituents include, but are not limited to, piperazinyl, piperidinyl, morpholinyl, pyrrolidinyl, tetrahydrofuranyl, and tetra hydropyranyl;

(3) partially or fully unsaturated heterocyclyl substituents include, but are not limited to, 4,5-dihydro-isoxazolyl, 4,5-dihydro-oxazolyl, 4,5-dihydro-1*H*-pyrazolyl, 2,3-dihydro-[1,3,4]-oxadiazolyl, and 1,2,3,4-tetrahydro-quinolinyl; and

(4) Additional examples of heterocyclyls include the following:



thietanyl thietanyl-oxide and thietanyl-dioxide.

[0043] The term **"locus"** means a habitat, breeding ground, plant, seed, soil, material, or environment, in which a pest is growing, may grow, or may traverse. For example, a locus may be: where crops, trees, fruits, cereals, fodder species, vines, turf, and/or ornamental plants, are growing; where domesticated animals are residing; the interior or exterior surfaces of buildings (such as places where grains are stored); the materials of construction used in buildings (such as impregnated wood); and the soil around buildings.

[0044] The phrase **"MoA Material"** means an active ingredient having a mode of action ("**MoA**") as indicated in IRAC MoA Classification v. 8.3, located at irac-online.org., which describes the following groups.

(1) Acetylcholinesterase (AChE) inhibitors, includes the following active ingredients *Alanycarb, Aldicarb, Bendiocarb, Benfuracarb, Butocarboxim, Butoxycarboxim, Carbaryl, Carbofuran, Carbosulfan, Ethiofencarb, Fenobucarb, Formetanate, Furathiocarb, Isoprocarb, Methiocarb, Methomyl, Metolcarb, Oxamyl, Pirimicarb, Propoxur, Thiodicarb, Thiofanox, Triazamate, Trimethacarb, XMC, Xylylcarb, Acephate, Azamethiphos, Azinphos-ethyl, Azinphos-methyl, Cadusafos, Chlorethoxyfos, Chlorfenvinphos, Chlormephos, Chlorpyrifos, Chlorpyrifos-methyl, Coumaphos, Cyanophos, Demeton-S-methyl, Diazinon, Dichlorvos/ DDVP, Dicrotophos, Dimethoate, Dimethylvinphos, Disulfoton, EPN, Ethion, Ethoprophos, Famphur, Fenamiphos, Fenitrothion, Fenthion, Fosthiazate, Heptenophos, Isofenphos, Isoxathion, Malathion, Mecarbam, Methamidophos, Methidathion, Mevinphos, Monocrotophos, Naled, Omethoate, Oxydemeton-methyl, Parathion, Parathion-methyl, Phenthoate, Phosalone, Phorate, Phosmet, Phosphamidon, Phoxim, Profenofos, Propetamphos, Prothiofos, Pyraclofos, Pyridaphenthion, Quinalphos, Sulfotep, Tebupirimfos, Temephos, Terbufos, Tetrachlorvinphos, Thiometon, Triazophos, Trichlorfon, Vamidothion, Pirimiphos-methyl, Imicyafos, and Isopropyl O-(methoxyaminothio-phosphoryl) salicylate.*

(2) GABA-gated chloride channel antagonists, includes the following active ingredients *Chlordane, Endosulfan, Ethiprole, and Fipronil.*

(3) Sodium channel modulators, includes the following active ingredients *Acrinathrin, Allethrin, d-cis-trans Allethrin, d-trans Allethrin, Bifenthrin, Bioallethrin, Bioallethrin S-cyclopentenyl, Bioresmethrin, Cycloprothrin, Cyfluthrin, beta-Cyfluthrin, Cyhalothrin, lambda-Cyhalothrin, gamma-Cyhalothrin, Cypermethrin, alpha-Cypermethrin, beta-Cypermethrin, theta-Cypermethrin, zeta-Cypermethrin, Cyphenothrin [(1R)-trans- isomers], Deltamethrin, Empenthrin [(EZ)- (1R)- isomers), Esfenvalerate, Etofenprox, Fenpropathrin, Fenvalerate, Flucythrinate, Flumethrin, tau-Fluvalinate, Kadethrin, Pyrethrins (pyrethrum), Halfenprox, Phenothrin [(1R)-transisomer), Prallethrin, Resmethrin, Silafluofen, Tefluthrin, Tetramethrin, Tetramethrin [(1R)- isomers), Tralomethrin, Transfluthrin, Permethrin, DDT, and Methoxychlor.*

(4) Nicotinic acetylcholine receptor (nAChR) agonists, includes the following active ingredients

(4A) *Acetamiprid, Clothianidin, Dinotefuran, Imidacloprid, Nitenpyram, Thiacloprid, Thiamethoxam*
(4B) *Nicotine,*
(4C) *Sulfoxaflor,*
(4D) *Flupyradifurone, and*
(4E) *Triflumezopyrim.*

(5) Nicotinic acetylcholine receptor (nAChR) allosteric activators, includes the following active ingredients *Spinetoram and Spinosad.*

(6) Chloride channel activators, includes the following active ingredients *Abamectin, Emamectin benzoate, Lepimectin, and Milbemectin.*

(7) Juvenile hormone mimics, includes the following active ingredients *Hydroprene, Kinoprene, Methoprene, Fenoxycarb, and Pyriproxyfen.*

(8) Miscellaneous nonspecific (multi-site) inhibitors, includes the following active ingredients *Methyl Bromide, Chloropicrin, Cryolite, Sulfuryl fluoride, Borax, Boric acid, Disodium octaborate, Sodium borate, Sodium metaborate, Tartar emetic, Diazomet, and Metam.*

(9) Chordotonal organ TRPV channel modulators, includes the following active ingredients *Pymetrozine and Pyrifluquinazon.*

(10) Mite growth inhibitors, includes the following active ingredients *Clofentezine, Hexythiazox, Diflovidazin, and Etoxazole.*

(11) Microbial disruptors of insect midgut membranes, includes the following active ingredients *B.t. var. israelensis, B.t. var. aizawai, B.t. var. kurstaki, B.t. var. tenebrionenis, and Bacillus sphaericus.*

(12) Inhibitors of mitochondrial ATP synthase, includes the following active ingredients *Tetradifon, Propargite, Azocyclotin, Cyhexatin, Fenbutatin oxide, and Diafenthiuron.*

(13) Uncouplers of oxidative phosphorylation via disruption of the proton gradient, includes the following

active ingredients *Chlorfenapyr, DNOC, and Sulfluramid.*

(14) Nicotinic acetylcholine receptor (nAChR) channel blockers, includes the following active ingredients *Bensultap, Cartap hydrochloride, Thiocyclam, and Thiosultap -sodium.*

(15) Inhibitors of chitin biosynthesis, type 0, includes the following active ingredients *Bistrifluron, Chlorfluazuron, Diflubenzuron, Flucycloxuron, Flufenoxuron, Hexaflumuron, Lufenuron, Novaluron, Noviflumuron, Teflubenzuron, and Triflumuron.*

(16) Inhibitors of chitin biosynthesis, type 1, includes the following active ingredient *Buprofezin.*

(17) Moulting disruptor, Dipteran, includes the following active ingredient Cyromazine.

(18) Ecdysone receptor agonists, includes the following active ingredients *Chromafenozide, Halofenozide, Methoxyfenozide, and Tebufenozide.*

(19) Octopamine receptor agonists, includes the following active ingredient *Amitraz.*

(20) Mitochondrial complex III electron transport inhibitors, includes the following active ingredients *Hydramethylnon, Acequinocyl, Bifenazate and Fluacrypyrim.*

(21) Mitochondrial complex I electron transport inhibitors, includes the following active ingredients *Fenazaquin, Fenpyroximate, Pyrimidifen, Pyridaben, Tebufenpyrad, Tolfenpyrad, and Rotenone.*

(22) Voltage-dependent sodium channel blockers, includes the following active ingredients *Indoxacarb and Metaflumizone.*

(23) Inhibitors of acetyl CoA carboxylase, includes the following active ingredients *Spirodiclofen, Spiromesifen, and Spirotetramat.*

(24) Mitochondrial complex IV electron transport inhibitors, includes the following active ingredients, *Aluminium phosphide, Calcium phosphide, Phosphine, Zinc phosphide, and Cyanide.*

(25) Mitochondrial complex II electron transport inhibitors, includes the following active ingredients *Cyenopyrafen, Cyflumetofen, and Pyflubumide.*

(28) Ryanodine receptor modulators, includes the following active ingredients *Chlorantraniliprole, Cyantraniliprole, and Flubendiamide.*

(29) Chordotonal Organ Modulators - undefined target site, includes the following active ingredient *Flonicamid.*

[0045] Groups 26 and 27 are unassigned in this version of the classification scheme. Additionally, there is a **Group UN** that contains active ingredients of unknown or uncertain mode of action. This group includes the following active ingredients, *Azadirachtin, Benzoximate, Bromopropylate, Chinomethionat, Dicofol, GS-omega/kappa HXTX-Hvla peptide, Lime Sulfur, Pyridalyl, and Sulfur.*

[0046] The term **"pest"** means an organism that is detrimental to humans, or human concerns (such as, crops, food, livestock, etc.), where said organism is from Phyla Arthropoda, Mollusca, or Nematoda. Particular examples are ants, aphids, bed bugs, beetles, bristletails, caterpillars, cockroaches, crickets, earwigs, fleas, flies, grasshoppers, grubs, hornets, jassids, leafhoppers, lice, locusts, maggots, mealybugs, mites, moths, nematodes, plantbugs, planthoppers, psyllids, sawflies, scales, silverfish, slugs, snails, spiders, springtails, stink bugs, symphylans, termites, thrips, ticks, wasps, whiteflies, and wireworms.

[0047] Additional examples are pests in

(1) Subphyla Chelicerata, Myriapoda, and Hexapoda.

(2) Classes of Arachnida, Symphyla, and Insecta.

(3) Order Anoplura. A non-exhaustive list of particular genera includes, but is not limited to, *Haematopinus* spp., *Hoplopleura* spp., *Linognathus* spp., *Pediculus* spp., *Polyplax* spp., *Solenopotes* spp., and *Neohaematopinis* spp. A non-exhaustive list of particular species includes, but is not limited to, *Haematopinus asini, Haematopinus suis, Linognathus setosus, Linognathus ovillus, Pediculus humanus capitis, Pediculus humanus humanus,* and *Pthirus pubis.*

(4) Order Coleoptera. A non-exhaustive list of particular genera includes, but is not limited to, *Acanthoscelides* spp., *Agriotes* spp., *Anthonomus* spp., *Apion* spp., *Apogonia* spp., *Araecerus* spp., *Aulacophora* spp., *Bruchus* spp., *Cerosterna* spp., *Cerotoma* spp., *Ceutorhynchus* spp., *Chaetocnema* spp., *Colaspis* spp., *Ctenicera* spp., *Curculio* spp., *Cyclocephala* spp., *Diabrotica* spp., *Dinoderus* spp., *Gnathocerus* spp., *Hemicoelus* spp., *Heterobostruchus* spp., *Hypera* spp., *Ips* spp., *Lyctus* spp., *Megascelis* spp., *Meligethes* spp., *Mezium* spp., *Niptus* spp., *Otiorhynchus* spp., *Pantomorus* spp., *Phyllophaga* spp., *Phyllotreta* spp., *Ptinus* spp., *Rhizotrogus* spp., *Rhynchites* spp., *Rhynchophorus* spp., *Scolytus* spp., *Sphenophorus* spp., *Sitophilus* spp., *Tenebrio* spp., and *Tribolium* spp. A non-exhaustive list of particular species includes, but is not limited to, *Acanthoscelides obtectus, Agrilus planipennis, Ahasverus advena, Alphitobius diaperinus, Anoplophora glabripennis, Anthonomus grandis, Anthrenus verbasci, Anthrenus falvipes, Ataenius spretulus, Atomaria linearis, Attagenus unicolor, Bothynoderes punctiventris, Bruchus pisorum, Callosobruchus maculatus, Carpophilus hemipterus, Cassida vittata, Cathartus quadricollis, Cerotoma trifurcata, Ceutorhynchus assimilis, Ceutorhynchus napi, Conoderus scalaris, Conoderus stigmosus, Conotrachelus*

nenuphar, Cotinis nitida, Crioceris asparagi, Cryptolestes ferrugineus, Cryptolestes pusillus, Cryptolestes turcicus, Cylindrocopturus adspersus, Deporaus marginatus, Dermestes lardarius, Dermestes maculatus, Epilachna varivestis, Euvrilletta peltata, Faustinus cubae, Hylobius pales, Hylotrupes bajulus, Hypera postica, Hypothenemus hampei, Lasioderma serricorne, Leptinotarsa decemlineata, Limonius canus, Liogenys fuscus, Liogenys suturalis, Lissorhoptrus oryzophilus, Lophocateres pusillus, Lyctus planicollis, Maecolaspis joliveti, Melanotus communis, Meligethes aeneus, Melolontha melolontha, Necrobia rufipes, Oberea brevis, Oberea linearis, Oryctes rhinoceros, Oryzaephilus mercator, Oryzaephilus surinamensis, Oulema melanopus, Oulema oryzae, Phyllophaga cuyabana, Polycaon stoutti, Popillia japonica, Prostephanus truncatus, Rhyzopertha dominica, Sitona lineatus, Sitophilus granarius, Sitophilus oryzae, Sitophilus zeamais, Stegobium paniceum, Tenebroides mauritanicus, Tribolium castaneum, Tribolium confusum, Trogoderma granarium, Trogoderma variabile, Xestobium rufovillosum, and *Zabrus tenebrioides.*

(5) Order Dermaptera. A non-exhaustive list of particular species includes, but is not limited to, *Forficula auricularia.*

(6) Order Blattaria. A non-exhaustive list of particular species includes, but is not limited to, *Blattella germanica, Blattella asahinai, Blatta orientalis, Blatta lateralis, Parcoblatta pennsylvanica, Periplaneta americana, Periplaneta australasiae, Periplaneta brunnea, Periplaneta fuliginosa, Pycnoscelus surinamensis,* and *Supella longipalpa.*

(7) Order Diptera. A non-exhaustive list of particular genera includes, but is not limited to, *Aedes* spp., *Agromyza* spp., *Anastrepha* spp., *Anopheles* spp., *Bactrocera* spp., *Ceratitis* spp., *Chrysops* spp., *Cochliomyia* spp., *Contarinia* spp., *Culex* spp., *Culicoides* spp., *Dasineura* spp., *Delia* spp., *Drosophila* spp., *Fannia* spp., *Hylemya* spp., *Liriomyza* spp., *Musca* spp., *Phorbia* spp., *Pollenia* spp., *Psychoda* spp., *Simulium* spp., *Tabanus* spp., and *Tipula* spp. A non-exhaustive list of particular species includes, but is not limited to, *Agromyza frontella, Anastrepha suspensa, Anastrepha ludens, Anastrepha obliqua, Bactrocera cucurbitae, Bactrocera dorsalis, Bactrocera invadens, Bactrocera zonata, Ceratitis capitata, Dasineura brassicae, Delia platura, Fannia canicularis, Fannia scalaris, Gasterophilus intestinalis, Gracillia perseae, Haematobia irritans, Hypoderma lineatum, Liriomyza brassicae, Liriomyza sativa, Melophagus ovinus, Musca autumnalis, Musca domestica, Oestrus ovis, Oscinella frit, Pegomya betae, Piophila casei, Psila rosae, Rhagoletis cerasi, Rhagoletis pomonella, Rhagoletis mendax, Sitodiplosis mosellana,* and *Stomoxys calcitrans.*

(8) Order Hemiptera. A non-exhaustive list of particular genera includes, but is not limited to, *Adelges* spp., *Aulacaspis* spp., *Aphrophora* spp., *Aphis* spp., *Bemisia* spp., *Ceroplastes* spp., *Chionaspis* spp., *Chrysomphalus* spp., *Coccus* spp., *Empoasca* spp., *Euschistus* spp., *Lepidosaphes* spp., *Lagynotomus* spp., *Lygus* spp., *Macrosiphum* spp., *Nephotettix* spp., *Nezara* spp., *Nilaparvata* spp., *Philaenus* spp., *Phytocoris* spp., *Piezodorus* spp., *Planococcus* spp., *Pseudococcus* spp., *Rhopalosiphum* spp., *Saissetia* spp., *Therioaphis* spp., *Toumeyella* spp., *Toxoptera* spp., *Trialeurodes* spp., *Triatoma* spp., and *Unaspis* spp. A non-exhaustive list of particular species includes, but is not limited to, *Acrosternum hilare, Acyrthosiphon pisum, Aleyrodes proletella, Aleurodicus dispersus, Aleurothrixus floccosus, Amrasca biguttula biguttula, Aonidiella aurantii, Aphis fabae, Aphis gossypii, Aphis glycines, Aphis pomi, Aulacorthum solani, Bactericera cockerelli, Bagrada hilaris, Bemisia argentifolii, Bemisia tabaci, Blissus leucopterus, Boisea trivittata, Brachycorynella asparagi, Brevennia rehi, Brevicoryne brassicae, Cacopsylla pyri, Cacopsylla pyricola, Calocoris norvegicus, Ceroplastes rubens, Cimex hemipterus, Cimex lectularius, Coccus pseudomagnoliarum, Dagbertus fasciatus, Dichelops furcatus, Diuraphis noxia, Diaphorina citri, Dysaphis plantaginea, Dysdercus suturellus, Edessa meditabunda, Empoasca vitis, Eriosoma lanigerum, Erythroneura elegantula, Eurygaster maura, Euschistus conspersus, Euschistus heros, Euschistus servus, Halyomorpha halys, Helopeltis antonii, Hyalopterus pruni, Helopeltis antonii, Helopeltis theivora, Icerya purchasi, Idioscopus nitidulus, Jacobiasca formosana, Laodelphax striatellus, Lecanium corni, Leptocorisa oratorius, Leptocorisa varicornis, Lygus hesperus, Maconellicoccus hirsutus, Macrosiphum euphorbiae, Macrosiphum granarium, Macrosiphum rosae, Macrosteles quadrilineatus, Mahanarva frimbiolata, Megacopta cribraria, Metopolophium dirhodum, Mictis longicornis, Myzus persicae, Nasonovia ribisnigri, Nephotettix cincticeps, Neurocolpus longirostris, Nezara viridula, Nilaparvata lugens, Paracoccus marginatus, Paratrioza cockerelli, Parlatoria pergandii, Parlatoria ziziphi, Peregrinus maidis, Phylloxera vitifoliae, Physokermes piceae, Phytocoris californicus, Phytocoris relativus, Piezodorus guildinii, Planococcus citri, Planococcus ficus, Poecilocapsus lineatus, Psallus vaccinicola, Pseudacysta perseae, Pseudococcus brevipes, Quadraspidiotus perniciosus, Rhopalosiphum maidis, Rhopalosiphum padi, Saissetia oleae, Scaptocoris castanea, Schizaphis graminum, Sitobion avenae, Sogatella furcifera, Trialeurodes vaporariorum, Trialeurodes abutiloneus, Unaspis yanonensis,* and *Zulia entrerriana.*

(9) Order Hymenoptera. A non-exhaustive list of particular genera includes, but is not limited to, *Acromyrmex* spp., *Atta* spp., *Camponotus* spp., *Diprion* spp., *Dolichovespula* spp., *Formica* spp., *Monomorium* spp., *Neodiprion* spp., *Paratrechina* spp., *Pheidole* spp., *Pogonomyrmex* spp., *Polistes* spp., *Solenopsis* spp., *Technomyrmex,* spp., *Tetramorium* spp., *Vespula* spp., *Vespa* spp., and *Xylocopa* spp. A non-exhaustive list of particular species includes, but is not limited to, *Athalia rosae, Atta texana, Caliroa cerasi, Cimbex americana, Iridomyrmex humilis, Linepithema humile, Mellifera Scutellata, Monomorium minimum, Monomorium pharaonis, Neodiprion sertifer, Solenopsis invicta, Solenopsis geminata, Solenopsis molesta, Solenopsis richtery, Solenopsis xyloni, Tapinoma sessile,* and *Wasmannia auropunctata.*

(10) Order Isoptera. A non-exhaustive list of particular genera includes, but is not limited to, *Coptotermes* spp., *Cornitermes* spp., *Cryptotermes* spp., *Heterotermes* spp., *Kalotermes* spp., *Incisitermes* spp., *Macrotermes* spp., *Marginitermes* spp., *Microcerotermes* spp., *Procornitermes* spp., *Reticulitermes* spp., *Schedorhinotermes* spp., and *Zootermopsis* spp. A non-exhaustive list of particular species includes, but is not limited to, *Coptotermes acinaciformis, Coptotermes curvignathus, Coptotermes frenchi, Coptotermes formosanus, Coptotermes gestroi, Cryptotermes brevis, Heterotermes aureus, Heterotermes tenuis, Incisitermes minor, Incisitermes snyderi, Microtermes obesi, Nasutitermes corniger, Odontotermes formosanus, Odontotermes obesus, Reticulitermes banyulensis, Reticulitermes grassei, Reticulitermes flavipes, Reticulitermes hageni, Reticulitermes hesperus, Reticulitermes santonensis, Reticulitermes speratus, Reticulitermes tibialis,* and *Reticulitermes virginicus.*

(11) Order Lepidoptera. A non-exhaustive list of particular genera includes, but is not limited to, *Adoxophyes* spp., *Agrotis* spp., *Argyrotaenia* spp., *Cacoecia* spp., *Caloptilia* spp., *Chilo* spp., *Chrysodeixis* spp., *Colias* spp., *Crambus* spp., *Diaphania* spp., *Diatraea* spp., *Earias* spp., *Ephestia* spp., *Epimecis* spp., *Feltia* spp., *Gortyna* spp., *Helicoverpa* spp., *Heliothis* spp., *Indarbela* spp., *Lithocolletis* spp., *Loxagrotis* spp., *Malacosoma* spp., *Nemapogon* spp., *Peridroma* spp., *Phyllonorycter* spp., *Pseudaletia* spp., *Plutella* spp., *Sesamia* spp., *Spodoptera* spp., *Synanthedon* spp., and *Yponomeuta* spp. A non-exhaustive list of particular species includes, but is not limited to, *Achaea janata, Adoxophyes orana, Agrotis ipsilon, Alabama argillacea, Amorbia cuneana, Amyelois transitella, Anacamptodes defectaria, Anarsia lineatella, Anomis sabulifera, Anticarsia gemmatalis, Archips argyrospila, Archips rosana, Argyrotaenia citrana, Autographa gamma, Bonagota cranaodes, Borbo cinnara, Bucculatrix thurberiella, Capua reticulana, Carposina niponensis, Chlumetia transversa, Choristoneura rosaceana, Cnaphalocrocis medinalis, Conopomorpha cramerella, Corcyra cephalonica, Cossus cossus, Cydia caryana, Cydia funebrana, Cydia molesta, Cydia nigricana, Cydia pomonella, Darna diducta, Diaphania nitidalis, Diatraea saccharalis, Diatraea grandiosella, Earias insulana, Earias vittella, Ecdytolopha aurantianum, Elasmopalpus lignosellus, Ephestia cautella, Ephestia elutella, Ephestia kuehniella, Epinotia aporema, Epiphyas postvittana, Erionota thrax, Estigmene acrea, Eupoecilia ambiguella, Euxoa auxiliaris, Galleria mellonella, Grapholita molesta, Hedylepta indicata, Helicoverpa armigera, Helicoverpa zea, Heliothis virescens, Hellula undalis, Keiferia lycopersicella, Leucinodes orbonalis, Leucoptera coffeella, Leucoptera malifoliella, Lobesia botrana, Loxagrotis albicosta, Lymantria dispar, Lyonetia clerkella, Mahasena corbetti, Mamestra brassicae, Manduca sexta, Maruca testulalis, Metisa plana, Mythimna unipuncta, Neoleucinodes elegantalis, Nymphula depunctalis, Operophtera brumata, Ostrinia nubilalis, Oxydia vesulia, Pandemis cerasana, Pandemis heparana, Papilio demodocus, Pectinophora gossypiella, Peridroma saucia, Perileucoptera coffeella, Phthorimaea operculella, Phyllocnistis citrella, Phyllonorycter blancardella, Pieris rapae, Plathypena scabra, Platynota idaeusalis, Plodia interpunctella, Plutella xylostella, Polychrosis viteana, Prays endocarpa, Prays oleae, Pseudaletia unipuncta, Pseudoplusia includens, Rachiplusia nu, Scirpophaga incertulas, Sesamia inferens, Sesamia nonagrioides, Setora nitens, Sitotroga cerealella, Sparganothis pilleriana, Spodoptera exigua, Spodoptera frugiperda, Spodoptera eridania, Theda basilides, Tinea pellionella, Tineola bisselliella, Trichoplusia ni, Tuta absoluta, Zeuzera coffeae,* and *Zeuzea pyrina.*

(12) Order Mallophaga. A non-exhaustive list of particular genera includes, but is not limited to, *Anaticola* spp., *Bovicola* spp., *Chelopistes* spp., *Goniodes* spp., *Menacanthus* spp., and *Trichodectes* spp. A non-exhaustive list of particular species includes, but is not limited to, *Bovicola bovis, Bovicola caprae, Bovicola ovis, Chelopistes meleagridis, Goniodes dissimilis, Goniodes gigas, Menacanthus stramineus, Menopon gallinae,* and *Trichodectes canis.*

(13) Order Orthoptera. A non-exhaustive list of particular genera includes, but is not limited to, *Melanoplus* spp. and *Pterophylla* spp. A non-exhaustive list of particular species includes, but is not limited to, *Acheta domesticus, Anabrus simplex, Gryllotalpa africana, Gryllotalpa australis, Gryllotalpa brachyptera, Gryllotalpa hexadactyla, Locusta migratoria, Microcentrum retinerve, Schistocerca gregaria,* and *Scudderia furcata.*

(14) Order Psocoptera. A non-exhaustive list of particular species includes, but is not limited to, *Liposcelis decolor, Liposcelis entomophila, Lachesilla quercus,* and *Trogium pulsatorium.*

(15) Order Siphonaptera. A non-exhaustive list of particular species includes, but is not limited to, *Ceratophyllus gallinae, Ceratophyllus niger, Ctenocephalides canis, Ctenocephalides felis,* and *Pulex irritans.*

(16) Order Thysanoptera. A non-exhaustive list of particular genera includes, but is not limited to, *Caliothrips* spp., *Frankliniella* spp., *Scirtothrips* spp., and *Thrips* spp. A non-exhaustive list of particular species includes, but is not limited to, *Caliothrips phaseoli, Frankliniella bispinosa, Frankliniella fusca, Frankliniella occidentalis, Frankliniella schultzei, Frankliniella tritici, Frankliniella williamsi, Heliothrips haemorrhoidalis, Rhipiphorothrips cruentatus, Scirtothrips citri, Scirtothrips dorsalis, Taeniothrips rhopalantennalis, Thrips hawaiiensis, Thrips nigropilosus, Thrips orientalis, Thrips palmi,* and *Thrips tabaci.*

(17) Order Thysanura. A non-exhaustive list of particular genera includes, but is not limited to, *Lepisma* spp. and *Thermobia* spp.

(18) Order Acarina. A non-exhaustive list of particular genera includes, but is not limited to, *Acarus* spp., *Aculops* spp., *Argus* spp., *Boophilus* spp., *Demodex* spp., *Dermacentor* spp., *Epitrimerus* spp., *Eriophyes* spp., *Ixodes* spp., *Oligonychus* spp., *Panonychus* spp., *Rhizoglyphus* spp., and *Tetranychus* spp. A non-exhaustive list of particular

species includes, but is not limited to, *Acarapis woodi, Acarus siro, Aceria mangiferae, Aculops lycopersici, Aculus pelekassi, Aculus schlechtendali, Amblyomma americanum, Brevipalpus obovatus, Brevipalpus phoenicis, Dermacentor variabilis, Dermatophagoides pteronyssinus, Eotetranychus carpini, Liponyssoides sanguineus, Notoedres cati, Oligonychus coffeae, Oligonychus ilicis, Ornithonyssus bacoti, Panonychus citri, Panonychus ulmi, Phyllocoptruta oleivora, Polyphagotarsonemus latus, Rhipicephalus sanguineus, Sarcoptes scabiei, Tegolophus perseaflorae, Tetranychus urticae, Tyrophagus longior,* and *Varroa destructor.*

(19) Order Araneae. A non-exhaustive list of particular genera includes, but is not limited to, *Loxosceles* spp., *Latrodectus* spp., and *Atrax* spp. A non-exhaustive list of particular species includes, but is not limited to, *Loxosceles reclusa, Latrodectus mactans,* and *Atrax robustus.*

(20) Class Symphyla. A non-exhaustive list of particular species includes, but is not limited to, *Scutigerella immaculata.*

(21) Subclass Collembola. A non-exhaustive list of particular species includes, but is not limited to, *Bourletiella hortensis, Onychiurus armatus, Onychiurus fimetarius,* and *Sminthurus viridis.*

(22) Phylum Nematoda. A non-exhaustive list of particular genera includes, but is not limited to, *Aphelenchoides* spp., *Belonolaimus* spp., *Criconemella* spp., *Ditylenchus* spp., *Globodera* spp., *Heterodera* spp., *Hirschmanniella* spp., *Hoplolaimus* spp., *Meloidogyne* spp., *Pratylenchus* spp., and *Radopholus* spp. A non-exhaustive list of particular species includes, but is not limited to, *Dirofilaria immitis, Globodera pallida, Heterodera glycines, Heterodera zeae, Meloidogyne incognita, Meloidogyne javanica, Onchocerca volvulus, Pratylenchus penetrans, Radopholus similis,* and *Rotylenchulus reniformis.*

(23) Phylum Mollusca. A non-exhaustive list of particular species includes, but is not limited to, *Arion vulgaris, Cornu aspersum, Deroceras reticulatum, Limax flavus, Milax gagates,* and *Pomacea canaliculata.*

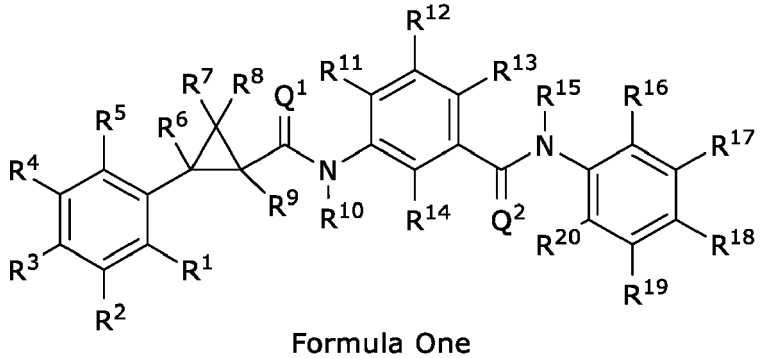
[0048] A particularly preferred pest group to control is sap-feeding pests. **Sap-feeding pests,** in general, have piercing and/or sucking mouthparts and feed on the sap and inner plant tissues of plants. Examples of sap-feeding pests of particular concern to agriculture include, but are not limited to, aphids, leafhoppers, moths, scales, thrips, psyllids, mealybugs, stinkbugs, and whiteflies. Specific examples of Orders that have sap-feeding pests of concern in agriculture include but are not limited to, Anoplura and Hemiptera. Specific examples of Hemiptera that are of concern in agriculture include, but are not limited to, *Aulacaspis* spp., *Aphrophora* spp., *Aphis* spp., *Bemisia* spp., *Coccus* spp., *Euschistus* spp., *Lygus* spp., *Macrosiphum* spp., *Nezara* spp., and *Rhopalosiphum* spp.

[0049] Another particularly preferred pest group to control is chewing pests. **Chewing pests,** in general, have mouthparts that allow them to chew on the plant tissue including roots, stems, leaves, buds, and reproductive tissues (including, but not limited to flowers, fruit, and seeds). Examples of chewing pests of particular concern to agriculture include, but are not limited to, caterpillars, beetles, grasshoppers, and locusts. Specific examples of Orders that have chewing pests of concern in agriculture include but are not limited to, Coleoptera and Lepidoptera. Specific examples of Coleoptera that are of concern in agriculture include, but are not limited to, *Anthonomus* spp., *Cerotoma* spp., *Chaetocnema* spp., *Colaspis* spp., *Cyclocephala* spp., *Diabrotica* spp., *Hypera* spp., *Phyllophaga* spp., *Phyllotreta* spp., *Sphenophorus* spp., *Sitophilus* spp.

[0050] The phrase **"pesticidally effective amount"** means the amount of a pesticide needed to achieve an observable effect on a pest, for example, the effects of necrosis, death, retardation, prevention, removal, destruction, or otherwise diminishing the occurrence and/or activity of a pest in a locus. This effect may come about when pest populations are repulsed from a locus, pests are incapacitated in, or around, a locus, and/or pests are exterminated in, or around, a locus. Of course, a combination of these effects can occur. Generally, pest populations, activity, or both are desirably reduced more than fifty percent, preferably more than 90 percent, and most preferably more than 99 percent. In general, a pesticidally effective amount, for agricultural purposes, is from about 0.0001 grams per hectare to about 5000 grams per hectare, preferably from about 0.0001 grams per hectare to about 500 grams per hectare, and it is even more preferably from about 0.0001 grams per hectare to about 50 grams per hectare.

Detailed description of this invention

[0051] The present invention is directed to molecules of **Formula One**

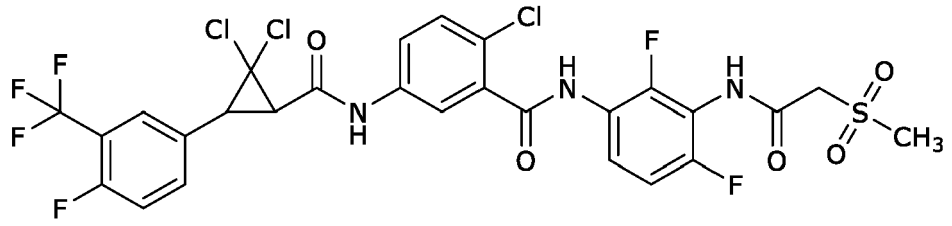


Formula One

wherein:

(A) R^1 is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, SF_5, and $(C_1\text{-}C_3)$haloalkyl;
(B) R^2 is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, SF_5, and $(C_1\text{-}C_3)$haloalkyl;
(C) R^3 is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, SF_5, and $(C_1\text{-}C_3)$haloalkyl;
(D) R^4 is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, SF_5, and $(C_1\text{-}C_3)$haloalkyl;
(E) R^5 is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, SF_5, and $(C_1\text{-}C_3)$haloalkyl;
(F) R^6 is H;
(G) R^7 is selected from the group consisting of F, C!, and Br;
(H) R^8 is selected from the group consisting of F, C!, and Br;
(I) R^9 is H;
(J) Q^1 is selected from the group consisting of O and S;
(K) Q^2 is selected from the group consisting of O and S;
(L) R^{10} is H;
(M) R^{11} is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, and $(C_1\text{-}C_3)$alkoxy;
(N) R^{12} is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, and $(C_1\text{-}C_3)$alkoxy;
(O) R^{13} is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, and $(C_1\text{-}C_3)$alkoxy;
(P) R^{14} is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, and $(C_1\text{-}C_3)$alkoxy;
(Q) R^{15} is H;
(R) R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are independently selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, NH_2, OH, SF_5, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, $(C_2\text{-}C_3)$alkenyl, $(C_2\text{-}C_3)$haloalkenyl, and $N(R^{21})C(=O)(R^{22})$, wherein at least one and no more than two of R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are $N(R^{21})C(=O)(R^{22})$;
(S) R^{21} is selected from the group consisting of H, $(C_1\text{-}C_3)$alkyl, $(C_2\text{-}C_3)$alkenyl, $(C_2\text{-}C_3)$alkynyl, $(C_1\text{-}C_3)$haloalkyl, $(C_2\text{-}C_3)$haloalkenyl, $(C_1\text{-}C_3)$alkylphenyl, $(C_1\text{-}C_3)$alkylO$(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$alkylOC(=O)$(C_1\text{-}C_3)$alkyl, C(=O)$(C_1\text{-}C_3)$alkyl, and phenyl;
(T) R^{22} is selected from the group consisting of $(C_1\text{-}C_6)$alkyl-S(=O)$_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$alkyl-S(=O)$_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$alkyl-S(=O)$_n$-aryl, $(C_1\text{-}C_6)$alkyl-S(=O)$_n$-heterocyclyl, $(C_2\text{-}C_6)$alkenyl-S(=O)$_n$-$(C_1\text{-}C_6)$alkyl, $(C_2\text{-}C_6)$alkenylS(=O)$_n$-$(C_2\text{-}C_6)$alkenyl, $(C_2\text{-}C_6)$alkenyl-S(=O)$_n$-aryl, $(C_2\text{-}C_6)$alkenyl-S(=O)$_n$-heterocyclyl,

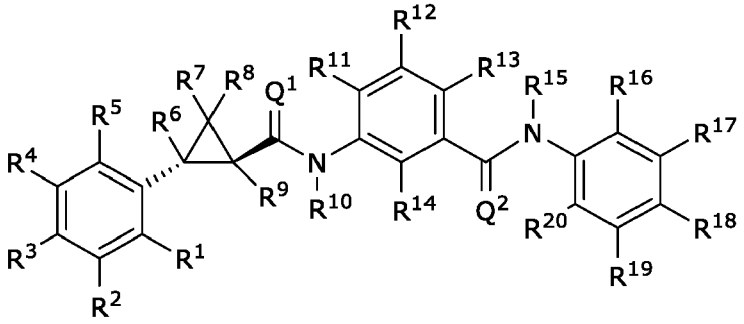
wherein n = 0, 1, or 2, and
wherein each said alkyl and alkenyl may be substituted with one or more substituents selected from the group consisting of F, C!, Br, I, CN, OH, oxo, NO_2, NH_2, NH$(C_1\text{-}C_3)$alkyl, N$((C_1\text{-}C_3)$alkyl$)_2$, O$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_3)$alkylO$(C_1\text{-}C_3)$alkyl, and $(C_3\text{-}C_6)$cycloalkyl and
wherein each said aryl and heterocyclyl may be substituted with one or more substituents selected from the group consisting of $(C_1\text{-}C_3)$alkyl, F, Cl, Br, I, CN, OH, oxo, NO_2, NH_2, NH$(C_1\text{-}C_3)$alkyl, N$((C_1\text{-}C_3)$alkyl$)_2$, O$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_3)$alkylO$(C_l\text{-}C_3)$alkyl, and $(C_3\text{-}C_6)$cycloalkyl; and
N-oxides, agriculturally acceptable salts, solvates, ester derivatives, crystal polymorphs, isotopes, resolved stereoisomers, tautomers, of the molecules of Formula One,
with the proviso that the following molecule is excluded



Molecule F1299.

[0052] The molecules of Formula One may exist in different geometric or optical isomeric or different tautomeric forms. One or more centers of chirality may be present in which case molecules of Formula One may be present as pure enantiomers, mixtures of enantiomers, pure diastereomers or mixtures of diastereomers. It will be appreciated by those skilled in the art that one stereoisomer may be more active than the other stereoisomers. Individual stereoisomers may be obtained by known selective synthetic procedures, by conventional synthetic procedures using resolved starting materials, or by conventional resolution procedures. There may be double bonds present in the molecule, in which case compounds of Formula One may exist as single geometric isomers (*cis* or *trans, E* or *Z*) or mixtures of geometric isomers (*cis* and *trans, E* and *Z*). Centers of tautomerisation may be present. This disclosure covers all such isomers, tautomers, and mixtures thereof, in all proportions. The structures disclosed in the present disclosure maybe drawn in only one geometric form for clarity, but are intended to represent all geometric forms of the molecule.

[0053] In one embodiment the molecules of Formula One, the carboxamido, and the phenyl, which are bonded to the cyclopropane, are in the *R*,*R* configuration, as shown below, in Formula Two which is a sub-set of Formula One.



Formula Two

[0054] In another embodiment a molecule according to Formula One and Formula Two wherein R^1 is selected from the group consisting of H, F, Cl, Br, SF_5, and CF_3.

[0055] In another embodiment a molecule according to Formula One and Formula Two wherein R^2 is selected from the group consisting of H, F, Cl, Br, SF_5, and CF_3.

[0056] In another embodiment a molecule according to Formula One and Formula Two wherein R^3 is selected from the group consisting of H, F, Cl, Br, SF_5, and CF_3.

[0057] In another embodiment a molecule according to Formula One and Formula Two wherein R^4 is selected from the group consisting of H, F, Cl, Br, SF_5, and CF_3.

[0058] In another embodiment a molecule according to Formula One and Formula Two wherein R^5 is selected from the group consisting of H, F, Cl, Br, SF_5, and CF_3.

[0059] In another embodiment a molecule according to Formula One and Formula Two wherein at least one of R^2, R^3, and R^4, is SF_5.

[0060] In another embodiment a molecule according to Formula One and Formula Two wherein R^7 is Cl.

[0061] In another embodiment a molecule according to Formula One and Formula Two wherein R^8 is Cl.

[0062] In another embodiment a molecule according to Formula One and Formula Two wherein R^7 and R^8 are not the same substituent.

[0063] In another embodiment a molecule according to Formula One and Formula Two wherein Q^1 is O.

[0064] In another embodiment a molecule according to Formula One and Formula Two wherein Q^2 is O.

[0065] In another embodiment a molecule according to Formula One and Formula Two wherein R^{11} is H.

[0066] In another embodiment a molecule according to Formula One and Formula Two wherein R^{12} is selected from the group consisting of H, F, Cl, CH_3, and CF_3.

[0067] In another embodiment a molecule according to Formula One and Formula Two wherein R^{13} is selected from

the group consisting of F, Cl, CH_3, and OCH_3.

[0068] In another embodiment a molecule according to Formula One and Formula Two wherein R^{14} is selected from the group consisting of H, F, and Cl.

[0069] In another embodiment a molecule according to Formula One and Formula Two wherein R^{16}, R^{18}, R^{19}, and R^{20} are independently selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, NH_2, OH, SF_5, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, $(C_2\text{-}C_3)$alkenyl, and $(C_2\text{-}C_3)$haloalkenyl, and R^{17} is $N(R^{21})C(=O)(R^{22})$.

[0070] In another embodiment a molecule according to Formula One and Formula Two wherein R^{16}, R^{17}, R^{19}, and R^{20} are independently selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, NH_2, OH, SF_5, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, $(C_2\text{-}C_3)$alkenyl, and $(C_2\text{-}C_3)$haloalkenyl, and R^{18} is $N(R^{21})C(=O)(R^{22})$.

[0071] In another embodiment a molecule according to Formula One and Formula Two wherein R^{21} is H.

[0072] In another embodiment a molecule according to Formula One and Formula Two wherein R^{22} is selected from the group consisting of $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-aryl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-heterocyclyl, wherein n = 0, 1, or 2, and wherein each said alkyl and alkenyl may be substituted with one or more substituents selected from the group consisting of F, Cl, Br, I, CN, OH, oxo, NO_2, NH_2, $NH(C_1\text{-}C_3)$alkyl, $N((C_1\text{-}C_3)\text{alkyl})_2$, $O(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_3)$alkyl$O(C_1\text{-}C_3)$alkyl, and $(C_3\text{-}C_6)$cycloalkyl and wherein each said aryl and heterocyclyl may be substituted with one or more substituents selected from the group consisting of $(C_1\text{-}C_3)$alkyl, F, Cl, Br, I, CN, OH, oxo, NO_2, NH_2, $NH(C_1\text{-}C_3)$alkyl, $N((C_1\text{-}C_3)\text{alkyl})_2$, $O(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_3)$alkyl$O(C_1\text{-}C_3)$alkyl, and $(C_3\text{-}C_6)$cycloalkyl.

[0073] In another embodiment a molecule according to Formula One and Formula Two wherein R^{22} is selected from the group consisting of $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-phenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-pyridyl, wherein n = 0, 1, or 2, and wherein each said alkyl and alkenyl may be substituted with one or more substituents selected from the group consisting of F, Cl, Br, and I, and wherein each said phenyl and pyridyl may be substituted with one or more substituents selected from the group consisting of F, Cl, Br, and I.

[0074] In another embodiment a molecule according to Formula One and Formula Two wherein:

R^1 is H;
R^2 is selected from the group consisting of H, F, Cl, and CF_3;
R^3 is selected from the group consisting of H, F, and Cl;
R^4 is selected from the group consisting of H, F, Cl, and CF_3;
R^5 is H;
R^7 is Cl;
R^8 is Cl;
Q^1 is O;
Q^2 is O;
R^{11} is H;
R12 is H;
R^{13} is Cl;
R14 is H;
R^{16} is F;
R^{17} is $N(R^{21})C(=O)(R^{22})$;
R^{18} is F;
R^{19} is H;
R^{20} is H;
R^{21} is H; and
R^{22} is selected from the group consisting of $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-phenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-pyridyl,
wherein n = 0, 1, or 2,
wherein each said alkyl, alkenyl, phenyl, and pyridyl may be substituted with one or more substituents selected from the group consisting of F and Cl.

[0075] In another embodiment a molecule according to Formula One and Formula Two wherein:

R^1 is H;
R^2 is selected from the group consisting of H, F, Cl, and CF_3;
R^3 is selected from the group consisting of H, F, and Cl;
R^4 is selected from the group consisting of H, F, Cl, and CF_3;
R^5 is H;
R^7 is Cl;

R^8 is Cl;
Q^1 is O;
Q^2 is O;
R^{11} is H;
R^{12} is H;
R^{13} is Cl;
R^{14} is H;
R^{16} is F;
R^{17} is H;
R^{18} is $N(R^{21})C(=O)(R^{22})$;
R^{19} is H;
R^{20} is H;
R^{21} is H; and
R^{22} is selected from the group consisting of $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-phenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-pyridyl,
wherein n = 0, 1, or 2,
wherein each said alkyl, alkenyl, phenyl, and pyridyl may be substituted with one or more substituents selected from the group consisting of F and Cl.

In another embodiment a molecule selected from Table 2, preferably a molecule selected from the group consisting of F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F22, F23, F24, F25, F26, F27, F28, F29, F30, F31, F32, F33, F34, F35, F37, F39, F42, F44, F45, F46, F47, F48, F49, F50, F51, and F52.

[0076] In another embodiment a molecule selected from Table 2, more preferably a molecule selected from the group consisting of F3, F5, F6, F10, F12, F13, F14, F15, F16, F17, F18, F19, F23, F27, F28, F29, F31, F32, F37, F39, F46, F47, and F49.

[0077] In another embodiment a molecules selected from Table 2, preferably a molecule selected from the group consisting of F15, F16, F17, F18, F19, F21, F23, F24, F25, F32, F34, and F46.

PREPARATION OF MOLECULES OF FORMULA ONE

Preparation of cyclopropyl amides

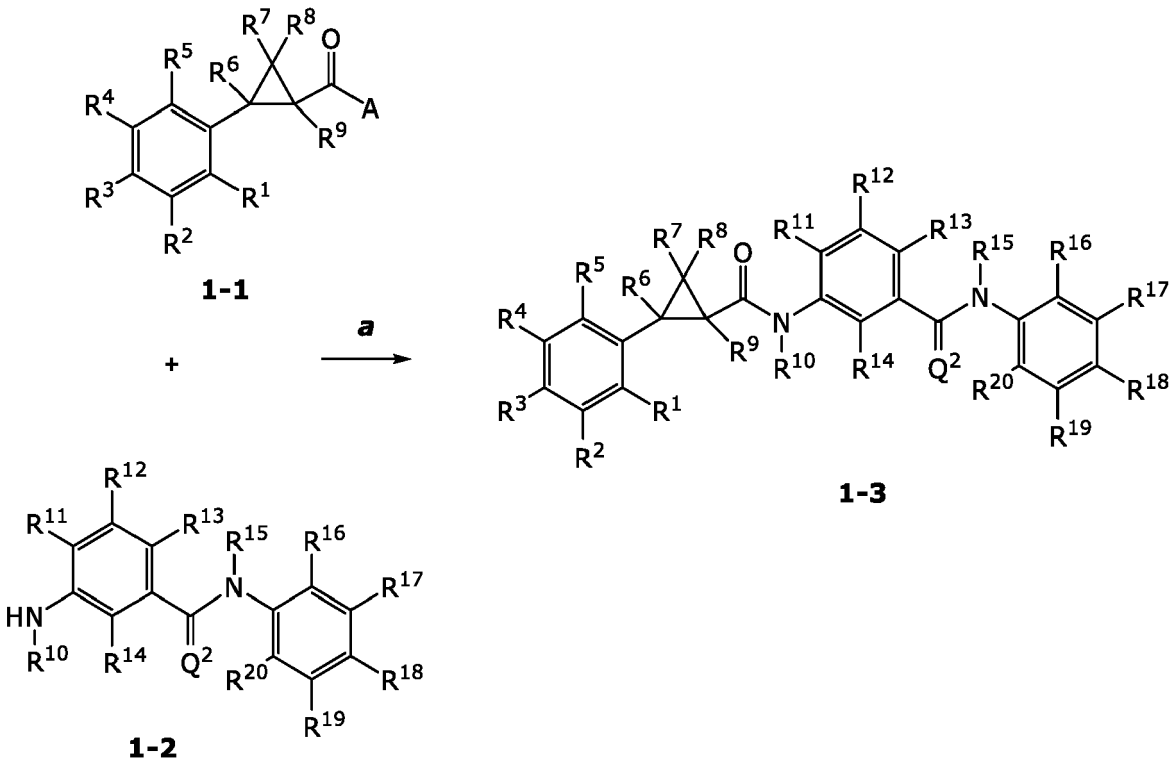
[0078] Cyclopropyl amides **1-3,** wherein Q^1 is O, and R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16}, R^{17}, R^{18}, R^{19}, R^{20}, R^{21}, R^{22}, and Q^2 are as previously disclosed, may be prepared by methods disclosed in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059), as well as by treatment with amines or amine salts **1-2,** wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16}, R^{17}, R^{18}, R^{19}, R^{20}, R^{21}, R^{22}, and Q^2 are as previously disclosed, and activated carboxylic acids **1-1,** wherein A is an activating group, and R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, and R^9 are as previously disclosed, with a base, such as triethylamine, diisopropylethylamine, 4-methylmorpholine, sodium bicarbonate, or 4-dimethylaminopyridine in an anhydrous aprotic solvent such as dichloromethane, tetrahydrofuran, 1,2-dichloroethane, dimethylformamide, ethylacetate, or any combination thereof, at temperatures between about 0 °C and about 120 °C (Scheme 1, step **a**).

[0079] Carboxylic acids **1-1,** wherein A is an activating group, may be an acid halide, such as an acid chloride, an acid bromide, or an acid fluoride; a carboxylic ester, such as a para-nitrophenyl ester, a pentafluorophenyl ester, an ethyl (hydroxyimino)cyanoacetate ester, a methyl ester, an ethyl ester, a benzyl ester, an *N*-hydroxysuccinimidyl ester, a hydroxybenzotriazol-1-yl ester, or a hydroxypyridyltriazol-1-yl ester; an O-acylisourea; an acid anhydride; or a thioester. Acid chlorides may be prepared from the corresponding carboxylic acids by treatment with a dehydrating chlorinating reagent, such as oxalyl chloride or thionyl chloride with or without *N*,*N*-dimethylformamide. Activated carboxylic esters 1-1 may be prepared from carboxylic acids *in situ* with a uronium salt, such as 1-[bis(dimethylamino)methylene]-1*H*-1,2,3-triazolo[4,5-b]pyridinium 3-oxid hexafluorophosphate (HATU), *O*-(benzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium hexafluorophosphate (HBTU), or (1-cyano-2-ethoxy-2-oxoethylidenaminooxy)dimethylamino-morpholino-carbenium hexafluorophosphate (COMU). Activated carboxylic esters **1-1** may also be prepared from carboxylic acids *in situ* with a phosphonium salt such as benzotriazol-1-yl-oxytripyrrolidinophosphonium hexafluorophosphate (PyBop). Activated carboxylic esters **1-1** may also be prepared from carboxylic acids *in situ* with a coupling reagent such as 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide, or dicyclohexylcarbodiimide in the presence of a triazole such as hydroxybenzotriazole·monohydrate (HOBt) or 1-hydroxy-7-azabenzotriazole (HOAt). *O*-Acylisoureas may be prepared with a dehydrating carbodimide such as 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide or dicyclohexylcarbodiimide. Activated carboxylic esters **1-1** may also be prepared from carboxylic acids *in situ* with a coupling reagent such as 2-chloro-1,3-dimethylimidazolidinium hexafluorophosphate (CIP) in the presence of a triazole such as 1-hydroxy-7-azabenzotriazole (HOAt).

Activated carboxylic esters **1-1** may also be prepared from carboxylic acids *in situ* with a coupling reagent such as 2,4,6-tripropyl-1,3,5,2,4,6-trioxatriphosphinane 2,4,6-trioxide (T3P®) in the presence of a base such as pyridine.

[0080] Amines or amine salts **1-2,** wherein Q^2 is O may be treated directly with a source of sulfur, such as phosphorus pentasulfide or 2,4-bis(4-methoxyphenyl)-1,3,2,4-dithiadiphosphetane 2,4-disulfide (Lawesson's reagent) with or without additives such as 1,1,1,3,3,3-hexamethyldisoloxane, in an aprotic solvent chosen from tetrahydrofuran, dichloromethane, chloroform, toluene, or pyridine, at temperatures from about 40 °C to about 120 °C to provide amines or amine salts **1-2,** wherein Q^2 is S.

Scheme 1

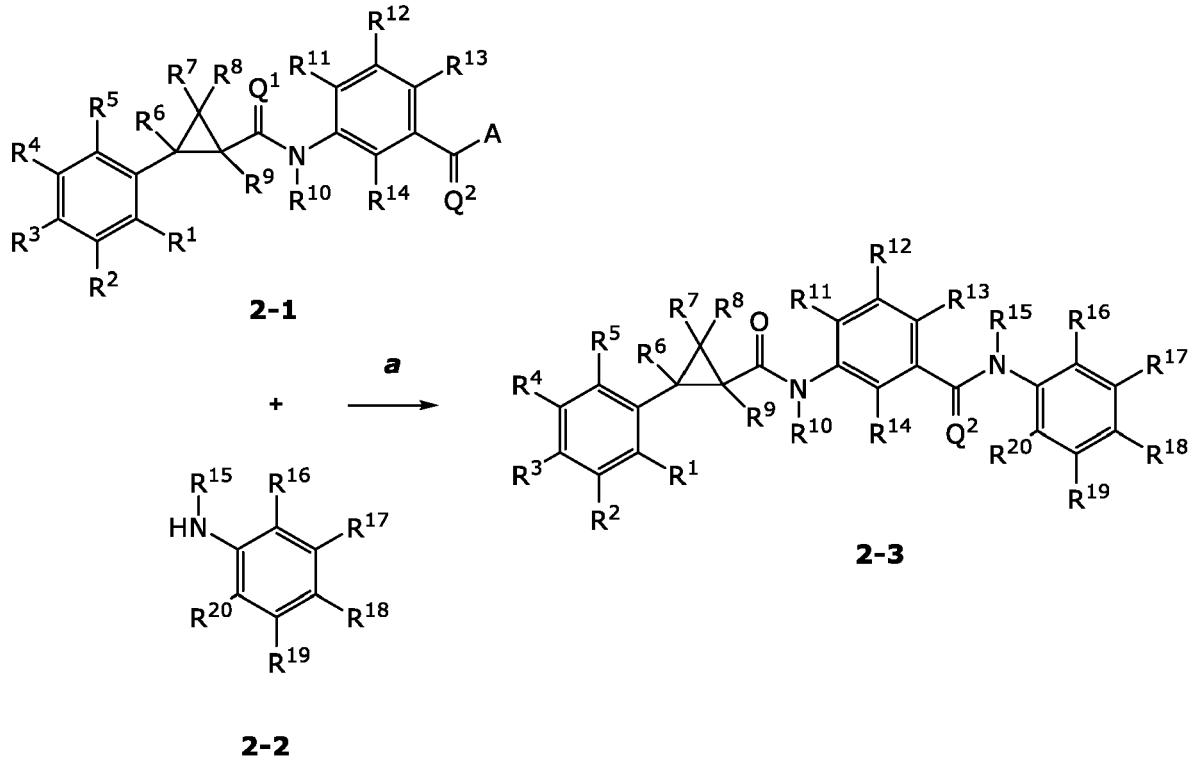


[0081] Cyclopropyl amides **2-3,** wherein Q^2 is O, and R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, Q^1, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16}, R^{17}, R^{18}, R^{19}, R^{20}, R^{21}, and R^{22} are as previously disclosed, may be prepared by treatment with amines or amine salts **2-2,** and activated carboxylic acids **2-1,** wherein A is an activating group, and R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, Q^1, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16}, R^{17}, R^{18}, R^{19}, R^{20}, R^{21}, R^{22}, and Q^2 are as previously disclosed, with a base, such as triethylamine, diisopropylethylamine, 4-methylmorpholine, pyridine, sodium bicarbonate, or 4-dimethylaminopyridine in an anhydrous aprotic solvent such as dichloromethane, tetrahydrofuran, 1,2-dichloroethane, dimethylformamide, ethyl acetate, or any combination thereof, at temperatures between about 0 °C and about 120 °C (Scheme 2, step ***a***).

[0082] Activated carboxylic acids **2-1** may be an acid halide, such as an acid chloride, an acid bromide, or an acid fluoride; a carboxylic ester, such as a para-nitrophenyl ester, a pentafluorophenyl ester, an ethyl (hydroxyimino)cyanoacetate ester, a methyl ester, an ethyl ester, a benzyl ester, an *N*-hydroxysuccinimidyl ester, a hydroxybenzotriazol-1-yl ester, or a hydroxypyridyltriazol-1-yl ester; an *O*-acylisourea; an acid anhydride; or a thioester. Acid chlorides may be prepared from the corresponding carboxylic acids by treatment with a dehydrating chlorinating reagent, such as oxalyl chloride or thionyl chloride. Activated carboxylic esters **2-1** may be prepared from carboxylic acids *in situ* with a uronium salt, such as 1-[bis(dimethylamino)methylene]-1*H*-1,2,3-triazolo[4,5-*b*]pyridinium 3-oxid hexafluorophosphate (HATU), *O*-(benzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium hexafluorophosphate (HBTU), or (1-cyano-2-ethoxy-2-oxoethylidenaminooxy)dimethylamino-morpholino-carbenium hexafluorophosphate (COMU). Activated carboxylic esters **2-1** may also be prepared from carboxylic acids *in situ* with a phosphonium salt such as benzotriazol-1-yl-oxytripyrrolidinophosphonium hexafluorophosphate (PyBop). Activated carboxylic esters **2-1** may also be prepared from carboxylic acids *in situ* with a coupling reagent such as 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide, or dicyclohexylcarbodiimide in the presence of a triazole such as hydroxybenzotriazole-monohydrate (HOBt) or 1-hydroxy-7-azabenzotriazole (HOAt). *O*-Acylisoureas may be prepared with a dehydrating carbodimide such as 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide or dicyclohexylcarbodiimide. Activated carboxylic esters **2-1** may also be prepared from carboxylic acids *in situ* with a

coupling reagent such as 2-chloro-1,3-dimethylimidazolidinium hexafluorophosphate (CIP) in the presence of a triazole such as 1-hydroxy-7-azabenzotriazole (HOAt). Activated carboxylic esters **2-1** may also be prepared from carboxylic acids *in situ* with a coupling reagent such as 2,4,6-tripropyl-1,3,5,2,4,6-trioxatriphosphinane 2,4,6-trioxide (T3P®) in the presence of a base such as pyridine.

Scheme 2

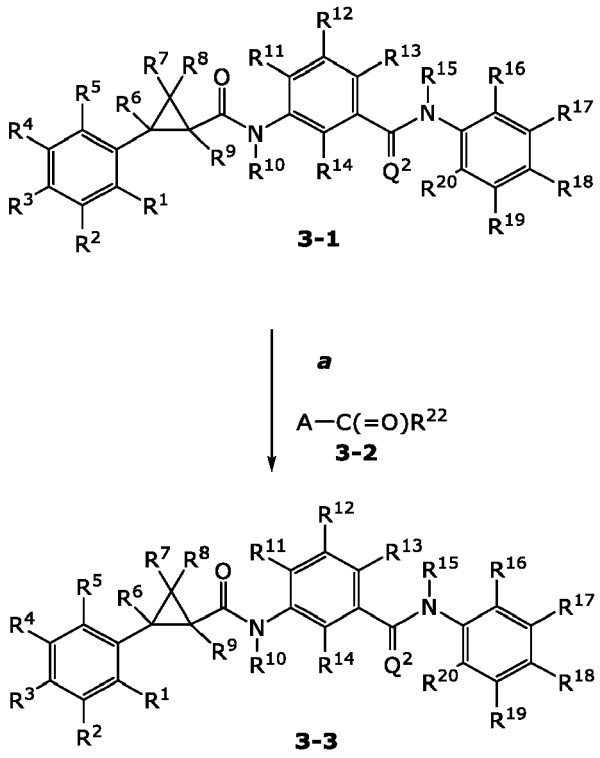


[0083] Cyclopropyl amides **3-3,** wherein at least one and no more than two of R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are $N(R^{21})C(=O)(R^{22})$; Q^2 is O, R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, Q^1, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, and R^{15} are as previously disclosed, may be prepared by treatment of amines **3-1,** wherein at least one and no more than two of R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are $N(R^{21})_2$ and R^{21} is H; Q^2 is O, R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, Q^1, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, and R^{15} are as previously disclosed, with an activated carboxylic acid **3-2** wherein A is an activating group and R^{22} is as previously disclosed and a base, such as triethylamine, diisopropylethylamine, 4-methylmorpholine, 4-dimethylaminopyridine, or pyridine, in an anhydrous aprotic solvent such as dichloromethane, tetrahydrofuran, 1,2-dichloroethane, *N*,*N*-dimethylformamide, or any combination thereof, at temperatures between about 0 °C and about 120 °C (Scheme 3, step ***a***).

[0084] Activated carboxylic acids **3-2,** may be an acid halide, such as an acid chloride, an acid bromide, an acid fluoride, or a chloroformate; a carboxylic ester, such as a *p*-nitrophenyl ester, a pentafluorophenyl ester, an ethyl (hydroxyimino)cyanoacetate ester, a methyl ester, an ethyl ester, a benzyl ester, an *N*-hydroxysuccinimidyl ester, a hydroxybenzotriazol-1-yl ester, or a hydroxypyridyltriazol-1-yl ester; an *O*-acylisourea; an acid anhydride; or a thioester. Acid chlorides may be prepared from the corresponding carboxylic acids by treatment with a dehydrating chlorinating reagent, such as oxalyl chloride or thionyl chloride. Activated carboxylic esters **3-2** may be prepared from carboxylic acids *in situ* with a uronium salt, such as 1-[bis(dimethylamino)methylene]-1*H*-1,2,3-triazolo[4,5-b]pyridinium 3-oxid hexafluorophosphate (HATU), *O*-(benzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium hexafluorophosphate (HBTU), or (1-cyano-2-ethoxy-2-oxoethylidenaminooxy)dimethylamino-morpholino-carbenium hexafluorophosphate (COMU). Activated carboxylic esters **3-2** may also be prepared from carboxylic acids *in situ* with a phosphonium salt such as benzotriazol-1-yl-oxytripyrrolidinophosphonium hexafluorophosphate (PyBop). Activated carboxylic esters **3-2** may also be prepared from carboxylic acids *in situ* with a coupling reagent, such as 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide or dicyclohexylcarbodiimide, in the presence of a triazole such as hydroxybenzotriazole·monohydrate (HOBt) or 1-hydroxy-7-azabenzotriazole (HOAt). O-Acylisoureas may be prepared with a dehydrating carbodimide such as 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide or dicyclohexylcarbodiimide. Activated carboxylic esters **3-2** may also be prepared from carboxylic acids *in situ* with a coupling reagent such as 2-chloro-1,3-dimethylimidazolidinium hexafluorophosphate (CIP) in the presence of a triazole such as 1-hydroxy-7-azabenzotriazole (HOAt). Activated carboxylic esters **3-2** may also be prepared from carboxylic acids *in situ* with a coupling reagent such as 2,4,6-tripropyl-1,3,5,2,4,6-

trioxatriphosphinane 2,4,6-trioxide (T3P®) in the presence of a base such as pyridine.

Scheme 3

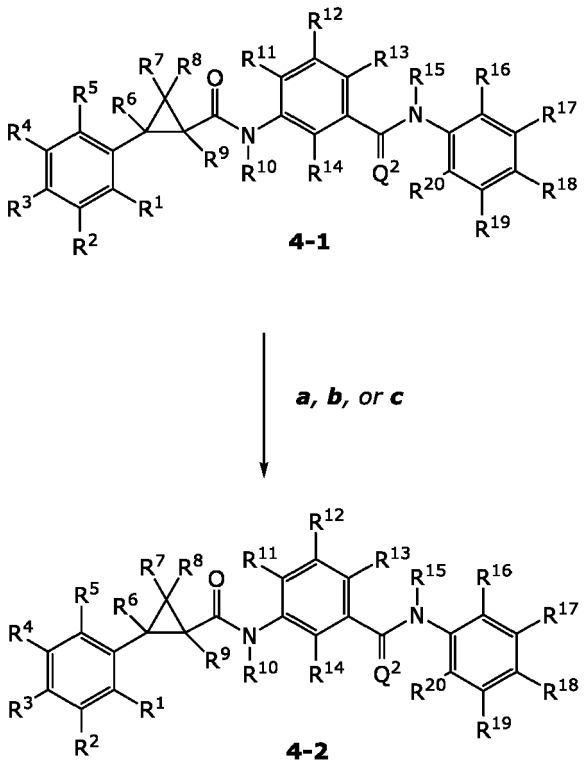


[0085] Cyclopropyl amides **4-2,** wherein at least one and no more than two of R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are $N(R^{21})_2$ and R^{21} is H; Q^2 is O, R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, Q^1, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, and R^{15} are as previously disclosed, may be prepared by treatment of **4-1,** wherein at least one and no more than two of R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are NOz; R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, Q^1, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, and $R^{15}$are as previously disclosed, with a metal such as palladium on carbon in the presence of a reducing agent such as hydrogen gas in a solvent such as ethyl acetate or with a metal such as iron in the presence of a reducing agent such as ammonium chloride in a solvent mixture such as methanol and water at a temperature of about 25 °C to about 60 °C (Scheme 4, step ***a***).

[0086] Alternatively, cyclopropyl amides **4-2,** wherein at least one and no more than two of R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are $N(R^{21})_2$ and R^{21} is H; Q^2 is O, R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, Q^1, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, and R^{15} are as previously disclosed, may be prepared by treatment of **4-1,** wherein at least one and no more than two of R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are $N(R^{21})C(=O)O(C_1\text{-}C_6)$alkyl wherein R^{21} is H; Q^2 is O, R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, Q^1, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, and R^{15a} are as previously disclosed, with an anhydrous acid solution such as hydrochloric acid in 1,4-dioxane and dichloromethane at a temperature of about 25 °C (Scheme 4, step **b**).

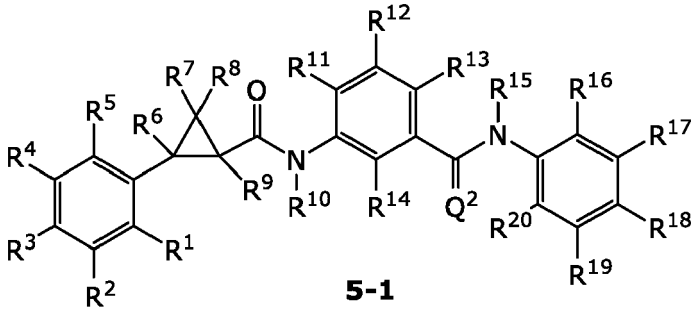
[0087] Alternatively, cyclopropyl amides **4-2,** wherein at least one and no more than two of R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are $N(R^{21})_2$ and R^{21} is H; Q^2 is O, R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, Q^1, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, and R^{15} are as previously disclosed, may be prepared by treatment of **4-1,** wherein at least one and no more than two of R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are $N(C(=O)O(C_1\text{-}C_6)\text{alkyl})_2$; Q^2 is O, R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, Q^1, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, and R^{15} are as previously disclosed, with an anhydrous acid solution such as hydrochloric acid in 1,4-dioxane and dichloromethane at a temperature of about 25 °C (Scheme 4, step c).

Scheme 4



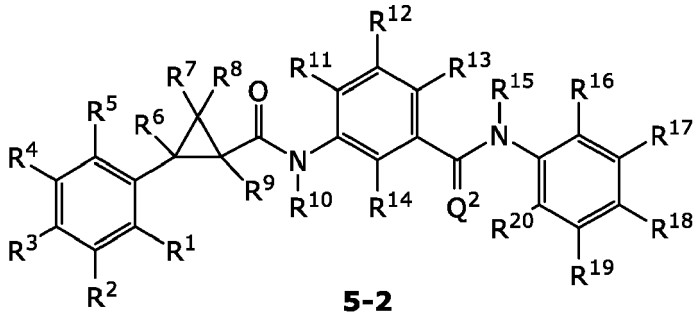
[0088] Cyclopropyl amides **5-1,** wherein at least one and no more than two of R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are $N(R^{21})C(=O)(R^{22})$ and R^{22} contains a sulfide, may be oxidized to the corresponding sulfoxide or sulfone **5-2** by treatment with about one equivalent of *meta*-chloroperoxybenzoic acid in a polar aprotic solvent such as dichloroethane at temperatures between about 0 °C to about 50 °C (Scheme 5, step **a**). Alternatively, cyclopropyl amides **5-1,** wherein R^{22} contains a sulfide may be oxidized to the corresponding sulfoxide or sulfone by treatment with one equivalent of sodium perborate in a protic solvent such as acetic acid (sulfoxide) or two equivalents of sodium perborate (sulfone). Preferably, the oxidation will be performed at temperatures between about 40 °C to about 100 °C using about 1.5 equivalents of sodium perborate to provide chromatographically separable mixtures of sulfoxide and sulfone cyclopropyl amides **5-2** (Scheme 5, step **b**). Alternatively, cyclopropyl amides **5-1**containing a sulfide may be oxidized to the corresponding sulfoxide by treatment with about one equivalent of 30% aqueous hydrogen peroxide, in a polar protic solvent such as hexafluoropropanol at ambient temperature (Scheme 5, step ***c***). Alternatively, cyclopropyl amides **5-1** containing a sulfide may be oxidized to the corresponding sulfoxide and sulfone by treatment with about 1 to about 2.5 equivalents of Oxone®, in a polar protic solvent such as methanol at ambient temperature (Scheme 5, step ***d***).

Scheme 5



5-1

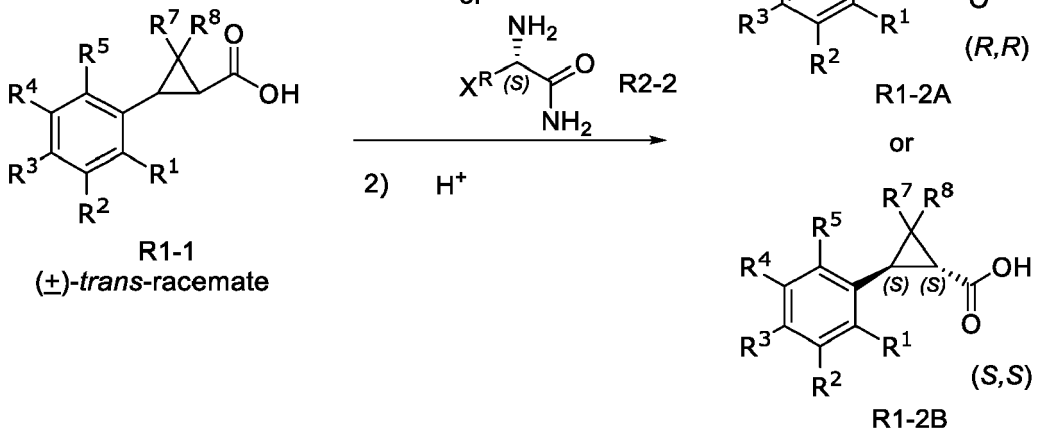
a, b, c, *or* ***d***



5-2

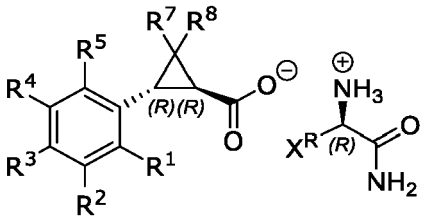
[0089] In another embodiment, the cyclopropyl acid **R1-1,** wherein R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, and R^9 are as previously disclosed, may be resolved into its (R,R) and (S,S) enantiomers via a method in Scheme R1.

Scheme R1

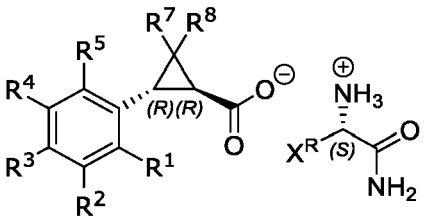


wherein: $\mathbf{X^R}$ is selected from the group consisting of C_1-C_4 alkyl or benzyl.

[0090] In Scheme R1, the (±)-trans-racemate of Formula R1-1 (i.e., the mixture of (*R*,*R*) and (*S*,*S*) enantiomers of a *trans*-2,2-dichloro-3-(substituted phenyl)cyclopropanecarboxylic acid) is combined with a resolving agent that is either the enantiomeric amine of Formula R2-1 or Formula R2-2, in a suitable solvent, to provide the diastereomeric amine salts of Formula R3-1A or Formula R3-1B,

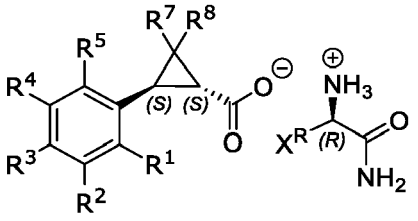


R3-1A

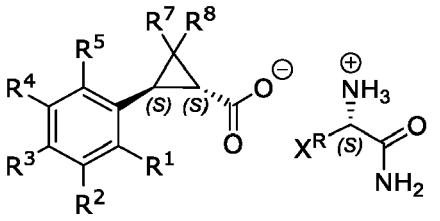


R3-1B

or of Formula R3-2A or Formula R3-2B,



R3-2A



R3-2B

that selectively crystallize or precipitate out of the resulting mixture. The diastereomeric amine salt of Formula R3-1A or Formula R3-1B, or of Formula R3-2A or Formula R3-2B, can then be isolated from the mixture and treated with an acid to provide the (1*R*,3*R*)-or the (1*S*,3*S*)-2,2-dihalo-3-(substituted phenyl)cyclopropanecarboxylic acid of Formula R1-2A or Formula R1-2B, respectively.

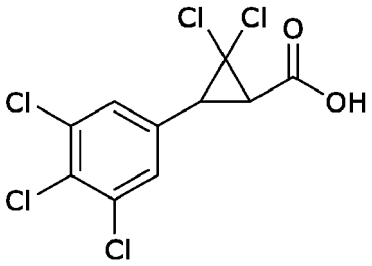
Examples

[0091] These examples are for illustration purposes and are not to be construed as limiting this disclosure to only the embodiments disclosed in these examples.

[0092] Starting materials, reagents, and solvents that were obtained from commercial sources were used without further purification. Anhydrous solvents were purchased as Sure/Seal™ from Aldrich and were used as received. Melting points were obtained on a Thomas Hoover Unimelt capillary melting point apparatus or an OptiMelt Automated Melting Point System from Stanford Research Systems and are uncorrected. Examples using "room temperature" were conducted in climate controlled laboratories with temperatures ranging from about 20 °C to about 24 °C. Molecules are given their known names, named according to naming programs within ISIS Draw, ChemDraw, or ACD Name Pro. If such programs are unable to name a molecule, such molecule is named using conventional naming rules. ^{1}H NMR spectral data are in ppm (δ) and were recorded at 300, 400, 500, or 600 MHz; ^{13}C NMR spectral data are in ppm (δ) and were recorded at 75, 100, or 150 MHz; and ^{19}F NMR spectral data are in ppm (δ) and were recorded at 376 MHz, unless otherwise stated.

Example 1: Preparation of trans-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropanecarboxylic acid (C1)

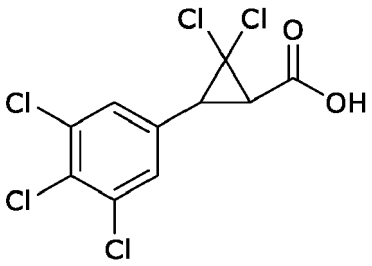
[0093]



[0094] The title compound was prepared from trans-1,2,3-trichloro-5-(2,2-dichloro-3-(4-methoxyphenyl)cyclopropyl)benzene **(C2)** according to the methods disclosed in Example 1 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as a yellow powder (1.5 grams (g), 39%): ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.31 (d, *J* = 0.7 Hz, 2H), 3.40 (d, *J* = 8.2 Hz, 1H), 2.86 (d, *J* = 8.3 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.05, 134.55, 132.44, 131.75, 128.89, 61.18, 39.26, 37.14; ESIMS *m*/*z* 333 ([M-H]$^-$).

Example 2: Preparation of trans-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropanecarboxylic acid (C1)

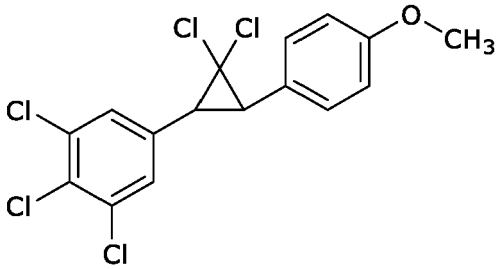
[0095]



[0096] The title compound was prepared from *trans*-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carbaldehyde **(C5)** according to the methods disclosed in Example 96 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as white solid (2.78 g, 95%): ^{1}H NMR (400 MHz, DMSO-d_6) δ 13.41 (s, 1H), 7.81 (d, *J* = 0.6 Hz, 2H), 3.62 (d, *J* = 8.6 Hz, 1H), 3.52 (d, *J* = 8.6 Hz, 1H); ESIMS *m*/*z* 332 ([M-H]-).

Example 3: Preparation of trans-1,2,3-trichloro-5-(2,2-dichloro-3-(4-methoxyphenyl)cyclopropyl)benzene (C2)

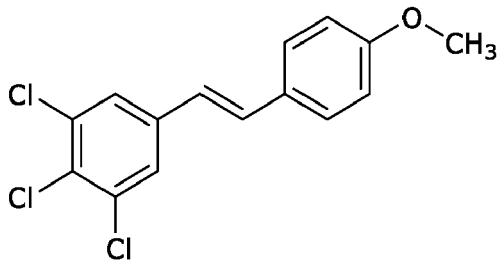
[0097]



[0098] The title compound was prepared from (*E*)-1,2,3-trichloro-5-(4-methoxystyryl)benzene **(C3)** and *N*-benzyl-*N*,*N*-diethylethanaminium chloride according to the methods disclosed in Example 3 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as a dark foam (4.7 g, 100%): ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.40 (d, J = 0.6 Hz, 2H), 7.29 - 7.22 (m, 2H), 6.96 - 6.89 (m, 2H), 3.83 (s, 3H), 3.12 (d, J = 8.8 Hz, 1H), 3.06 (d, J = 8.7 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.46, 135.08, 134.23, 130.91, 129.85, 129.16, 125.42, 114.02, 64.67, 55.32, 39.62, 38.48.

Example 4: Preparation of (E)-1,2,3-trichloro-5-(4-methoxystyryl)benzene (C3)

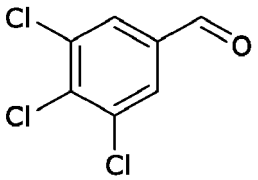
[0099]



[0100] The title compound was prepared from 3,4,5-trichlorobenzaldehyde (**C4**) and diethyl 4-methoxybenzylphosphonate according to the methods disclosed in Example 5 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated off-white solid (3.7 g, 31%): ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.49 - 7.46 (m, 2H), 7.47 - 7.39 (m, 2H), 7.04 (d, *J* = 16.3 Hz, 1H), 6.93 - 6.89 (m, 2H), 6.78 (d, *J* = 16.3 Hz, 1H), 3.84 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.46, 135.08, 134.23, 130.91, 129.85, 129.16, 125.42, 114.02, 64.67, 55.32, 39.62, 38.48; EIMS *m*/*z* 313 ($[M]^+$).

Example 5: Preparation of 3,4,5-trichlorobenzaldehyde (C4)

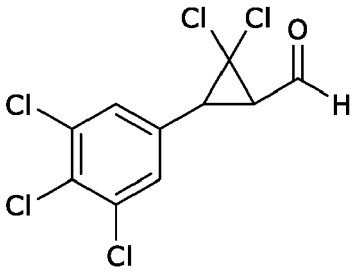
[0101]



[0102] The title compound was prepared from 5-bromo-1,2,3-trichlorobenzene according to the methods disclosed in Example 10 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as a white solid (10:1 mixture of title compound to 1,2,3-trichlorobenzene, 7.96 g, 99%): ^{1}H NMR ($CDCl_3$) δ 9.91 (s, 1H), 7.88 (s, 2H); EIMS *m*/*z* 209 ($[M]^+$).

Example 6: Preparation of trans-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carbaldehyde (C5)

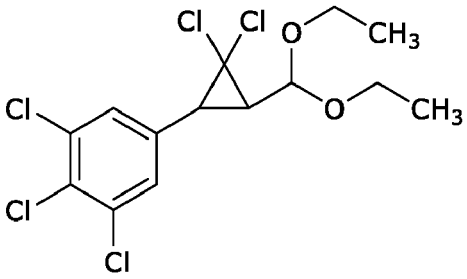
[0103]



[0104] The title compound was prepared from trans-1,2,3-trichloro-5-(2,2-dichloro-3-(diethoxymethyl)cyclopropyl)benzene **(C6)** according to the methods disclosed in Example 97 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as a yellow solid (2.8 g, 69%): ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.55 (d, *J* = 3.9 Hz, 1H), 7.30 (d, *J* = 0.7 Hz, 2H), 3.48 (dt, *J* = 8.0, 0.8 Hz, 1H), 2.92 (dd, *J* = 7.9, 3.9 Hz, 1H).

Example 7: Preparation of trans-1,2,3-trichloro-5-(2,2-dichloro-3-(diethoxymethyl)cyclopropyl)benzene (C6)

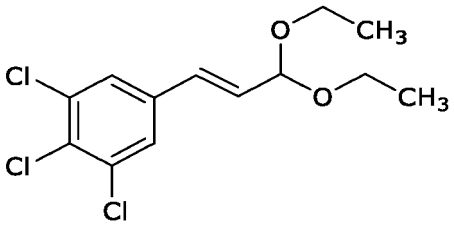
[0105]



[0106] The title compound was prepared from (*E*)-1,2,3-trichloro-5-(3,3-diethoxyprop-1-en-1-yl)benzene **(C7)** according to the methods disclosed in Example 98 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as a brown oil (146 g, 93%): ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.29 (d, *J* = 0.7 Hz, 2H), 4.59 (d, *J* = 6.1 Hz, 1H), 3.82 - 3.54 (m, 4H), 2.75 (d, *J* = 8.5 Hz, 1H), 2.23 (dd, *J* = 8.5, 6.1 Hz, 1H), 1.30 (t, *J* = 7.0 Hz, 3H), 1.20 (t, *J* = 7.0 Hz, 3H).

Example 8: Preparation of (*E*)-1,2,3-trichloro-5-(3,3-diethoxyprop-1-en-1-yl)benzene(C7)

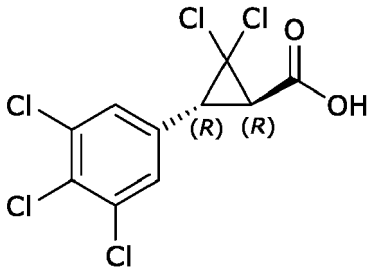
[0107]



[0108] The title compound was prepared from 3,4,5-trichlorobenzaldehyde according to the methods disclosed in Example 99 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as an orange oil (40 g, 91%): ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.41 (s, 2H), 6.58 (dd, *J* = 16.1, 1.2 Hz, 1H), 6.21 (dd, *J* = 16.1, 4.6 Hz, 1H), 5.06 (dd, *J* = 4.7, 1.2 Hz, 1H), 3.69 (dq, *J* = 9.3, 7.1 Hz, 2H), 3.55 (dq, *J* = 9.5, 7.0 Hz, 2H), 1.25 (t, *J* = 7.1 Hz, 6H).

Example R1: Resolution of (1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxylic acid (C8)

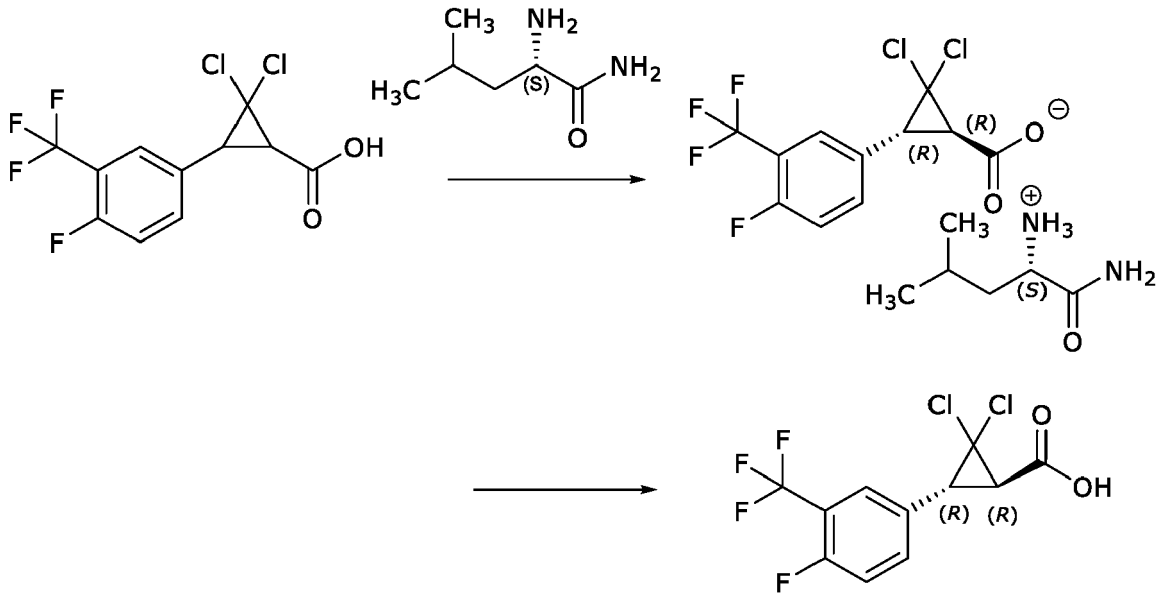
[0109]



[0110] The title compound was resolved according to the methods disclosed in Example 100 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as a white solid (2 g, 29%, 99% ee). Analytical data are consistent with racemic acid **C1.**

Example R4: Resolution of racemic trans-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxylic acid (C9) with (L)-leucinamide to provide (1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxylic acid (C10)

[0111]

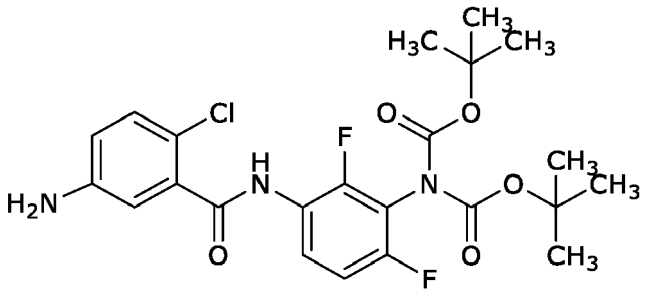


[0112] A mixture of (*L*)-leucinamide (15.6 g, 120 mmol) and racemic trans-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxylic acid **(C9,** prepared according to the methods disclosed in Example 1 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059); 63.4 g, 200 mmol), in acetonitrile (800 mL) was stirred at 60 °C for 1 hour (h). After a solid began to deposit, the mixture was placed at room temperature for 4 h. The solid was collected, washed with minimal acetonitrile and dried to afford the salt of (*L*)-leucinamide and *trans*-(1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxylate as a white solid: (38.9 g, 95% ee, 43%): ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.80 (s, 1H), 7.73 (m, 2H), 7.49 (dd, *J* = 10.7, 8.6 Hz, 1H), 7.31 (s, 1H), 3.53 (dd, *J* = 7.9, 6.4 Hz, 1H), 3.34 (d, *J* = 8.6 Hz, 1H), 3.07 (d, *J* = 8.6 Hz, 1H), 1.77 - 1.60 (m, 1H), 1.60 - 1.40 (m, 2H), 0.89 (t, *J* = 6.7 Hz, 6H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.88, -117.93.

[0113] The white solid salt was diluted with EtOAc and washed with 1.5 normal (N) HCl and water. The organic layer was dried over Na_2SO_4, filtered and concentrated to afford the title product as a white solid (27.3 g, 95% ee, 43% yield): ^{1}H NMR (400 MHz, DMSO-d_6) δ 13.24 (s, 1H), 8.03 - 7.71 (m, 2H), 7.54 (dd, *J* = 10.6, 8.7 Hz, 1H), 3.65 - 3.51 (m, 2H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.93, -117.06; ESIMS *m*/*z* = 316 ([M-H]$^-$).

Example 9: Preparation of *tert*-butyl-*N*-((tert-butoxy)carbonyl)-*N*-(3-(5-amino-2-chlorobenzamido)-2,6-difluorophenyl)carbamate (C11)

[0114]

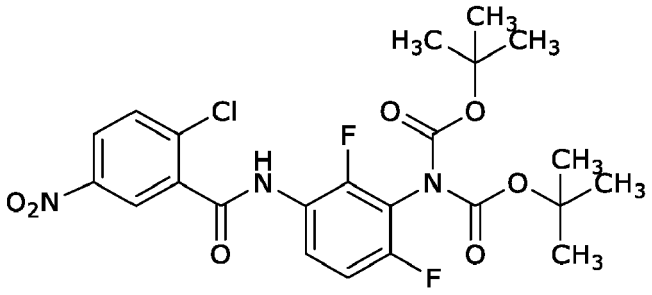


[0115] The title compound was prepared from *tert*-butyl-*N*-((*tert*-butoxy)carbonyl)-*N*-(3-(2-chloro-5-nitrobenzamido)-2,4-difluorophenyl)carbamate (**C12**) according to the methods disclosed in Example 83 in Heemstra, R. J., et al., U. S.

Patent 9,781,935 B2 (WO 2016/168059) and isolated as a white solid (2.89 g, 59%): ^{1}H NMR (400 MHz, DMSO-d_6) δ 10.28 (s, 1H), 7.67 (td, *J* = 8.8, 5.8 Hz, 1H), 7.24 (td, *J* = 9.3, 1.7 Hz, 1H), 7.13 (d, *J* = 8.6 Hz, 1H), 6.73 (d, *J* = 2.7 Hz, 1H), 6.65 (dd, *J* = 8.6, 2.8 Hz, 1H), 5.48 (s, 2H), 1.40 (s, 18H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -123.86, -126.24; ESIMS *m*/*z* 496 ([M-H]$^-$).

Example 10: Preparation of *tert*-butyl-*N*-((*tert*-butoxy)carbonyl)-*N*-(3-(2-chloro-5-nitrobenzamido)-2,4-difluorophenyl)carbamate (C12)

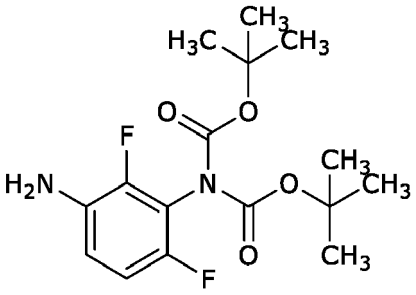
[0116]



[0117] The title compound was prepared from 2-chloro-5-nitrobenzoic acid and *tert*-butyl-*N*-((*tert*-butoxy)carbonyl)-*N*-(3-amino-2,6-difluorophenyl)carbamate (**C13**) according to the methods disclosed in Example 28 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as a yellow oil (5.2 g, 66%): ^{1}H NMR (400 MHz, DMSO-d_6) δ 10.69 (s, 1H), 8.51 (d, *J* = 2.7 Hz, 1H), 8.35 (dd, *J* = 8.8, 2.8 Hz, 1H), 7.97 - 7.79 (m, 2H), 7.30 (td, *J* = 9.3, 1.7 Hz, 1H), 1.41 (s, 18H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -123.43, -127.02 (d, J = 2.0 Hz); ESIMS *m*/*z* 526 ([M-H]$^-$).

Example 11: Preparation of *tert*-butyl-*N*-((*tert*-butoxy)carbonyl)-*N*-(3-amino-2,6-difluorophenyl)carbamate (C13)

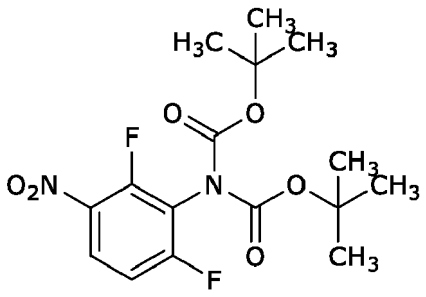
[0118]



[0119] The title compound was prepared from *tert*-butyl-*N*-((*tert*-butoxy)carbonyl)-*N*-(2,6-difluoro-3-nitrophenyl)carbamate (**C14**) according to the methods disclosed in Example 91 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as a white solid (5.06 g, 100%): ^{1}H NMR (400 MHz, DMSO-d_6) δ 6.87 (td, *J* = 9.3, 1.7 Hz, 1H), 6.74 (td, *J* = 9.4, 5.7 Hz, 1H), 5.12 (s, 2H), 1.39 (s, 18H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -137.96 (d, *J* = 3.7 Hz), -141.10 (d, *J* = 3.7 Hz); ESIMS *m*/*z* 244 ([M-BOC]$^-$).

Example12: Preparation of *tert*-butyl-*N*-((*tert*-butoxy)carbonyl)-*N*-(2,6-difluoro-3-nitrophenyl)carbamate (C14)

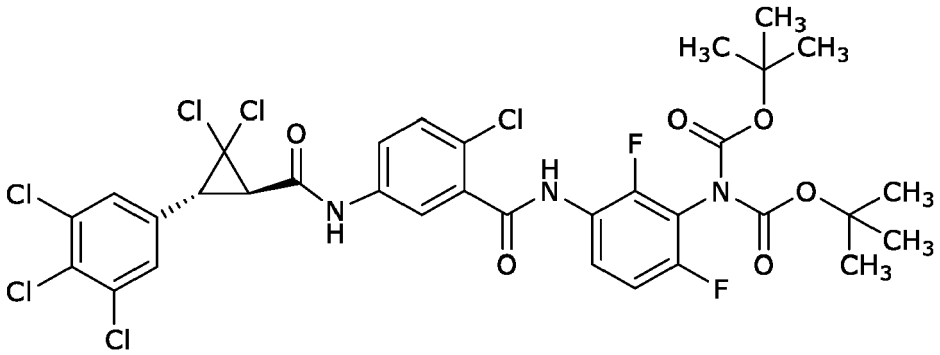
[0120]



[0121] The title compound was prepared from 2,6-difluoro-5-nitroaniline according to the methods disclosed in Example 89 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as a white foam (5.2 g, 69%): ^{1}H NMR (300 MHz, $CDCl_3$) δ 8.14 (ddd, *J* = 9.2, 8.1, 5.5 Hz, 1H), 7.10 (ddd, *J* = 9.7, 8.0, 2.0 Hz, 1H), 1.45 (s, 18H); ^{19}F NMR (376 MHz, $CDCl_3$) δ -105.95 (dd, *J* = 10.9, 2.7 Hz), -119.53 (d, *J* = 10.6 Hz); ESIMS *m*/*z* 397 ([M+Na]$^+$).

Example 13: Preparation of *tert*-butyl-*N*-((*tert*-butoxy)carbonyl)-*N*-(3-(2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxamido)benzamido)-2,6-difluorophenyl)carbamate (DP1)

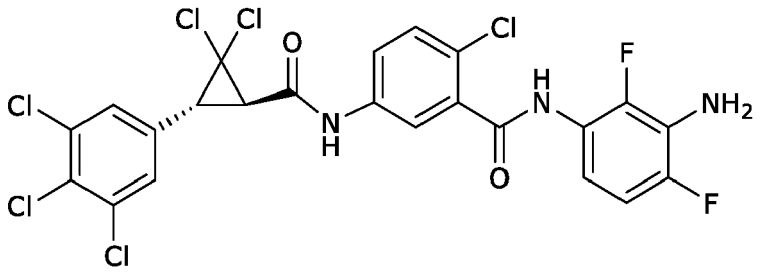
[0122]



[0123] The title compound was prepared from (1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxylic acid **(C8)** and *tert*-butyl-*N*-((*tert*-butoxy)carbonyl)-*N*-(3-(5-amino-2-chlorobenzamido)-2,6-difluorophenyl)carbamate **(C11)** according to the methods disclosed in Example 13 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as a white solid (0.171 g, 64%).

Example 14: Preparation of *N*-(3-amino-2,4-difluorophenyl)-2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxamido)benzamide (DP2)

[0124]

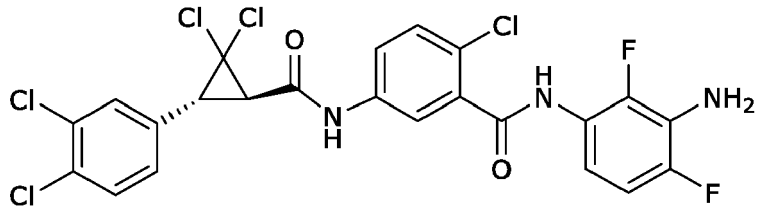


[0125] The title compound was prepared from *tert*-butyl-*N*-((*tert*-butoxy)carbonyl)-*N*-(3-(2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxamido)benzamido)-2,6-difluorophenyl)carbamate **(DP1)** according to the methods disclosed in Example 62 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 (WO 2016/168059) and isolated as a white solid (0.108 g, 84%).

[0126] *The following compounds were prepared in like manner to the procedures outlined in the above examples or via the methods disclosed in the schemes* (vide supra):

***N*-(3-Amino-2,4-difluorophenyl)-2-chloro-5-((1*R*,3*R*)-2,2-dichioro-3-(3,4-dichlorophenyl)cyclopropane-1-carboxamido)benzamide (DP3)**

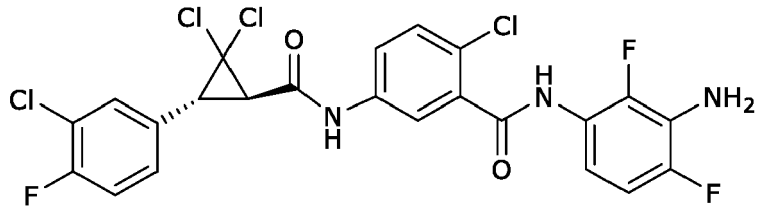
[0127]



[0128] Isolated as a white solid (0.115 g, 89%).

***N*-(3-Amino-2,4-difluorophenyl)-2-chloro-5-((1*R*,3*R*)-2,2-dichioro-3-(3-chloro-4-fluorophenyl)cyclopropane-1-carboxamido)benzamide (DP4)**

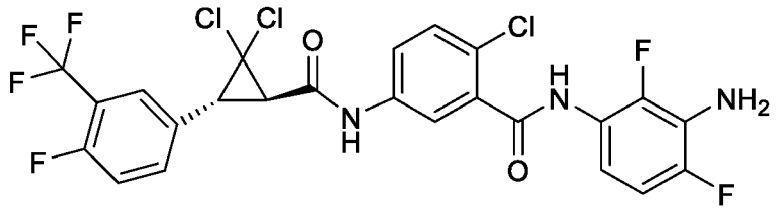
[0129]



[0130] Isolated as a white solid (0.087 g, 84%).

***N*-(3-Amino-2,4-difluorophenyl)-2-chloro-5-((1*R*,3*R*)-2,2-dichioro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)benzamide (DP5)**

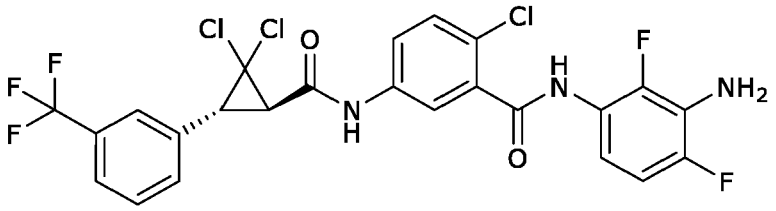
[0131]



[0132] Isolated as a white foam (0.043 g, 53%).

***N*-(3-Amino-2,4-difluorophenyl)-2-chloro-5-((1*R*,3*R*)-2,2-dichioro-3-(3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)benzamide (DP6)**

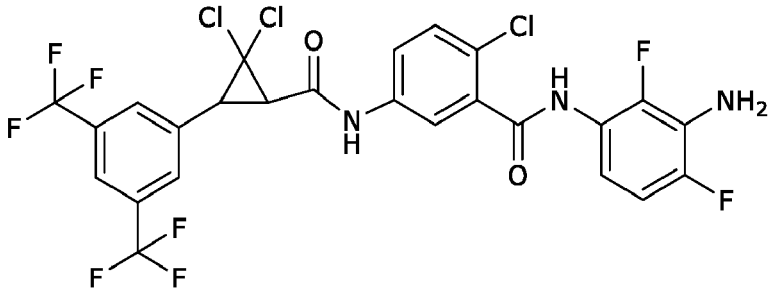
[0133]



[0134] Isolated as a white solid (0.860 g, 85%).

***trans*-*N*-(3-Amino-2,4-difluorophenyl)-5-(3-(3,5-bis(trifluoromethyl)phenyl)-2,2-dichlorocyclopropane-1-carboxamido)-2-chlorobenzamide (DP7)**

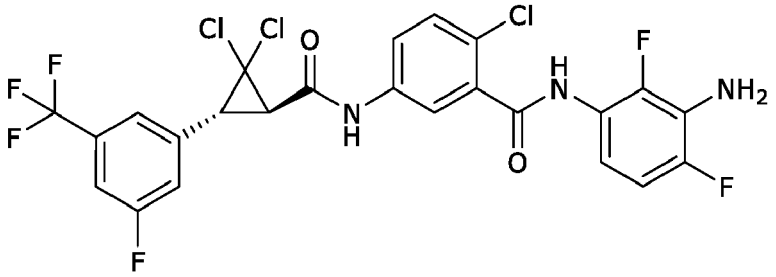
[0135]



[0136] Isolated as a white foam (1.27 g, 98%).

***N*-(3-Amino-2,4-difluorophenyl)-2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3-fluoro-5-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)benzamide (DP8)**

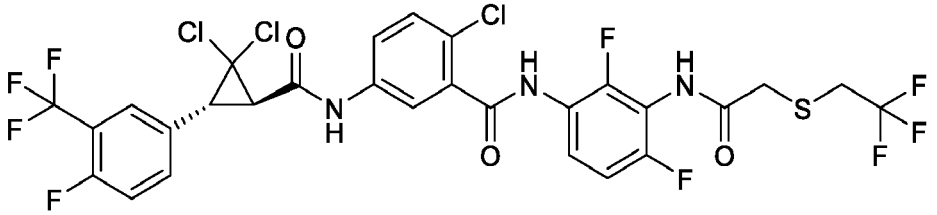
[0137]



[0138] Isolated as a white solid (0.784 g, 87%).

Example 15: Preparation of 2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)thio)acetamido)phenyl)benzamide (F15)

[0139]

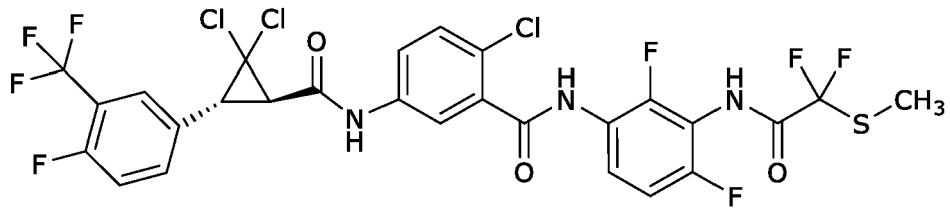


[0140] To a magnetically stirred solution of *N*-(3-amino-2,4-difluorophenyl)-2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)benzamide **(DP5;** 250 milligrams (mg), 0.419 millimoles (mmol)) in ethyl acetate (4 milliliters (mL)) were added 2-((2,2,2-trifluoroethyl)thio)acetic acid (77 mg, 0.440 mmol), followed by pyridine (134 microliters (μL), 1.26 mmol) and 2,4,6-tripropyl-1,3,5,2,4,6-trioxatriphosphinane 2,4,6-trioxide (T3P®; 503 μL, 0.838 mmol), and the resulting light-yellow solution was warmed to 55 °C and stirred for 12 hours. The solution was concentrated under a stream of nitrogen gas (N_2), and the crude residue was purified by automated flash chromatography (silica gel (SiOz); 0 - 60% ethyl acetate in hexanes) to give the title compound (284 mg, 90%) as a white solid.

[0141] *The following compounds were prepared in like manner to the procedure outlined in Example **15**:*

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(3-(2,2-difluoro-2-(methylthio)acetamido)-2,4-difluorophenyl)benzamide (F1)

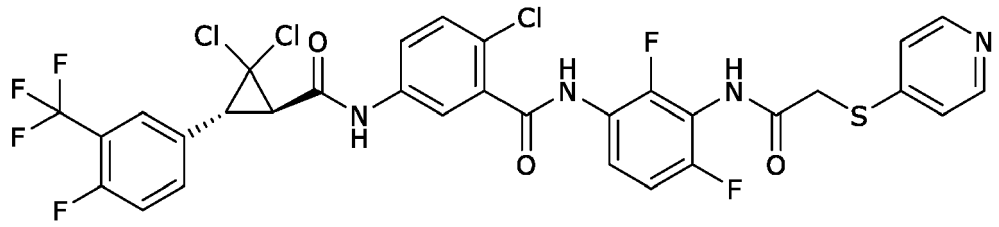
[0142]



[0143] Isolated as a white solid (29 mg, 46%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-(pyridin-4-ylthio)acetamido)phenyl)benzamide (F2)

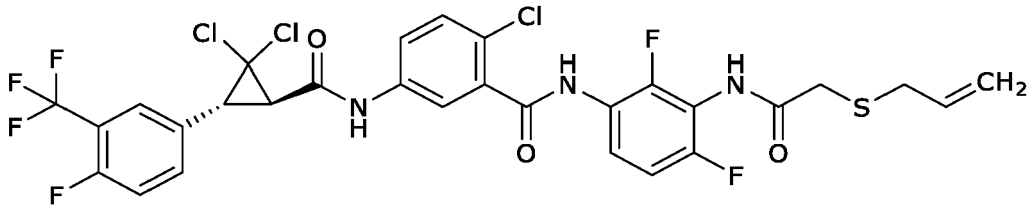
[0144]



[0145] Isolated as a light-tan foam (82 mg, 79%).

***N*-(3-(2-(Allylthio)acetamido)-2,4-difluorophenyl)-2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)benzamide (F3)**

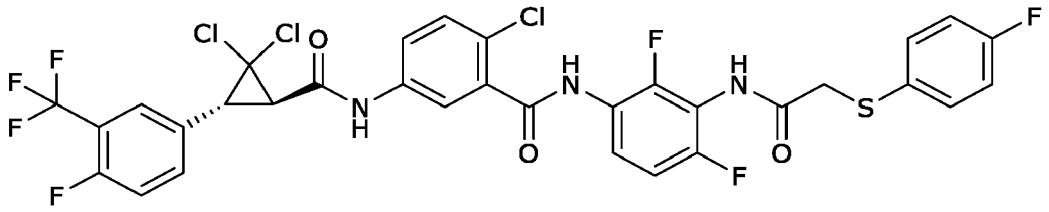
[0146]



[0147] Isolated as a white solid (85 mg, 85%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((4-fluorophenyl)thio)acetamido)phenyl)benzamide (F4)

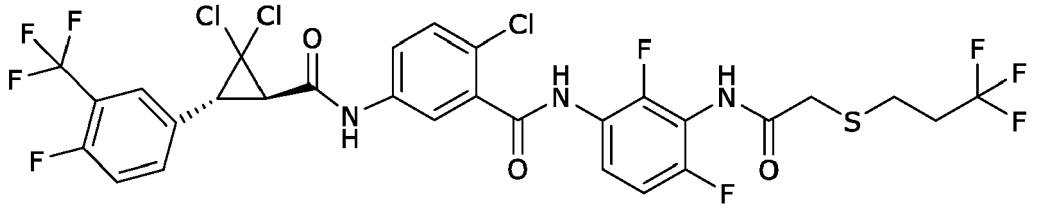
[0148]



[0149] Isolated as a white solid (80 mg, 74%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((3,3,3-trifluoropropyl)thio)acetamido)phenyl)benzamide (F5)

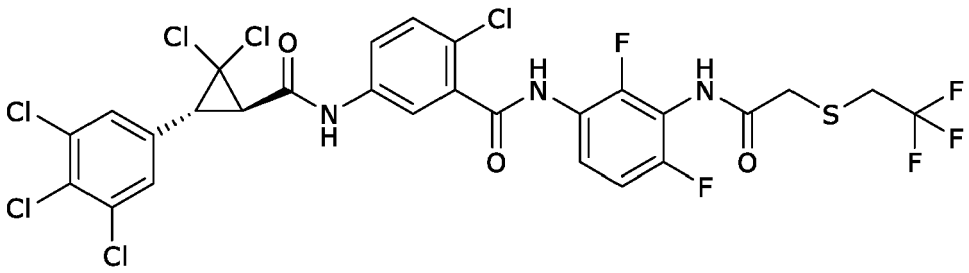
[0150]



[0151] Isolated as a white solid (81 mg, 80%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxamido)-N-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)thio)acetamido)phenyl)benzamide (F6)

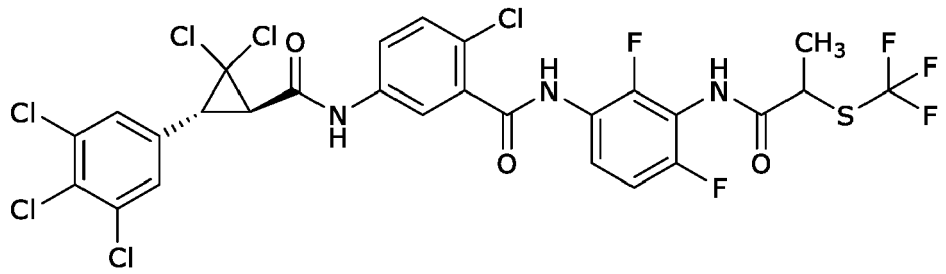
[0152]



[0153] Isolated as a white solid (122 mg, 75%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)propanamido)phenyl)benzamide (F7)

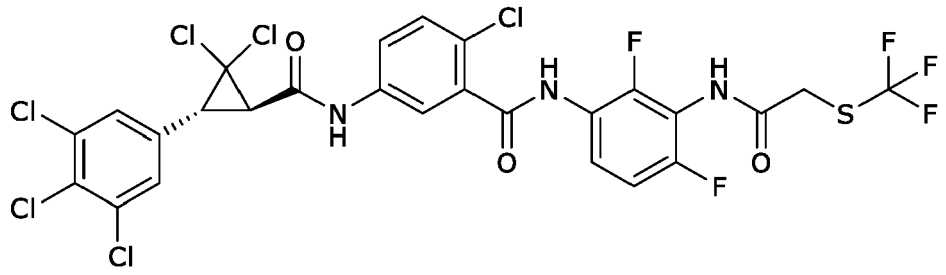
[0154]



[0155] Isolated as a white solid (129 mg, 80%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)acetamido)phenyl)benzamide (F8)

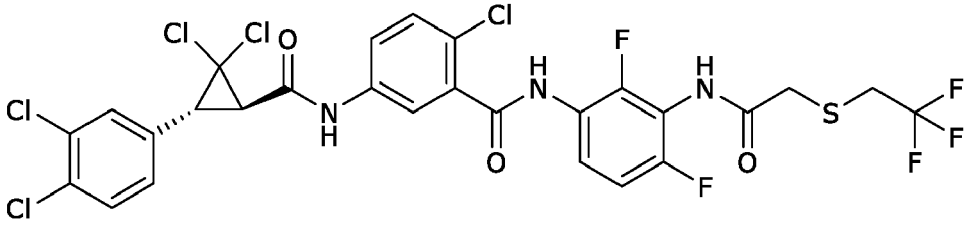
[0156]



[0157] Isolated as a white solid (125 mg, 79%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4-dichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)thio)acetamido)phenyl)benzamide (F9)

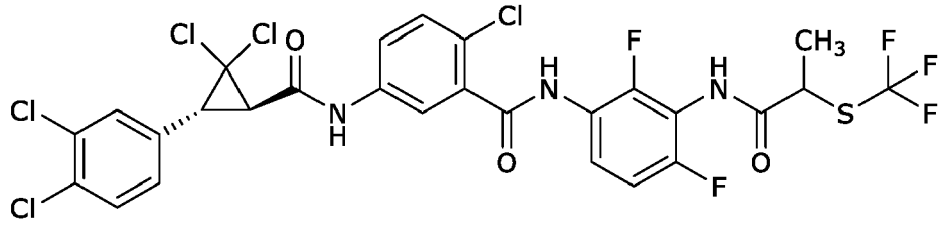
[0158]



[0159] Isolated as a white solid (136 mg, 68%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4-dichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)propanamido)phenyl)benzamide (F10)

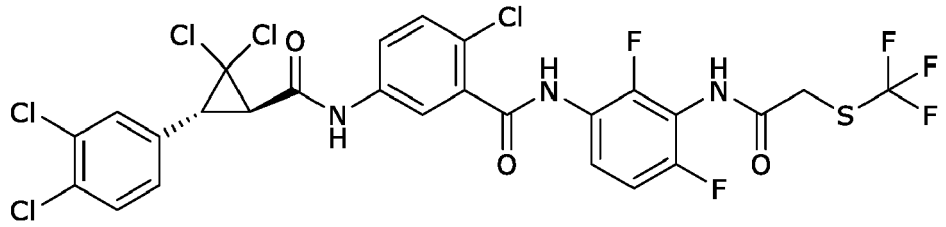
[0160]



[0161] Isolated as a white solid (142 mg, 73%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4-dichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)acetamido)phenyl)benzamide (F11)

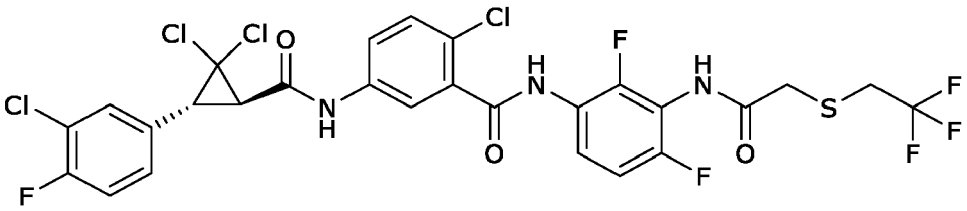
[0162]



[0163] Isolated as a white solid (152 mg, 79%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichioro-3-(3-chloro-4-fluorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)thio)acetamido)phenyl)benzamide (F12)

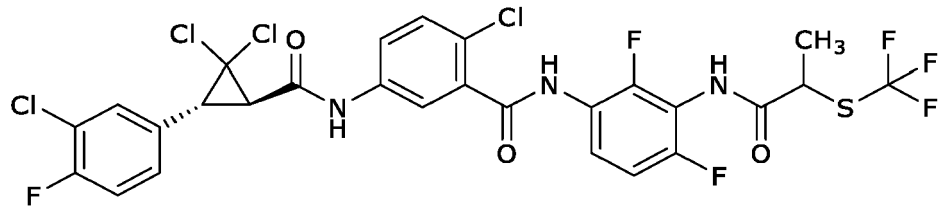
[0164]



[0165] Isolated as a white solid (141 mg, 70%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3-chloro-4-fluorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)propanamido)phenyl)benzamide (F13)

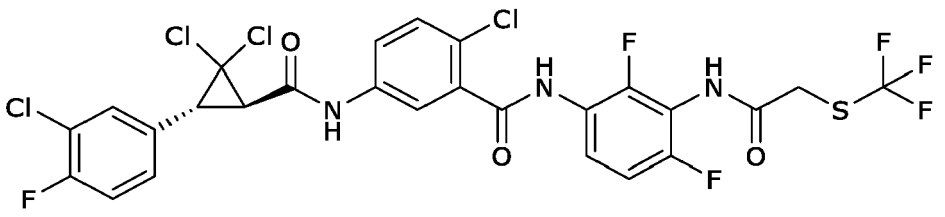
[0166]



[0167] Isolated as a white solid (151 mg, 76%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3-chloro-4-fluorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)acetamido)phenyl)benzamide (F14)

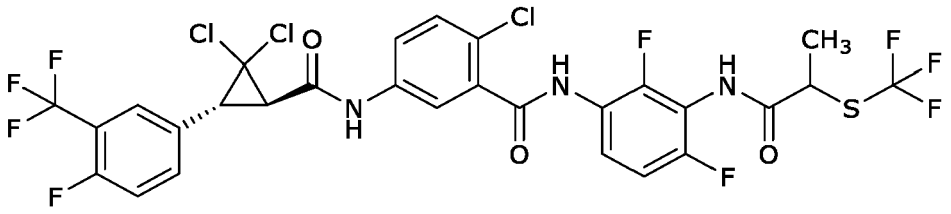
[0168]



[0169] Isolated as a white solid (143 mg, 74%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)propanamido)phenyl)benzamide (F16)

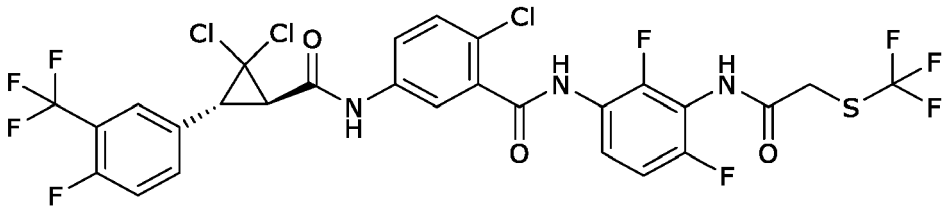
[0170]



[0171] Isolated as a white solid (302 mg, 91%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)acetamido)phenyl)benzamide (F17)

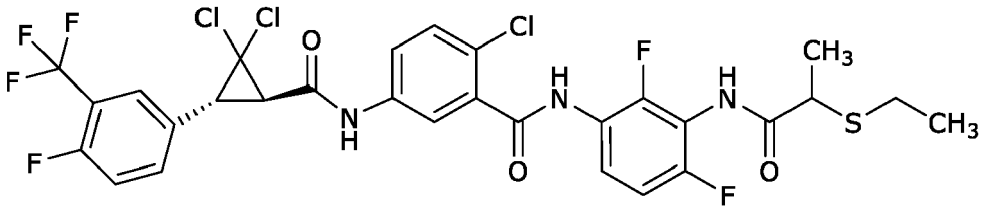
[0172]



[0173] Isolated as a white solid (426 mg, 83%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(3-(2-(ethylthio)propanamido)-2,4-difluorophenyl)benzamide (F18)

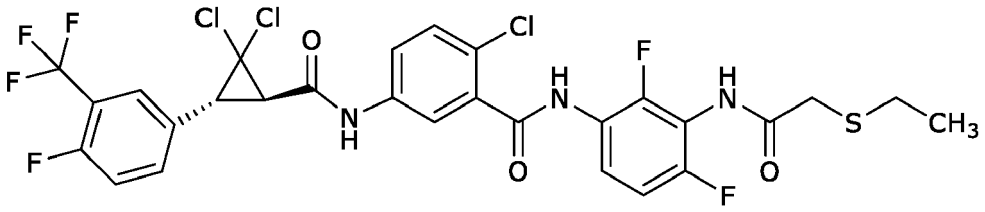
[0174]



[0175] Isolated as a white foam (101 mg, 80%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(3-(2-(ethylthio)acetamido)-2,4-difluorophenyl)benzamide (F19)

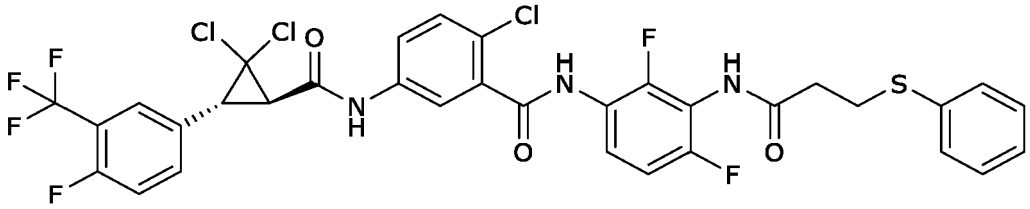
[0176]



[0177] Isolated as a white solid (117 mg, 95%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(3-(phenylthio)propanamido)phenyl)benzamide (F20)

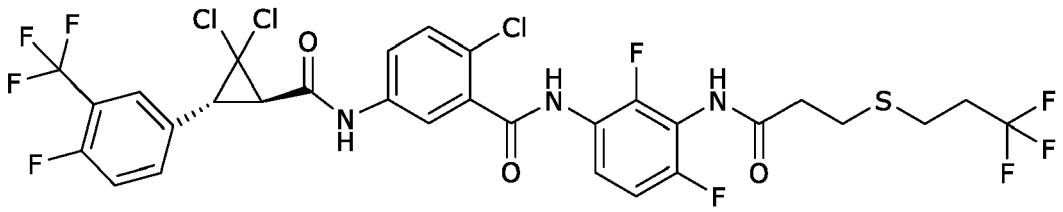
[0178]



[0179] Isolated as a white solid (89 mg, 83%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(3-((3,3,3-trifluoropropyl)thio)propanamido)phenyl)benzamide (F21)

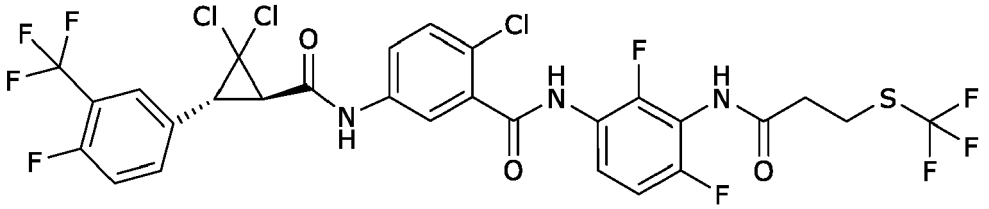
[0180]



[0181] Isolated as a white solid (77 mg, 74%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(3-((trifluoromethyl)thio)propanamido)phenyl)benzamide (F22)

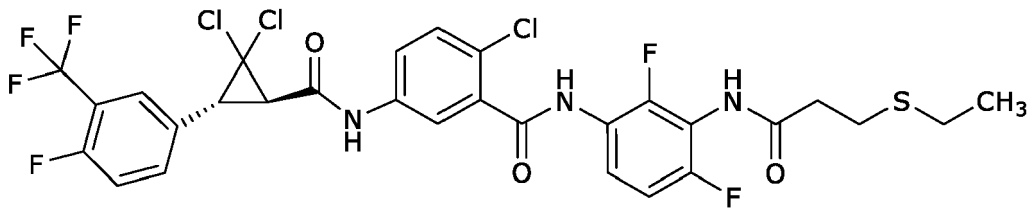
[0182]



[0183] Isolated as a white solid (83 mg, 83%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(3-(3-(ethylthio)propanamido)-2,4-difluorophenyl)benzamide (F23)

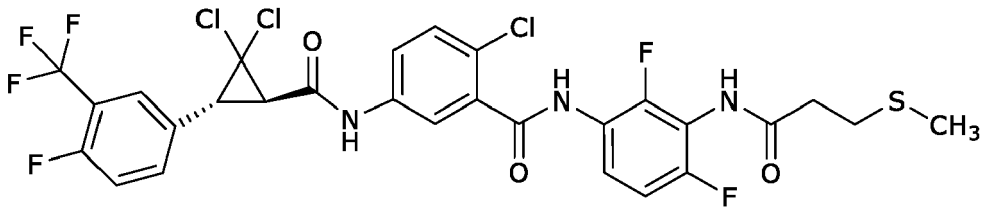
[0184]



[0185] Isolated as a white solid (61 mg, 65%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(3-(methylthio)propanamido)phenyl)benzamide (F24)

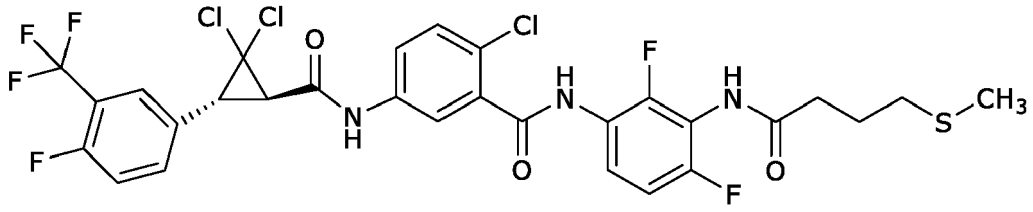
[0186]



[0187] Isolated as a white solid (72 mg, 78%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(4-(methylthio)butanamido)phenyl)benzamide (F25)

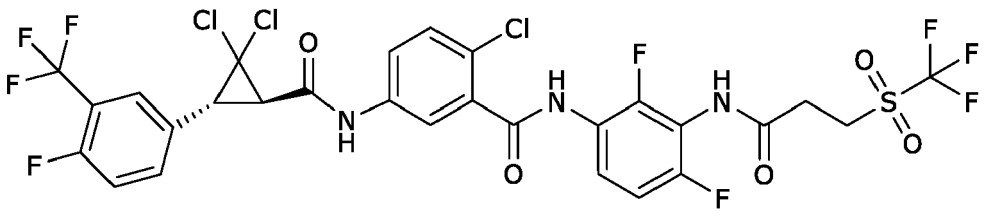
[0188]



[0189] Isolated as a white solid (57 mg, 60%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(3-((trifluoromethyl)sulfonyl)propanamido)phenyl)benzamide (F46)

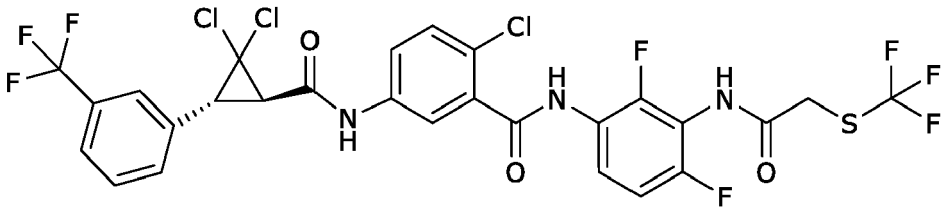
[0190]



[0191] Isolated as a white solid (55 mg, 53%).

2-Chloro-S-((1*R*,3*R*)-2,2-dichloro-3-(3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)acetamido)phenyl)benzamide (F47)

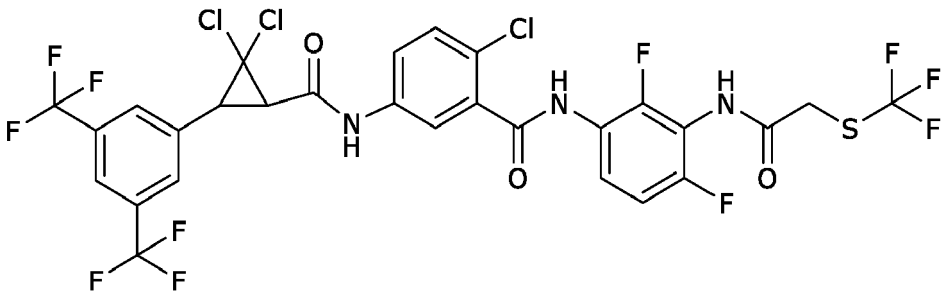
[0192]



[0193] Isolated as a white solid (74 mg, 75%).

***trans*-5-(3-(3,5-Bis(trifluoromethyl)phenyl)-2,2-dichlorocyclopropane-1-carboxamido)-2-chloro-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)acetamido)phenyl)benzamide (F48)**

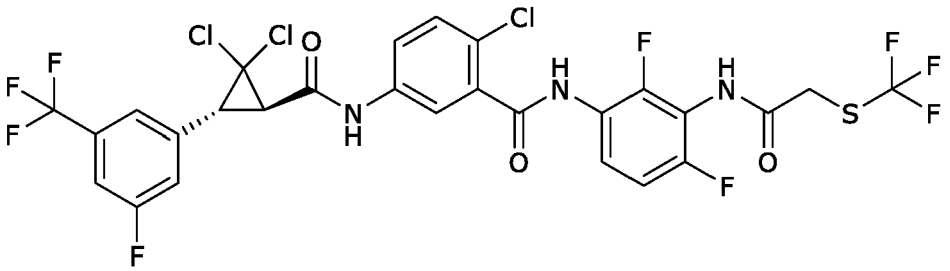
[0194]



[0195] Isolated as a white foam (110 mg, 90%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3-fluoro-5-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)acetamido)phenyl)benzamide (F49)

[0196]

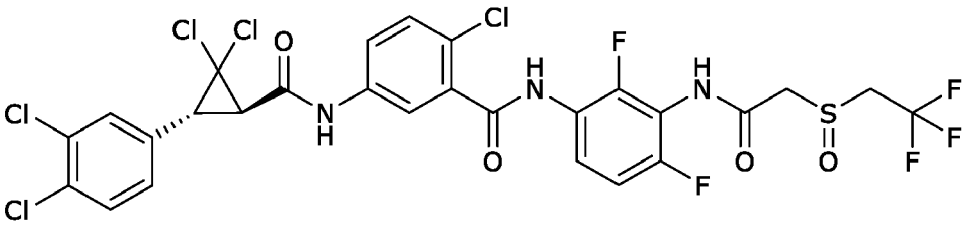


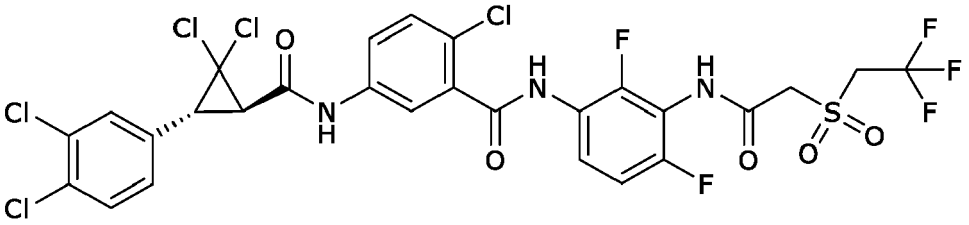
[0197] Isolated as a white solid (70 mg, 84%).

Example 16: Preparation of 2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4-dichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)sulfinyl)acetamido)phenyl)benzamide (F30) and

2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4-dichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)sulfonyl)acetamido)phenyl)benzamide (F42)

[0198]



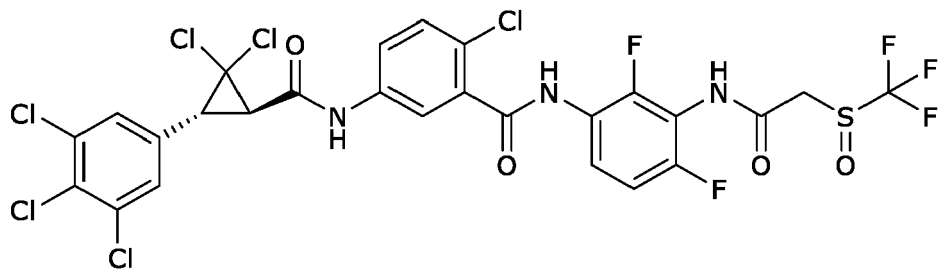


[0199] To a magnetically stirred solution of 2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4-dichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)thio)acetamido)phenyl)benzamide (**F9**; 78 mg, 0.11 mmol) in 1,2-dichloroethane (DCE; 2.1 mL) was added 3-chloroperoxybenzoic acid (34.1 mg, 0.148 mmol) at 0 °C, and the resulting colorless solution was allowed to slowly warm to room temperature over a period of 16 hours. Analysis of the milky reaction mixture (white precipitate) by LCMS indicated full consumption of starting material with conversion to the sulfoxide (92%) and sulfone (8%). The mixture was warmed to 45 °C and stirred overnight to give a 43 : 56 ratio of sulfoxide and sulfone products. The milky reaction mixture was diluted with ethyl acetate (15 mL), and the resulting solution was washed successively with 10% aqueous sodium bisulfite (2 x 5 mL), saturated aqueous sodium bicarbonate (5 mL), and saturated aqueous sodium chloride (brine; 5 mL), dried over sodium sulfate, filtered, and concentrated under reduced pressure. The residue was purified by automated flash chromatography (SiO_2; 0 - 90% ethyl acetate in hexanes) to give the title compounds (**F30**, 30 mg, 38%; **F42**, 41 mg, 51%) as white solids.

[0200] *The following compounds were prepared in like manner to the procedure outlined in Example **16:***

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)sulfinyl)acetamido)phenyl)benzamide (F26)

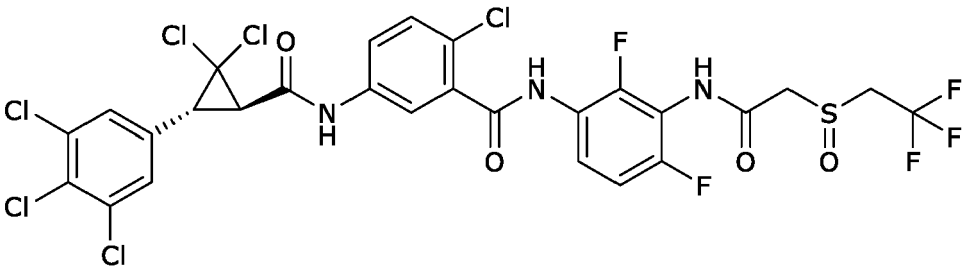
[0201]



[0202] Isolated as a white solid (22 mg, 32%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)sulfinyl)acetamido)phenyl)benzamide (F29)

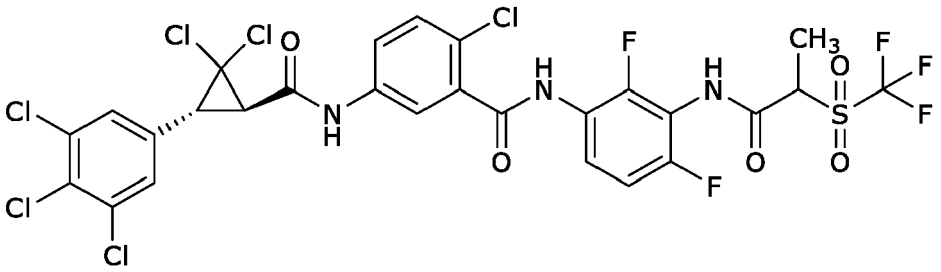
[0203]



[0204] Isolated as a white solid (27 mg, 40%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)sulfonyl)propanamido)phenyl)benzamide (F35)

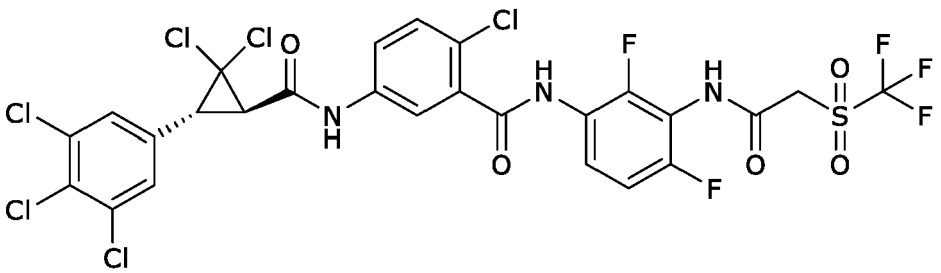
[0205]



[0206] Isolated as a white solid (27 mg, 35%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)sulfonyl)acetamido)phenyl)benzamide (F36)

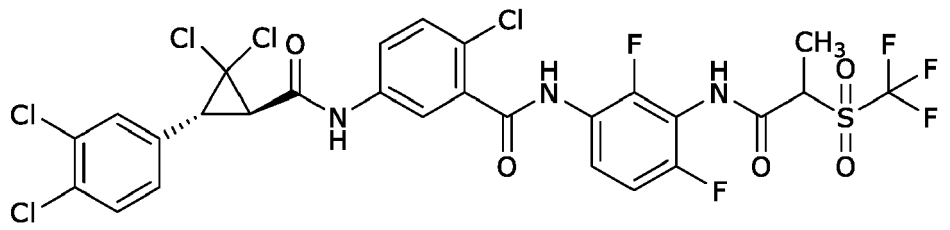
[0207]



[0208] Isolated as a white solid (32 mg, 46%).

2-Chloro-S-((1*R*,3*R*)-2,2-dichloro-3-(3,4-dichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)sulfonyl)propanamido)phenyl)benzamide (F37)

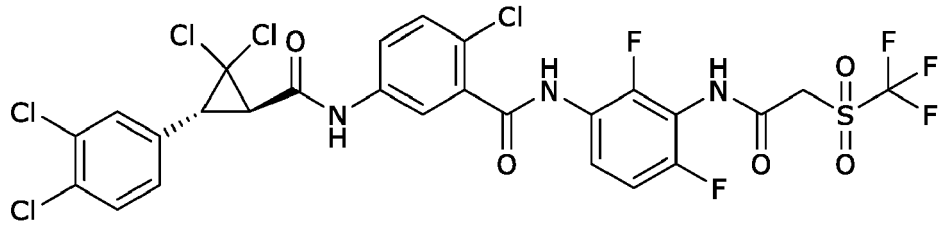
[0209]



[0210] Isolated as a white solid (30 mg, 32%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4-dichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)sulfonyl)acetamido)phenyl)benzamide (F38)

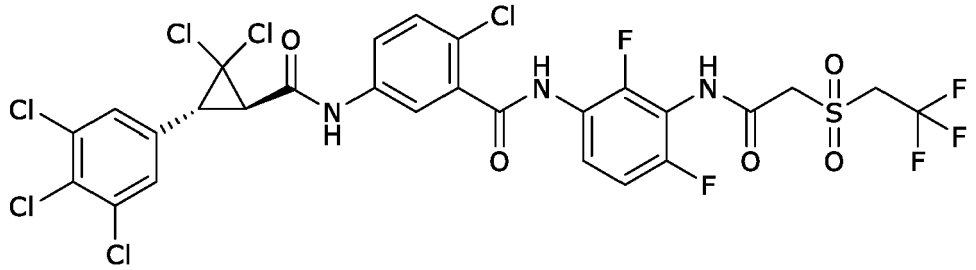
[0211]



[0212] Isolated as a white solid (70 mg, 69%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3,4,5-trichlorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)sulfonyl)acetamido)phenyl)benzamide (F41)

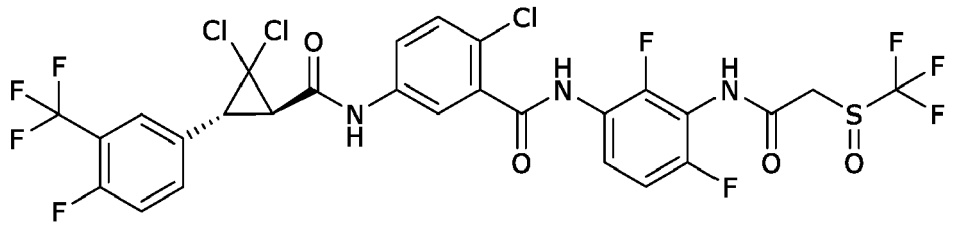
[0213]



[0214] Isolated as a white solid (32 mg, 47%).

Example 17: Preparation of 2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)sulfinyl)acetamido)phenyl)benzamide (F33)

[0215]

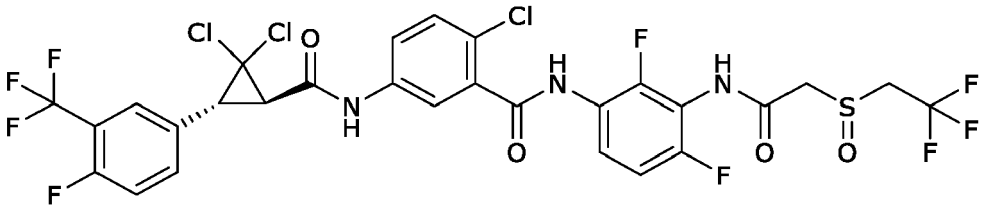


[0216] To a solution of 2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)thio)acetamido)phenyl)benzamide (**F17**; 197 mg, 0.267 mmol) in acetic acid (2.7 mL) was added sodium perborate tetrahydrate (62 mg, 0.40 mmol), and the resulting milky mixture was warmed to 55 °C and stirred for 16 hours. The reaction mixture was warmed to 65 °C and stirred for 5 hours, cooled to 55 °C, and treated with additional perborate (12 mg, 0.053 mmol). The milky reaction mixture was stirred at 55 °C for 16 hours, cooled to room temperature, diluted with dichloromethane (50 mL), and carefully neutralized with saturated aqueous sodium bicarbonate. The phases were separated and the aqueous phase was extracted with additional dichloromethane (10 mL). The combined organic phases were washed with brine (25 mL) and dried by passing through a phase separator cartridge. The solvent was evaporated and the resulting residue was purified by automated flash chromatography (SiO_2; 0 - 60% ethyl acetate in hexanes) to give the title compound (19 mg, 9.4%) as a white solid.

[0217] *The following compounds were prepared in like manner to the procedure outlined in Example **17:***

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)sulfinyl)acetamido)phenyl)benzamide (F32)

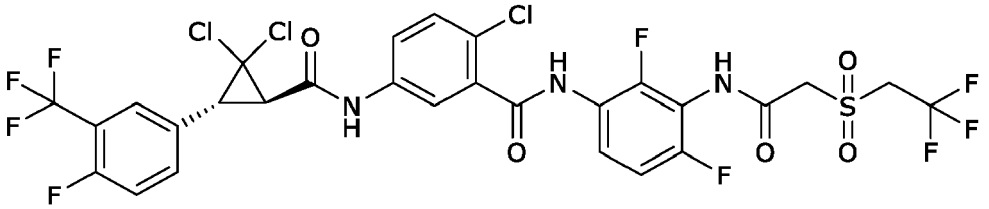
[0218]



[0219] Isolated as a white solid (118 mg, 62%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)sulfonyl)acetamido)phenyl)benzamide (F44)

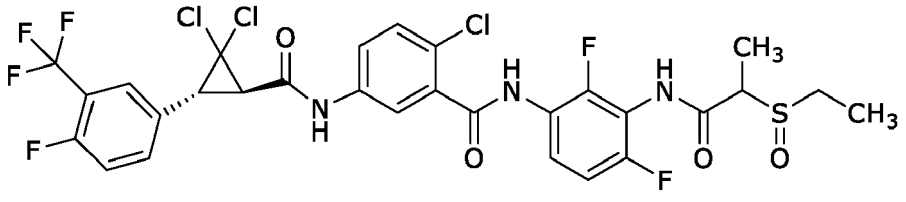
[0220]



[0221] Isolated as a white solid (47 mg, 24%).

Example 18: Preparation of 2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(3-(2-(ethylsulfinyl)propanamido)-2,4-difluorophenyl)benzamide (F34)

[0222]

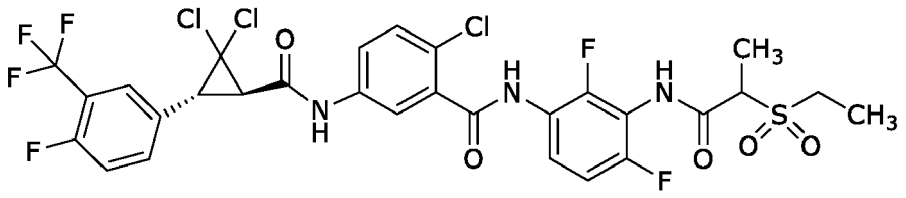


[0223] 2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(3-(2-(ethylthio)propanamido)-2,4-difluorophenyl)benzamide **(F18)** (0.130 g, 0.182 mmol) was dissolved in hexafluoroisopropanol (5 mL). 30% Aqueous hydrogen peroxide (0.083 g, 0.729 mmol) was added at room temperature.

After 2 hours, the reaction mixture was poured into ethyl acetate (50 mL) and washed with saturated aqueous sodium bisulfite (10 mL) and water (10 mL). The organic extract was concentrated under vacuum on a rotary evaporator, and the resulting crude product was purified by silica and C-18 flash chromatography to give the title compound (0.066 g, 47%) as a white foam (mixture of diastereomers).

Example 19: Preparation of 2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(3-(2-(ethylsulfonyl)propanamido)-2,4-difluorophenyl)benzamide (F45)

[0224]

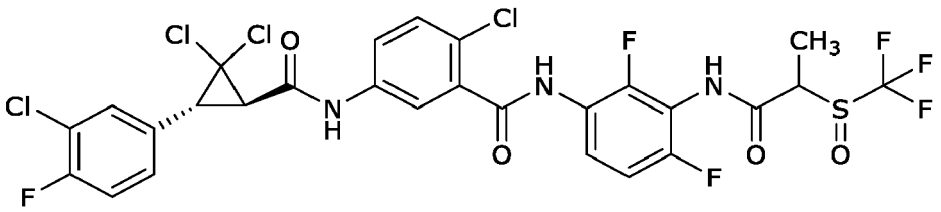


[0225] 2-Chloro-5-((1R,3R)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(3-(2-(ethylthio)propanamido)-2,4-difluorophenyl)benzamide **(F18)** (0.093 g, 0.130 mmol) was dissolved in 2 mL of methanol (2 mL). Oxone® (0.100 g, 0.326 mmol) was added at room temperature. After 20 hours, the reaction mixture was poured into ethyl acetate (50 mL) and washed with saturated aqueous sodium bisulfite (10 mL) and water (10 mL). The organic extract was concentrated under vacuum on a rotary evaporator, and the resulting crude product was purified by silica gel flash chromatography to give the title compound (0.079 g, 77%) as a white solid.

[0226] *The following compounds were prepared in like manner to the procedure outlined in Example **19:***

2-Chloro-5-((1*R*,3*R*)-2,2-dichioro-3-(3-chloro-4-fluorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)sulfinyl)propanamido)phenyl)benzamide (F27)

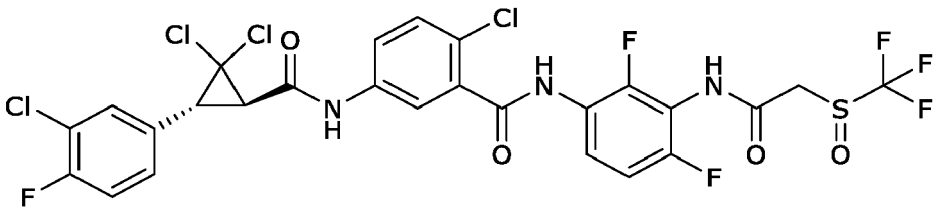
[0227]



[0228] Isolated as a white solid (28 mg, 24%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichioro-3-(3-chloro-4-fluorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)sulfinyl)acetamido)phenyl)benzamide (F28)

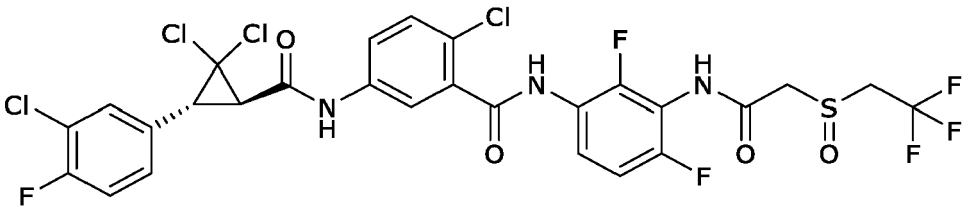
[0229]



[0230] Isolated as a light tan solid (13 mg, 15%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichioro-3-(3-chloro-4-fluorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)sulfinyl)acetamido)phenyl)benzamide (F31)

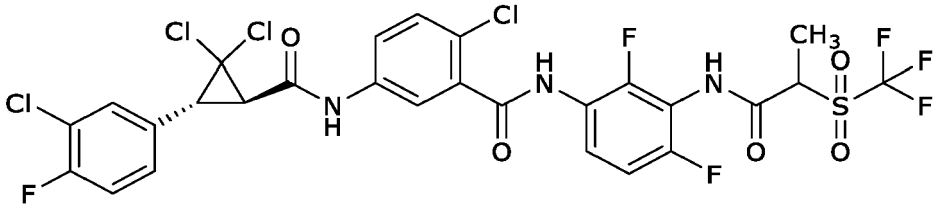
[0231]



[0232] Isolated as a white solid (16 mg, 19%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(3-chloro-4-fluorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)sulfonyl)propanamido)phenyl)benzamide (F39)

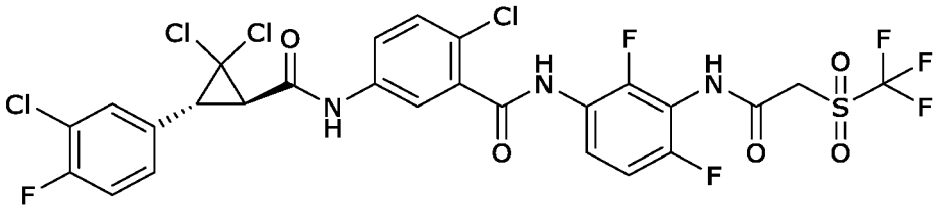
[0233]



[0234] Isolated as a white solid (27 mg, 25%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichioro-3-(3-chloro-4-fluorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((trifluoromethyl)sulfonyl)acetamido)phenyl)benzamide (F40)

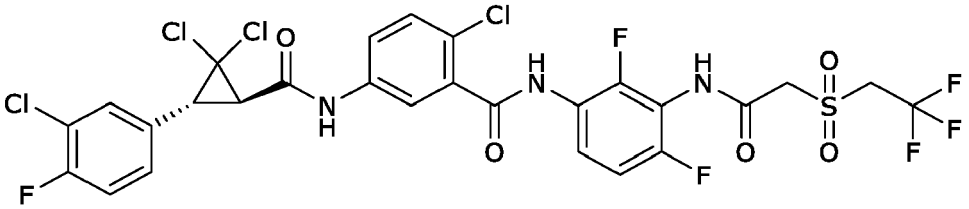
[0235]



[0236] Isolated as a light tan solid (30 mg, 32%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichioro-3-(3-chloro-4-fluorophenyl)cyclopropane-1-carboxamido)-*N*-(2,4-difluoro-3-(2-((2,2,2-trifluoroethyl)sulfonyl)acetamido)phenyl)benzamide (F43)

[0237]

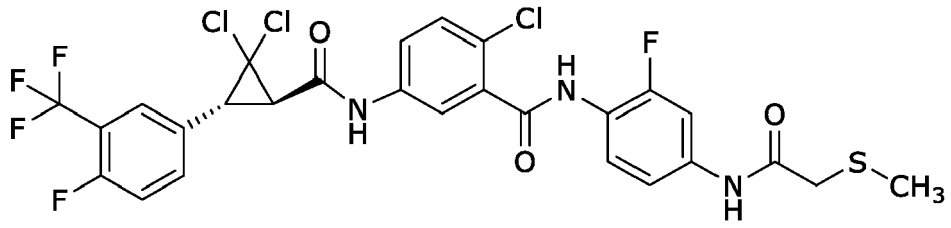


[0238] Isolated as a white solid (54 mg, 63%).

[0239] *The following compounds were prepared in like manner to the procedure outlined in Example **15:***

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2-fluoro-4-(2-(methylthio)acetamido)phenyl)benzamide (F50)

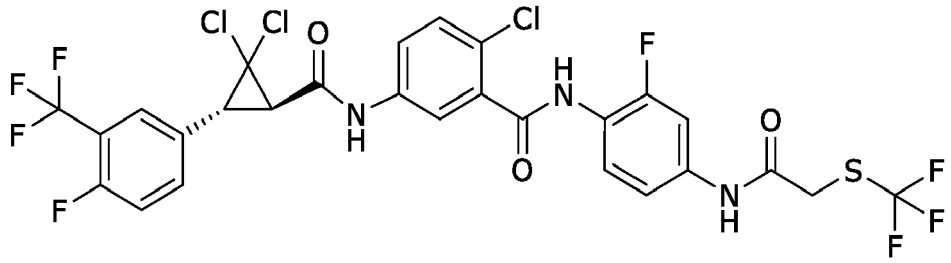
[0240]



[0241] Isolated as a white soild (38 mg, 50%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2-fluoro-4-(2-((trifluoromethyl)thio)acetamido)phenyl)benzamide (F51)

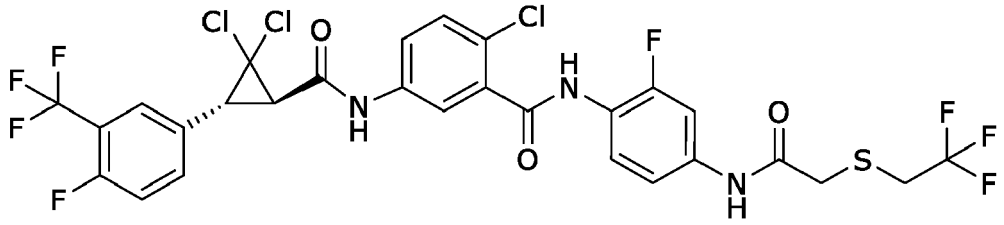
[0242]



[0243] Isolated as a light-yellow foam (58 mg, 75%).

2-Chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)-*N*-(2-fluoro-4-(2-((2,2,2-trifluoroethyl)thio)acetamido)phenyl)benzamide (F52)

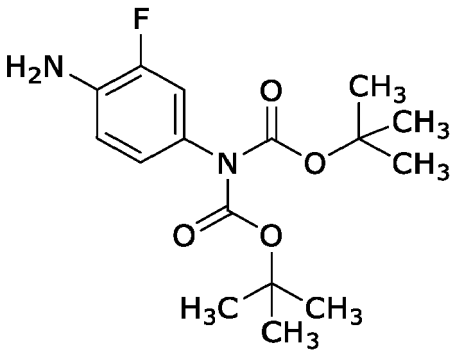
[0244]



[0245] Isolated as a white foam (59 mg, 75%).

Example 20: Preparation of *tert*-butyl *N*-(4-amino-3-fluorophenyl)-*N*-tert-butoxycarbonyl-carbamate (C15)

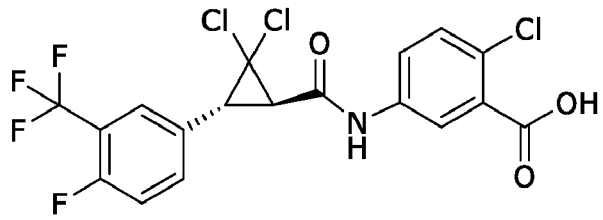
[0246]



[0247] The title compound was prepared from *tert*-butyl *N*-*tert*-butoxycarbonyl-*N*-(3-fluoro-4-nitro-phenyl)carbamate according to the methods disclosed in Example 91 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2 and isolated as a peach-colored solid (3.475 g, 100%): mp 77 - 82 °C; ^{1}H NMR (300 MHz, DMSO-d_6) δ 6.90 - 6.83 (m, 1H), 6.74 - 6.64 (m, 2H), 5.23 (s, 2H), 1.38 (s, 18H); ^{19}F NMR (564 MHz, DMSO-d_6) δ -134.64, -134.66, -134.66, -134.68; HRMS-ESI (*m*/*z*) [M+]$^{+}$ calcd for $C_{16}H_{23}FN_2O_4$, 326.1642; found, 326.1646.

Example 21: Preparation of 2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)benzoic acid (C16)

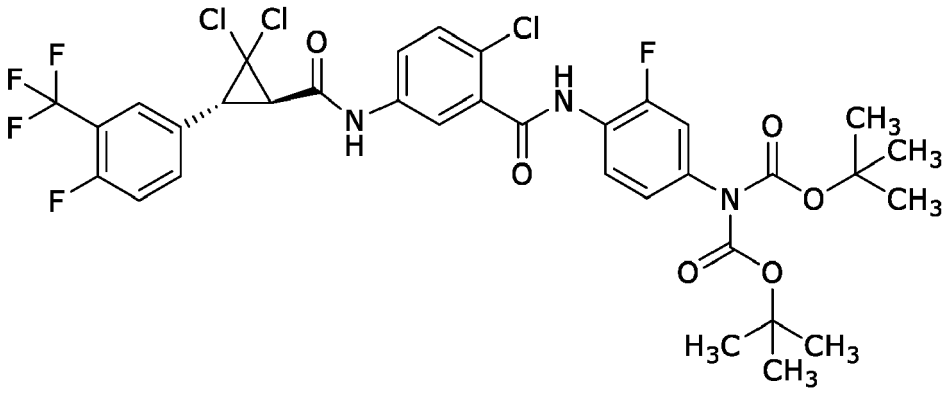
[0248]



[0249] The title compound was prepared from (1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxylic acid (**C10**, prepared as in Heemstra, R. J., et al., U. S. Patent Application Publication 2018/0098541 A1) and 5-amino-2-chloro benzoic acid according to the methods disclosed in Example 39 in Heemstra, R. J., et al., U. S. Patent Application Publication 2018/0098541A1 and isolated as a tan solid (5.80 g, 93%): ^{1}H NMR (400 MHz, DMSO-d_6) δ 13.48 (s, 1H), 10.94 (s, 1H), 8.17 (d, *J* = 2.7 Hz, 1H), 7.94 - 7.72 (m, 3H), 7.68 - 7.44 (m, 2H), 3.68 (d, *J* = 8.4 Hz, 1H), 3.49 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.93 (d, *J* = 12.6 Hz), -116.95 (q, *J* = 12.5 Hz); ESIMS *m*/*z* 472 ([M+H]$^{+}$).

Example 22: Preparation of tert-butyl *N*-*tert*-butoxycarbonyl-*N*-[4-[[2-chloro-5-[[(1*R*,3*R*)-2,2-dichloro-3-[4-fluoro-3-(trifluoromethyl)phenyl]cyclopropane-carbonyl]amino]benzoyl]amino]-3-fluoro-phenyl]carbamate (C17)

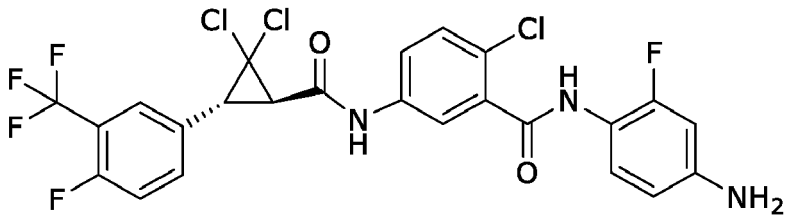
[0250]



[0251] The title compound was prepared from *tert*-butyl *N*-(4-amino-3-fluorophenyl)-*N*-*tert*-butoxycarbonyl-carbamate (prepared from *tert*-butyl *N*-tert-butoxycarbonyl-*N*-(3-fluoro-4-nitro-phenyl)carbamate according to the methods disclosed in Example 91 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2) and 2-chloro-5-((1*R*,3*R*)-2,2-dichloro-3-(4-fluoro-3-(trifluoromethyl)phenyl)cyclopropane-1-carboxamido)benzoic acid **(C16)** according to the methods disclosed for **F602** in Example 15 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2) and isolated as a white solid (0.606 g, 89%): mp 128 - 132 °C; ^{1}H NMR (300 MHz, DMSO-d_6) δ 10.98 (s, 1H), 10.49 (s, 1H), 7.94 - 7.75 (m, 5H), 7.63 - 7.54 (m, 2H), 7.31 (dd, *J* = 11.3, 2.4 Hz, 1H), 7.09 (d, *J* = 8.6 Hz, 1H), 3.70 (d, *J* = 8.5 Hz, 1H), 3.52 (d, *J* = 8.5 Hz, 1H), 1.41 (s, 18H); ^{19}F NMR (471 MHz, DMSO-d_6) δ -59.91 (d, *J* = 12.3 Hz), -116.93 (ddq, *J* = 18.3, 12.2, 6.4 Hz), -121.42--121.52 (m); HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{34}H_{31}Cl_3F_5N_3O_6$, 777.1199; found, 777.1192.

Example 23: Preparation of *N*-(4-amino-2-fluoro-phenyl)-2-chloro-5-[[(1*R*,3*R*)-2,2-dichloro-3-[4-fluoro-3-(trifluoromethyl)phenyl]cyclopropanecarbonyl]-amino]benzamide (C18)

[0252]



[0253] The title compound was prepared from *tert*-butyl *N*-tert-butoxycarbonyl-*N*-[4-[[2-chloro-5-[[(1*R*,3*R*)-2,2-dichloro-3-[4-fluoro-3-(trifluoromethyl)phenyl]cyclopropanecarbonyl]amino]benzoyl]amino]-3-fluoro-phenyl]carbamate **(C17)** according to the methods disclosed for **F175** in Example 62 in Heemstra, R. J., et al., U. S. Patent 9,781,935 B2) and isolated as a tan foam (0.502 g,94%): ^{1}H NMR (500 MHz, DMSO-d_6) δ 10.92 (s, 1H), 9.82 (s, 1H), 7.89 - 7.80 (m, 3H), 7.74 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.59 (dd, *J* = 10.7, 8.7 Hz, 1H), 7.52 (d, *J* = 8.8 Hz, 1H), 7.17 (t, *J* = 8.6 Hz, 1H), 6.45 - 6.35 (m, 2H), 5.37 (s, 2H), 3.69 (d, *J* = 8.5 Hz, 1H), 3.50 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (471 MHz, DMSO-d_6) δ -59.91 (d, *J* = 12.3 Hz), -116.94 (ddq, *J* = 18.3, 12.3, 6.5 Hz), -122.15 (dd, *J* = 12.3, 8.8 Hz); HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{24}H_{15}Cl_3F_5N_3O_2$, 577.0150; found, 577.0152.

[0254] It is recognized that some reagents and reaction conditions may not be compatible with certain functionalities that may be present in certain molecules of Formula One or certain molecules used in the preparation of certain molecules of Formula One. In such cases, it may be necessary to employ standard protection and deprotection protocols comprehensively reported in the literature and well known to a person skilled in the art. In addition, in some cases it may be necessary to perform further routine synthetic steps not described herein to complete the synthesis of desired molecules. A person skilled in the art will also recognize that it may be possible to achieve the synthesis of desired molecules by performing some of the steps of the synthetic routes in a different order to that described. A person skilled in the art will also recognize that it may be possible to perform standard functional group interconversions or substitution reactions on desired molecules to introduce or modify substituents.

Biological Assays

[0255] The following bioassays against Beet Armyworm (*Spodoptera exigua*), Cabbage Looper (*Trichoplusia ni*), and Yellow Fever Mosquito (*Aedes aegypti*), are included herein due to the damage they inflict. Furthermore, the Beet Armyworm and Cabbage Looper are two good indicator species for a broad range of chewing pests. Additionally, the Green Peach Aphid is a good indicator species for a broad range of sap-feeding pests. The results with these four indicator species along with the Yellow Fever Mosquito show the broad usefulness of the molecules of Formula One in controlling pests in Phyla Arthropoda, Mollusca, and Nematoda (Drewes et al.)

Example A: Bioassays on Beet Armyworm (*Spodoptera exigua,* LAPHEG) ("BAW") and Cabbage Looper (*Trichoplusia ni,* TRIPNI) ("CL")

[0256] Beet armyworm is a serious pest of economic concern for alfalfa, asparagus, beets, citrus, corn, cotton, onions, peas, peppers, potatoes, soybeans, sugar beets, sunflowers, tobacco, and tomatoes, among other crops. It is native to Southeast Asia but is now found in Africa, Australia, Japan, North America, and Southern Europe. The larvae may feed in large swarms causing devastating crop losses. It is known to be resistant to several pesticides.

[0257] Cabbage looper is a serious pest found throughout the world. It attacks alfalfa, beans, beets, broccoli, Brussel

sprouts, cabbage, cantaloupe, cauliflower, celery, collards, cotton, cucumbers, eggplant, kale, lettuce, melons, mustard, parsley, peas, peppers, potatoes, soybeans, spinach, squash, tomatoes, turnips, and watermelons, among other crops. This species is very destructive to plants due to its voracious appetite. The larvae consume three times their weight in food daily. The feeding sites are marked by large accumulations of sticky, wet, fecal material, which may contribute to higher disease pressure thereby causing secondary problems on the plants in the site. It is known to be resistant to several pesticides.

[0258] Consequently, because of the above factors control of these pests is important. Furthermore, molecules that control these pests (BAW and CL), which are known as chewing pests, will be useful in controlling other pests that chew on plants.

[0259] Certain molecules disclosed in this document were tested against BAW and CL using procedures described in the following examples. In the reporting of the results, the "**BAW & CL Rating Table**" was used (See Table Section).

Bioassays on BAW

[0260] Bioassays on BAW were conducted using a 128-well diet tray assay. One to five second instar BAW larvae were placed in each well (3 mL) of the diet tray that had been previously filled with 1 mL of artificial diet to which 50 $\mu g/cm^2$ of the test molecule (dissolved in 50 μL of 90:10 acetone-water mixture) had been applied (to each of eight wells) and then allowed to dry. Trays were covered with a clear self-adhesive cover, vented to allow gas exchange, and held at 25 °C, 14:10 light-dark for five to seven days. Percent mortality was recorded for the larvae in each well; activity in the eight wells was then averaged. The results are indicated in the table entitled "**Table ABC: Biological Results**" (See Table Section).

Bioassays on CL

[0261] Bioassays on CL were conducted using a 128-well diet tray assay. One to five second instar CL larvae were placed in each well (3 mL) of the diet tray that had been previously filled with 1 mL of artificial diet to which 50 $\mu g/cm^2$ of the test molecule (dissolved in 50 μL of 90:10 acetone-water mixture) had been applied (to each of eight wells) and then allowed to dry. Trays were covered with a clear self-adhesive cover, vented to allow gas exchange, and held at 25 °C, 14:10 light-dark for five to seven days. Percent mortality was recorded for the larvae in each well; activity in the eight wells was then averaged. The results are indicated in the table entitled "**Table ABC: Biological Results**" (See Table Section).

Example B: Bioassays on Green Peach Aphid (*Myzus persicae,* MYZUPE) ("GPA").

[0262] GPA is the most significant aphid pest of peach trees, causing decreased growth, shriveling of the leaves, and the death of various tissues. It is also hazardous because it acts as a vector for the transport of plant viruses, such as potato virus Y and potato leafroll virus to members of the nightshade/potato family *Solanaceae,* and various mosaic viruses to many other food crops. GPA attacks such plants as broccoli, burdock, cabbage, carrot, cauliflower, daikon, eggplant, green beans, lettuce, macadamia, papaya, peppers, sweet potatoes, tomatoes, watercress, and zucchini, among other crops. GPA also attacks many ornamental crops such as carnation, chrysanthemum, flowering white cabbage, poinsettia, and roses. GPA has developed resistance to many pesticides. Currently, it is a pest that has the third largest number of reported cases of insect resistance (Sparks et al.). Consequently, because of the above factors control of this pest is important. Furthermore, molecules that control this pest (GPA), which is known as a sap-feeding pest, are useful in controlling other pests that feed on the sap from plants.

[0263] Certain molecules disclosed in this document were tested against GPA using procedures described in the following example. In the reporting of the results, the "**GPA & YFM Rating Table**" was used (See Table Section).

[0264] Cabbage seedlings grown in 3-inch pots, with 2-3 small (3-5 cm) true leaves, were used as test substrate. The seedlings were infested with 20-50 GPA (wingless adult and nymph stages) one day prior to chemical application. Four pots with individual seedlings were used for each treatment. Test molecules (2 mg) were dissolved in 2 mL of acetone/methanol (1:1) solvent, forming stock solutions of 1000 ppm test molecule. The stock solutions were diluted 5X with 0.025% Tween 20 in water to obtain the solution at 200 ppm test molecule. A hand-held aspirator-type sprayer was used for spraying a solution to both sides of cabbage leaves until runoff. Reference plants (solvent check) were sprayed with the diluent only containing 20% by volume of acetone/methanol (1:1) solvent. Treated plants were held in a holding room for three days at approximately 25 °C and ambient relative humidity (RH) prior to grading. Evaluation was conducted by counting the number of live aphids per plant under a microscope. Percent control was measured using Abbott's correction formula (W. S. Abbott, "A Method of Computing the Effectiveness of an Insecticide" J. Econ. Entomol. 18 (1925), pp.265-267) as follows. Corrected % Control = 100 * (X - Y) / X where X = No. of live aphids on solvent check plants and Y = No. of live aphids on treated plants. The results are indicated in the table entitled "Table ABC: Biological

Results" (See Table Section).

Example C: Bioassays on Yellow Fever Mosquito (*Aedes aegypti,* AEDSAE) ("YFM").

[0265] YFM prefers to feed on humans during the daytime and is most frequently found in or near human habitations. YFM is a vector for transmitting several diseases. It is a mosquito that can spread the dengue fever and yellow fever viruses. Yellow fever is the second most dangerous mosquito-borne disease after malaria. Yellow fever is an acute viral hemorrhagic disease and up to 50% of severely affected persons without treatment will die from yellow fever. There are an estimated 200,000 cases of yellow fever, causing 30,000 deaths worldwide each year. Dengue fever is a nasty, viral disease; it is sometimes called "breakbone fever" or "break-heart fever" because of the intense pain it can produce. Dengue fever kills about 20,000 people annually. Consequently, because of the above factors control of this pest is important. Furthermore, molecules that control this pest (YFM), which is known as a sucking pest, are useful in controlling other pests that cause human and animal suffering.

[0266] Certain molecules disclosed in this document were tested against YFM using procedures described in the following paragraph. In the reporting of the results, the "**GPA & YFM Rating Table**" was used (See Table Section).

[0267] Master plates containing 400 μg of a molecule dissolved in 100 μL of dimethyl sulfoxide (DMSO) (equivalent to a 4000 ppm solution) are used. A master plate of assembled molecules contains 15 μL per well. To this plate, 135 μL of a 90:10 water/acetone mixture is added to each well. A robot (Biomek® NXP Laboratory Automation Workstation) is programmed to dispense 15 μL aspirations from the master plate into an empty 96-well shallow plate ("daughter" plate). There are 6 reps ("daughter" plates) created per master. The created "daughter" plates are then immediately infested with YFM larvae.

[0268] The day before plates are to be treated, mosquito eggs are placed in Millipore water containing liver powder to begin hatching (4 g into 400 mL). After the "daughter" plates are created using the robot, they are infested with 220 μL of the liver powder/larval mosquito mixture (about 1 day-old larvae). After plates are infested with mosquito larvae, a non-evaporative lid is used to cover the plate to reduce drying. Plates are held at room temperature for 3 days prior to grading. After 3 days, each well is observed and scored based on mortality. The results are indicated in the table entitled "**Table ABC: Biological Results**" (See Table Section).

Agriculturally acceptable acid addition salts, salt derivatives, solvates, ester derivatives, polymorphs, isotopes, and radionuclides

[0269] Molecules of Formula One may be formulated into agriculturally acceptable acid addition salts. By way of a non-limiting example, an amine function can form salts with hydrochloric, hydrobromic, sulfuric, phosphoric, acetic, benzoic, citric, malonic, salicylic, malic, fumaric, oxalic, succinic, tartaric, lactic, gluconic, ascorbic, maleic, aspartic, benzenesulfonic, methanesulfonic, ethanesulfonic, hydroxyl-methanesulfonic, and hydroxyethanesulfonic acids. Additionally, by way of a non-limiting example, an acid function can form salts including those derived from alkali or alkaline earth metals and those derived from ammonia and amines. Examples of preferred cations include sodium, potassium, and magnesium.

[0270] Molecules of Formula One may be formulated into salt derivatives. By way of a non-limiting example, a salt derivative may be prepared by contacting a free base with a sufficient amount of the desired acid to produce a salt. A free base may be regenerated by treating the salt with a suitable dilute aqueous base solution such as dilute aqueous sodium hydroxide, potassium carbonate, ammonia, and sodium bicarbonate. As an example, in many cases, a pesticide, such as 2,4-D, is made more water-soluble by converting it to its dimethylamine salt.

[0271] Molecules of Formula One may be formulated into stable complexes with a solvent, such that the complex remains intact after the non-complexed solvent is removed. These complexes are often referred to as "solvates." However, it is particularly desirable to form stable hydrates with water as the solvent.

[0272] Molecules of Formula One containing an acid functionality may be made into ester derivatives. These ester derivatives can then be applied in the same manner as the molecules disclosed in this document are applied.

[0273] Molecules of Formula One may be made as various crystal polymorphs. Polymorphism is important in the development of agrochemicals since different crystal polymorphs or structures of the same molecule can have vastly different physical properties and biological performances.

[0274] Molecules of Formula One may be made with different isotopes. Of particular importance are molecules having ^{2}H (also known as deuterium) or ^{3}H (also known as tritium) in place of ^{1}H. Molecules of Formula One may be made with different radionuclides. Of particular importance are molecules having ^{14}C (also known as radiocarbon). Molecules of Formula One having deuterium, tritium, or ^{14}C may be used in biological studies allowing tracing in chemical and physiological processes and half-life studies, as well as, MoA studies.

Combinations

[0275] In another embodiment of this invention, molecules of Formula One may be used in combination (such as, in a compositional mixture, or a simultaneous or sequential application) with one or more active ingredients.

[0276] In another embodiment of this invention, molecules of Formula One may be used in combination (such as, in a compositional mixture, or a simultaneous or sequential application) with one or more active ingredients each having a MoA that is the same as, similar to, but more likely - different from, the MoA of the molecules of Formula One.

[0277] In another embodiment, molecules of Formula One may be used in combination (such as, in a compositional mixture, or a simultaneous or sequential application) with one or more molecules having acaricidal, algicidal, avicidal, bactericidal, fungicidal, herbicidal, insecticidal, molluscicidal, nematicidal, rodenticidal, and/or virucidal properties.

[0278] In another embodiment, the molecules of Formula One may be used in combination (such as, in a compositional mixture, or a simultaneous or sequential application) with one or more molecules that are antifeedants, bird repellents, chemosterilants, herbicide safeners, insect attractants, insect repellents, mammal repellents, mating disrupters, plant activators, plant growth regulators, and/or synergists.

[0279] In another embodiment, molecules of Formula One may also be used in combination (such as in a compositional mixture, or a simultaneous or sequential application) with one or more biopesticides.

[0280] In another embodiment, in a pesticidal composition combinations of a molecule of Formula One and an active ingredient may be used in a wide variety of weight ratios. For example, in a two-component mixture, the weight ratio of a molecule of Formula One to an active ingredient, the weight ratios in Table B may be used. However, in general, weight ratios less than about 10:1 to about 1:10 are preferred. It is also preferred sometimes to use a three, four, five, six, seven, or more, component mixture comprising a molecule of Formula One and an additional two or more active ingredients.

[0281] Weight ratios of a molecule of Formula One to an active ingredient may also be depicted as *X:Y*; wherein *X* is the parts by weight of a molecule of Formula One and *Y* is the parts by weight of active ingredient. The numerical range of the parts by weight for *X* is $0 < X \leq 100$ and the parts by weight for *Y* is $0 < Y \leq 100$ and is shown graphically in TABLE C. By way of non-limiting example, the weight ratio of a molecule of Formula One to an active ingredient may be 20:1.

[0282] Ranges of weight ratios of a molecule of Formula One to an active ingredient may be depicted as $X_1:Y_1$ to $X_2:Y_2$, wherein *X* and *Y* are defined as above.

[0283] In one embodiment, the range of weight ratios may be $X_1:Y_1$ to $X_2:Y_2$, wherein $X_1 > Y_1$ and $X_2 < Y_2$. By way of non-limiting example, the range of a weight ratio of a molecule of Formula One to an active ingredient may be between 3:1 and 1:3, inclusive of the endpoints.

[0284] In another embodiment, the range of weight ratios may be $X_1:Y_1$ to $X_2:Y_2$, wherein $X_1 > Y_1$ and $X_2 > Y_2$. By way of non-limiting example, the range of weight ratio of a molecule of Formula One to an active ingredient may be between 15:1 and 3:1, inclusive of the endpoints.

[0285] In another embodiment, the range of weight ratios may be $X_1:Y_1$ to $X_2:Y_2$, wherein $X_1 < Y_1$ and $X_2 < Y_2$. By way of non-limiting example, the range of weight ratios of a molecule of Formula One to an active ingredient may be between about 1:3 and about 1:20, inclusive of the endpoints.

Formulations

[0286] A pesticide is many times not suitable for application in its pure form. It is usually necessary to add other substances so that the pesticide may be used at the required concentration and in an appropriate form, permitting ease of application, handling, transportation, storage, and maximum pesticide activity. Thus, pesticides are formulated into, for example, baits, concentrated emulsions, dusts, emulsifiable concentrates, fumigants, gels, granules, microencapsulations, seed treatments, suspension concentrates, suspoemulsions, tablets, water soluble liquids, water dispersible granules or dry flowables, wettable powders, and ultra-low volume solutions.

[0287] Pesticides are applied most often as aqueous suspensions or emulsions prepared from concentrated formulations of such pesticides. Such water-soluble, water-suspendable, or emulsifiable formulations are either solids, usually known as wettable powders, water dispersible granules, liquids usually known as emulsifiable concentrates, or aqueous suspensions. Wettable powders, which may be compacted to form water dispersible granules, comprise an intimate mixture of the pesticide, a carrier, and surfactants. The concentration of the pesticide is usually from about 10% to about 90% by weight. The carrier is usually selected from among the attapulgite clays, the montmorillonite clays, the diatomaceous earths, or the purified silicates. Effective surfactants, comprising from about 0.5% to about 10% of the wettable powder, are found among sulfonated lignins, condensed naphthalenesulfonates, naphthalenesulfonates, alkylbenzenesulfonates, alkyl sulfates, and non-ionic surfactants such as ethylene oxide adducts of alkyl phenols.

[0288] Emulsifiable concentrates of pesticides comprise a convenient concentration of a pesticide, such as from about 50 to about 500 grams per liter of liquid dissolved in a carrier that is either a water miscible solvent or a mixture of water-immiscible organic solvent and emulsifiers. Useful organic solvents include aromatics, especially xylenes and petroleum

fractions, especially the high-boiling naphthalenic and olefinic portions of petroleum such as heavy aromatic naphtha. Other organic solvents may also be used, such as the terpenic solvents including rosin derivatives, aliphatic ketones such as cyclohexanone, and complex alcohols such as 2-ethoxyethanol. Suitable emulsifiers for emulsifiable concentrates are selected from conventional anionic and non-ionic surfactants.

[0289] Aqueous suspensions comprise suspensions of water-insoluble pesticides dispersed in an aqueous carrier at a concentration in the range from about 5% to about 50% by weight. Suspensions are prepared by finely grinding the pesticide and vigorously mixing it into a carrier comprised of water and surfactants. Ingredients, such as inorganic salts and synthetic or natural gums may, also be added to increase the density and viscosity of the aqueous carrier. It is often most effective to grind and mix the pesticide at the same time by preparing the aqueous mixture and homogenizing it in an implement such as a sand mill, ball mill, or piston-type homogenizer. The pesticide in suspension might be microencapsulated in plastic polymer.

[0290] Oil dispersions (OD) comprise suspensions of organic solvent-insoluble pesticides finely dispersed in a mixture of organic solvent and emulsifiers at a concentration in the range from about 2% to about 50% by weight. One or more pesticide might be dissolved in the organic solvent. Useful organic solvents include aromatics, especially xylenes and petroleum fractions, especially the high-boiling naphthalenic and olefinic portions of petroleum such as heavy aromatic naphtha. Other solvents may include vegetable oils, seed oils, and esters of vegetable and seed oils. Suitable emulsifiers for oil dispersions are selected from conventional anionic and non-ionic surfactants. Thickeners or gelling agents are added in the formulation of oil dispersions to modify the rheology or flow properties of the liquid and to prevent separation and settling of the dispersed particles or droplets.

[0291] Pesticides may also be applied as granular compositions that are particularly useful for applications to the soil. Granular compositions usually contain from about 0.5% to about 10% by weight of the pesticide, dispersed in a carrier that comprises clay or a similar substance. Such compositions are usually prepared by dissolving the pesticide in a suitable solvent and applying it to a granular carrier, which has been preformed to the appropriate particle size, in the range of from about 0.5 mm to about 3 mm. Such compositions may also be formulated by making a dough or paste of the carrier and molecule, and then crushing and drying to obtain the desired granular particle size. Another form of granules is a water emulsifiable granule (EG). It is a formulation consisting of granules to be applied as a conventional oil-in-water emulsion of the active ingredient(s), either solubilized or diluted in an organic solvent, after disintegration and dissolution in water. Water emulsifiable granules comprise one or several active ingredient(s), either solubilized or diluted in a suitable organic solvent that is (are) absorbed in a water soluble polymeric shell or some other type of soluble or insoluble matrix.

[0292] Dusts containing a pesticide are prepared by intimately mixing the pesticide in powdered form with a suitable dusty agricultural carrier, such as kaolin clay, and ground volcanic rock. Dusts can suitably contain from about 1% to about 10% of the pesticide. Dusts may be applied as a seed dressing or as a foliage application with a dust blower machine.

[0293] It is equally practical to apply a pesticide in the form of a solution in an appropriate organic solvent, usually petroleum oil, such as the spray oils, which are widely used in agricultural chemistry.

[0294] Pesticides can also be applied in the form of an aerosol composition. In such compositions, the pesticide is dissolved or dispersed in a carrier, which is a pressure-generating propellant mixture. The aerosol composition is packaged in a container from which the mixture is dispensed through an atomizing valve.

[0295] Pesticide baits are formed when the pesticide is mixed with food or an attractant or both. When the pests eat the bait, they also consume the pesticide. Baits may take the form of granules, gels, flowable powders, liquids, or solids. Baits may be used in pest harborages.

[0296] Fumigants are pesticides that have a relatively high vapor pressure and hence can exist as a gas in sufficient concentrations to kill pests in soil or enclosed spaces. The toxicity of the fumigant is proportional to its concentration and the exposure time. They are characterized by a good capacity for diffusion and act by penetrating the pest's respiratory system or being absorbed through the pest's cuticle. Fumigants are applied to control stored product pests under gas proof sheets, in gas sealed rooms or buildings, or in special chambers.

[0297] Pesticides may be microencapsulated by suspending the pesticide particles or droplets in plastic polymers of various types. By altering, the chemistry of the polymer or by changing factors in the processing, microcapsules may be formed of various sizes, solubility, wall thicknesses, and degrees of penetrability. These factors govern the speed with which the active ingredient within is released, which in turn, affects the residual performance, speed of action, and odor of the product. The microcapsules might be formulated as suspension concentrates or water dispersible granules.

[0298] Oil solution concentrates are made by dissolving pesticide in a solvent that will hold the pesticide in solution. Oil solutions of a pesticide usually provide faster knockdown and kill of pests than other formulations due to the solvents themselves having pesticidal action and the dissolution of the waxy covering of the integument increasing the speed of uptake of the pesticide. Other advantages of oil solutions include better storage stability, better penetration of crevices, and better adhesion to greasy surfaces.

[0299] Another embodiment is an oil-in-water emulsion, wherein the emulsion comprises oily globules which are each provided with a lamellar liquid crystal coating and are dispersed in an aqueous phase, wherein each oily globule comprises

at least one molecule which is agriculturally active, and is individually coated with a monolamellar or oligolamellar layer comprising: (1) at least one non-ionic lipophilic surface-active agent, (2) at least one non-ionic hydrophilic surface-active agent, and (3) at least one ionic surface-active agent, wherein the globules having a mean particle diameter of less than 800 nanometers.

Other formulation components

[0300] Generally, when the molecules disclosed in Formula One are used in a formulation, such formulation can also contain other components. These components include, but are not limited to, (this is a non-exhaustive and non-mutually exclusive list) wetters, spreaders, stickers, penetrants, buffers, sequestering agents, drift reduction agents, compatibility agents, anti-foam agents, cleaning agents, and emulsifiers. A few components are described forthwith.

[0301] A wetting agent is a substance that when added to a liquid increases the spreading or penetration power of the liquid by reducing the interfacial tension between the liquid and the surface on which it is spreading. Wetting agents are used for two main functions in agrochemical formulations: during processing and manufacture to increase the rate of wetting of powders in water to make concentrates for soluble liquids or suspension concentrates; and during mixing of a product with water in a spray tank to reduce the wetting time of wettable powders and to improve the penetration of water into water-dispersible granules. Examples of wetting agents used in wettable powder, suspension concentrate, and water-dispersible granule formulations are: sodium lauryl sulfate, sodium dioctyl sulfosuccinate, alkyl phenol ethoxylates, and aliphatic alcohol ethoxylates.

[0302] A dispersing agent is a substance that adsorbs onto the surface of particles, helps to preserve the state of dispersion of the particles, and prevents them from reaggregating. Dispersing agents are added to agrochemical formulations to facilitate dispersion and suspension during manufacture, and to ensure the particles redisperse into water in a spray tank. They are widely used in wettable powders, suspension concentrates, and water-dispersible granules. Surfactants that are used as dispersing agents have the ability to adsorb strongly onto a particle surface and provide a charged or steric barrier to reaggregation of particles. The most commonly used surfactants are anionic, non-ionic, or mixtures of the two types. For wettable powder formulations, the most common dispersing agents are sodium lignosulfonates. For suspension concentrates, very good adsorption and stabilization are obtained using polyelectrolytes, such as sodium-naphthalene-sulfonate-formaldehyde-condensates. Tristyrylphenol ethoxylate phosphate esters are also used. Non-ionics such as alkylarylethylene oxide condensates and EO-PO block copolymers are sometimes combined with anionics as dispersing agents for suspension concentrates. In recent years, new types of very high molecular weight polymeric surfactants have been developed as dispersing agents. These have very long hydrophobic 'backbones' and a large number of ethylene oxide chains forming the 'teeth' of a 'comb' surfactant. These high molecular weight polymers can give very good long-term stability to suspension concentrates because the hydrophobic backbones have many anchoring points onto the particle surfaces. Examples of dispersing agents used in agrochemical formulations are: sodium lignosulfonates, sodium naphthalene sulfonate formaldehyde condensates, tristyrylphenol-ethoxylate-phosphate-esters, aliphatic alcohol ethoxylates, alkyl ethoxylates, EO-PO block copolymers, and graft copolymers.

[0303] An emulsifying agent is a substance that stabilizes a suspension of droplets of one liquid phase in another liquid phase. Without the emulsifying agent, the two liquids would separate into two immiscible liquid phases. The most commonly used emulsifier blends contain an alkylphenol or an aliphatic alcohol with twelve or more ethylene oxide units and the oil-soluble calcium salt of dodecylbenzenesulfonic acid. A range of hydrophile-lipophile balance ("HLB") values from about 8 to about 18 will normally provide good stable emulsions. Emulsion stability can sometimes be improved by the addition of a small amount of an EO-PO block copolymer surfactant.

[0304] A solubilizing agent is a surfactant that will form micelles in water at concentrations above the critical micelle concentration. The micelles are then able to dissolve or solubilize water-insoluble materials inside the hydrophobic part of the micelle. The types of surfactants usually used for solubilization are non-ionics, sorbitan monooleates, sorbitan monooleate ethoxylates, and methyl oleate esters.

[0305] Surfactants are sometimes used, either alone or with other additives such as mineral or vegetable oils as adjuvants to spray-tank mixes to improve the biological performance of the pesticide on the target. The types of surfactants used for bioenhancement depend generally on the nature and mode of action of the pesticide. However, they are often non-ionics such as: alkyl ethoxylates, linear aliphatic alcohol ethoxylates, and aliphatic amine ethoxylates.

[0306] A carrier or diluent in an agricultural formulation is a material added to the pesticide to give a product of the required strength. Carriers are usually materials with high absorptive capacities, while diluents are usually materials with low absorptive capacities. Carriers and diluents are used in the formulation of dusts, wettable powders, granules, and water-dispersible granules.

[0307] Organic solvents are used mainly in the formulation of emulsifiable concentrates, oil-in-water emulsions, suspoemulsions, oil dispersions, and ultra-low volume formulations, and to a lesser extent, granular formulations. Sometimes mixtures of solvents are used. The first main groups of solvents are aliphatic paraffinic oils such as kerosene or refined paraffins. The second main group (and the most common) comprises the aromatic solvents such as xylene and higher

molecular weight fractions of C9 and C10 aromatic solvents. Chlorinated hydrocarbons are useful as cosolvents to prevent crystallization of pesticides when the formulation is emulsified into water. Alcohols are sometimes used as cosolvents to increase solvent power. Other solvents may include vegetable oils, seed oils, and esters of vegetable and seed oils.

[0308] Thickeners or gelling agents are used mainly in the formulation of suspension concentrates, oil dispersions, emulsions and suspoemulsions to modify the rheology or flow properties of the liquid and to prevent separation and settling of the dispersed particles or droplets. Thickening, gelling, and anti-settling agents generally fall into two categories, namely water-insoluble particulates and water-soluble polymers. It is possible to produce suspension concentrate and oil dispersion formulations using clays and silicas. Examples of these types of materials, include, but are not limited to, montmorillonite, bentonite, magnesium aluminum silicate, and attapulgite. Water-soluble polysaccharides in water based suspension concentrates have been used as thickening-gelling agents for many years. The types of polysaccharides most commonly used are natural extracts of seeds and seaweeds or are synthetic derivatives of cellulose. Examples of these types of materials include, but are not limited to, guar gum, locust bean gum, carrageenam, alginates, methyl cellulose, sodium carboxymethyl cellulose (SCMC), and hydroxyethyl cellulose (HEC). Other types of anti-settling agents are based on modified starches, polyacrylates, polyvinyl alcohol, and polyethylene oxide. Another good anti-settling agent is xanthan gum.

[0309] Microorganisms can cause spoilage of formulated products. Therefore, preservation agents are used to eliminate or reduce their effect. Examples of such agents include, but are not limited to: propionic acid and its sodium salt, sorbic acid and its sodium or potassium salts, benzoic acid and its sodium salt, p-hydroxybenzoic acid sodium salt, methyl p-hydroxybenzoate, and 1,2-benzisothiazolin-3-one (BIT).

[0310] The presence of surfactants often causes water-based formulations to foam during mixing operations in production and in application through a spray tank. In order to reduce the tendency to foam, anti-foam agents are often added either during the production stage or before filling into bottles. Generally, there are two types of anti-foam agents, namely silicones and non-silicones. Silicones are usually aqueous emulsions of dimethyl polysiloxane, while the non-silicone anti-foam agents are water-insoluble oils, such as octanol and nonanol, or silica. In both cases, the function of the anti-foam agent is to displace the surfactant from the air-water interface.

[0311] "Green" agents (*e.g.*, adjuvants, surfactants, solvents) can reduce the overall environmental footprint of crop protection formulations. Green agents are biodegradable and generally derived from natural and/or sustainable sources, *e.g.* plant and animal sources. Specific examples are: vegetable oils, seed oils, and esters thereof, also alkoxylated alkyl polyglucosides.

Applications

[0312] Molecules of Formula One may be applied to any locus. Particular loci to apply such molecules include loci where alfalfa, almonds, apples, barley, beans, canola, corn, cotton, crucifers, flowers, fodder species (Rye Grass, Sudan Grass, Tall Fescue, Kentucky Blue Grass, and Clover), fruits, lettuce, oats, oil seed crops, oranges, peanuts, pears, peppers, potatoes, rice, sorghum, soybeans, strawberries, sugarcane, sugarbeets, sunflowers, tobacco, tomatoes, wheat (for example, Hard Red Winter Wheat, Soft Red Winter Wheat, White Winter Wheat, Hard Red Spring Wheat, and Durum Spring Wheat), and other valuable crops are growing or the seeds thereof are going to be planted.

[0313] Molecules of Formula One may also be applied where plants, such as crops, are growing and where there are low levels (even no actual presence) of pests that can commercially damage such plants. Applying such molecules in such locus is to benefit the plants being grown in such locus. Such benefits, may include, but are not limited to: helping the plant grow a better root system; helping the plant better withstand stressful growing conditions; improving the health of a plant; improving the yield of a plant *(e.g.* increased biomass and/or increased content of valuable ingredients); improving the vigor of a plant (*e.g.* improved plant growth and/or greener leaves); improving the quality of a plant (*e.g.* improved content or composition of certain ingredients); and improving the tolerance to abiotic and/or biotic stress of the plant.

[0314] Molecules of Formula One may be applied with ammonium sulfate when growing various plants as this may provide additional benefits.

[0315] Molecules of Formula One may be applied on, in, or around plants genetically modified to express specialized traits, such as *Bacillus thuringiensis* (for example, Cry1Ab, Cry1Ac, Cry1Fa, Cry1A.105, Cry2Ab, Vip3A, mCry3A, Cry3Ab, Cry3Bb, Cry34Ab1/Cry35Ab1), other insecticidal toxins, or those expressing herbicide tolerance, or those with "stacked" foreign genes expressing insecticidal toxins, herbicide tolerance, nutrition-enhancement, or any other beneficial traits.

[0316] Molecules of Formula One may be applied to the foliar and/or fruiting portions of plants to control pests. Either such molecules will come in direct contact with the pest, or the pest will consume such molecules when eating the plant or while extracting sap or other nutrients from the plant.

[0317] Molecules of Formula One may also be applied to the soil, and when applied in this manner, root and stem feeding pests may be controlled. The roots may absorb such molecules thereby taking it up into the foliar portions of

the plant to control above ground chewing and sap feeding pests.

[0318] Systemic movement of pesticides in plants may be utilized to control pests on one portion of the plant by applying (for example by spraying a locus) a molecule of Formula One to a different portion of the plant. For example, control of foliar-feeding insects may be achieved by drip irrigation or furrow application, by treating the soil with for example pre- or post-planting soil drench, or by treating the seeds of a plant before planting.

[0319] Molecules of Formula One may be used with baits. Generally, with baits, the baits are placed in the ground where, for example, termites can come into contact with, and/or be attracted to, the bait. Baits can also be applied to a surface of a building, (horizontal, vertical, or slant surface) where, for example, ants, termites, cockroaches, and flies, can come into contact with, and/or be attracted to, the bait.

[0320] Molecules of Formula One may be encapsulated inside, or placed on the surface of a capsule. The size of the capsules can range from nanometer size (about 100-900 nanometers in diameter) to micrometer size (about 10-900 microns in diameter).

[0321] Molecules of Formula One may be applied to eggs of pests. Because of the unique ability of the eggs of some pests to resist certain pesticides, repeated applications of such molecules may be desirable to control newly emerged larvae.

[0322] Molecules of Formula One may be applied as seed treatments. Seed treatments may be applied to all types of seeds, including those from which plants genetically modified to express specialized traits will germinate. Representative examples include those expressing proteins toxic to invertebrate pests, such as *Bacillus thuringiensis* or other insecticidal toxins, those expressing herbicide tolerance, such as "Roundup Ready" seed, or those with "stacked" foreign genes expressing insecticidal toxins, herbicide tolerance, nutrition-enhancement, drought tolerance, or any other beneficial traits. Furthermore, such seed treatments with molecules of Formula One may further enhance the ability of a plant to withstand stressful growing conditions better. This results in a healthier, more vigorous plant, which can lead to higher yields at harvest time. Generally, about 1 gram of such molecules to about 500 grams per 100,000 seeds is expected to provide good benefits, amounts from about 10 grams to about 100 grams per 100,000 seeds is expected to provide better benefits, and amounts from about 25 grams to about 75 grams per 100,000 seeds is expected to provide even better benefits. Molecules of Formula One may be applied with one or more active ingredients in a soil amendment.

[0323] Molecules of Formula One may be used for controlling endoparasites and ectoparasites in the veterinary medicine sector or in the field of non-human-animal keeping. Such molecules may be applied by oral administration in the form of, for example, tablets, capsules, drinks, granules, by dermal application in the form of, for example, dipping, spraying, pouring on, spotting on, and dusting, and by parenteral administration in the form of, for example, an injection.

[0324] Molecules of Formula One may also be employed advantageously in livestock keeping, for example, cattle, chickens, geese, goats, pigs, sheep, and turkeys. They may also be employed advantageously in pets such as, horses, dogs, and cats. Particular pests to control would be flies, fleas, and ticks that are bothersome to such animals. Suitable formulations are administered orally to the animals with the drinking water or feed. The dosages and formulations that are suitable depend on the species.

[0325] Molecules of Formula One may also be used for controlling parasitic worms, especially of the intestine, in the animals listed above.

[0326] Molecules of Formula One may also be employed in therapeutic methods for human health care. Such methods include, but are limited to, oral administration in the form of, for example, tablets, capsules, drinks, granules, and by dermal application.

[0327] Molecules of Formula One may also be applied to invasive pests. Pests around the world have been migrating to new environments (for such pest) and thereafter becoming a new invasive species in such new environment. Such molecules may also be used on such new invasive species to control them in such new environments.

TABLE SECTION

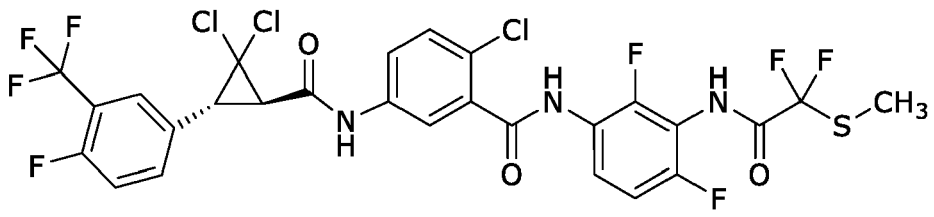
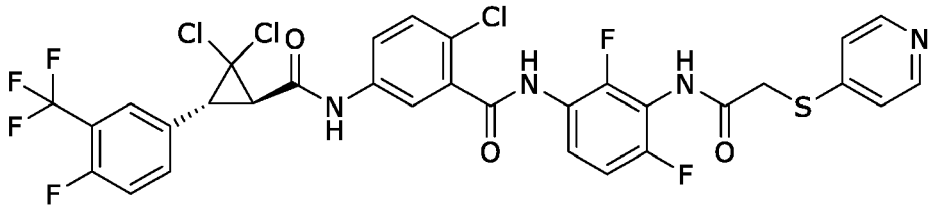
[0328]

TABLE B
Weight Ratios **Molecule of the Formula One : active ingredient**
100:1 to 1:100
50:1 to 1:50
20:1 to 1:20
10:1 to 1:10

(continued)

TABLE B
Weight Ratios Molecule of the Formula One : active ingredient
5:1 to 1:5
3:1 to 1:3
2:1 to 1:2
1:1

TABLE C										
active ingredient (*Y*) *Parts by weight*	**100**	***X,Y***		***X,Y***			***X,Y***			
	50	***X,Y***	***X,Y***	***X,Y***			***X,Y***	***X,Y***		
	20	***X,Y***		***X,Y***	***X,Y***		***X,Y***		***X,Y***	
	15	***X,Y***	***X,Y***					***X,Y***	***X,Y***	***X,Y***
	10	***X,Y***		***X,Y***						
	5	***X,Y***	***X,Y***	***X,Y***				***X,Y***		
	3	***X,Y***	***X,Y***		***X,Y***	***X,Y***		***X,Y***	***X,Y***	***X,Y***
	2	***X,Y***		***X,Y***	***X,Y***		***X,Y***		***X,Y***	
	1	***X,Y***	***X,Y***	***X,Y***	***X,Y***	***X,Y***	***X,Y***	***X,Y***	***X,Y***	***X,Y***
		1	**2**	**3**	**5**	**10**	**15**	**20**	**50**	**100**
	molecule of Formula One (*X*) *Parts by weight*									

Table 2. Structure and preparation method for F Series molecules		
No.	**Structure**	**Prep. ***
F1		**15**
F2		**15**

(continued)

Table 2. Structure and preparation method for F Series molecules		
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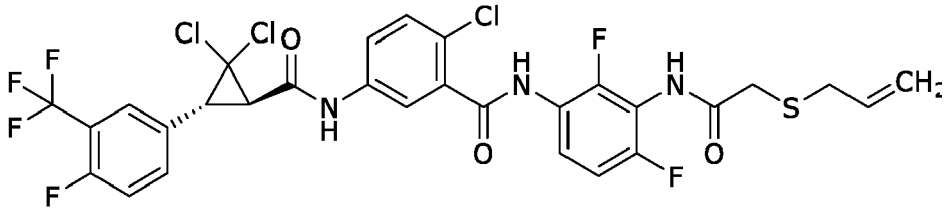
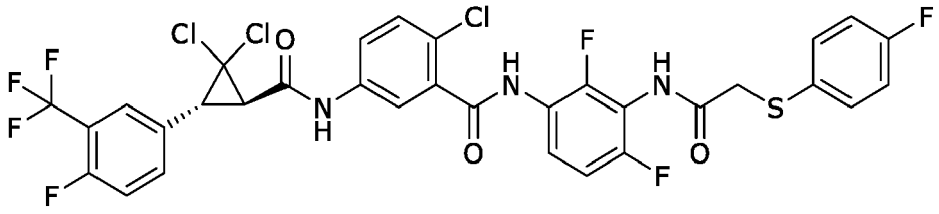
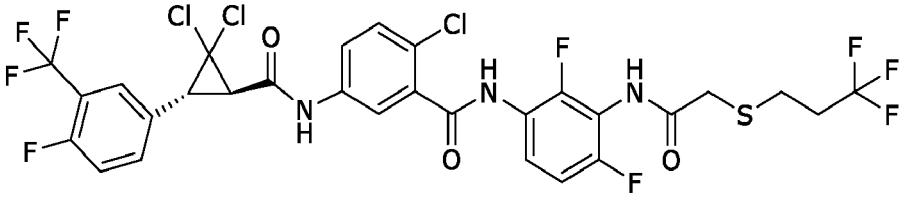
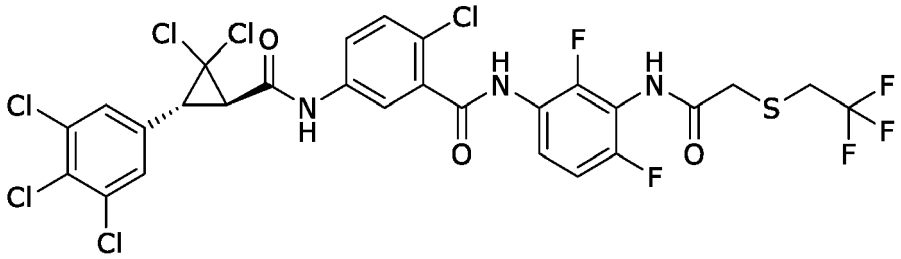
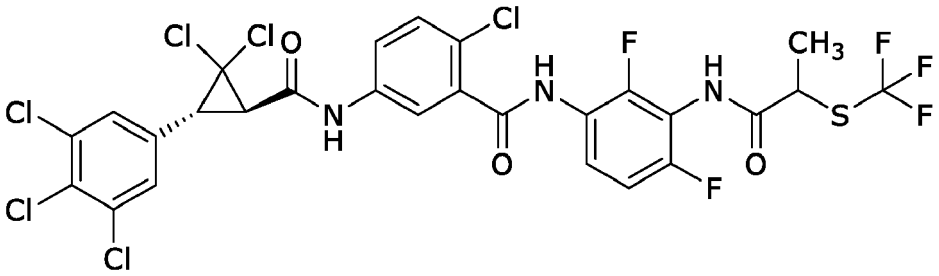
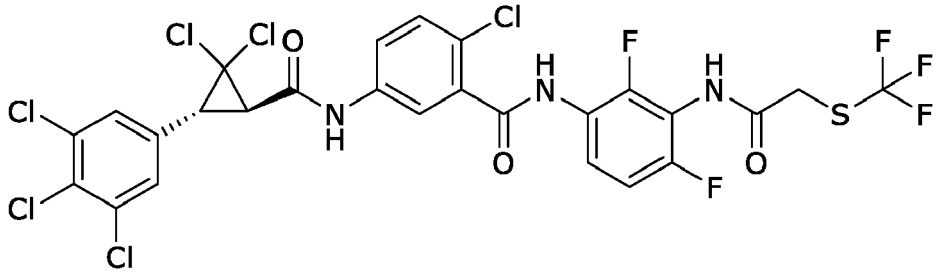
F3		15
F4		15
F5		15
F6		15
F7		15
F8		15

(continued)

Table 2. Structure and preparation method for F Series molecules		
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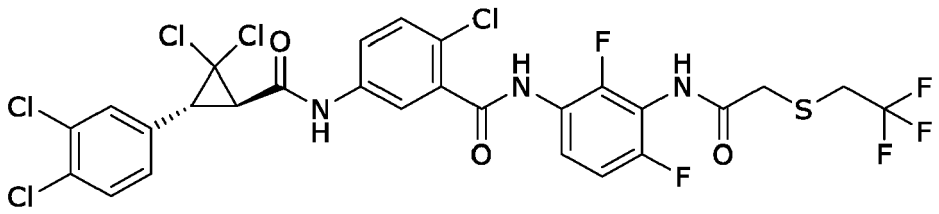
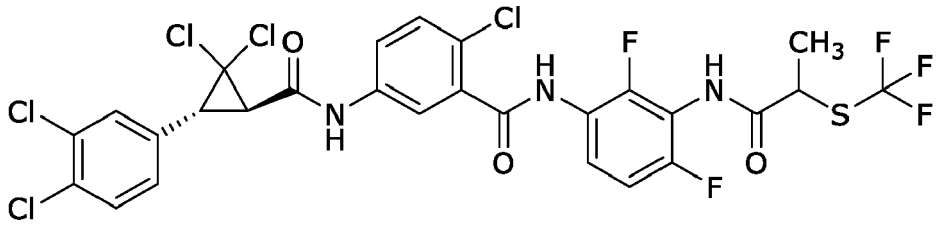
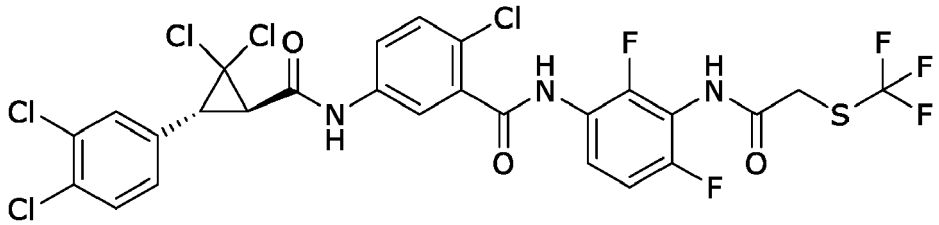
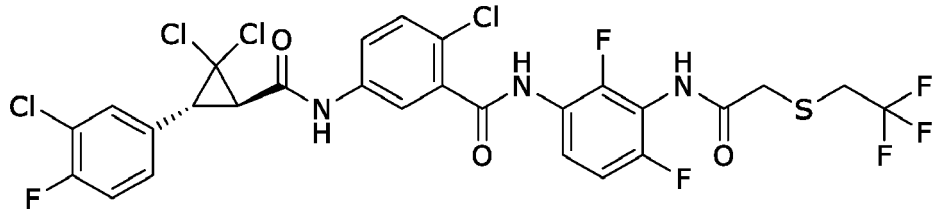
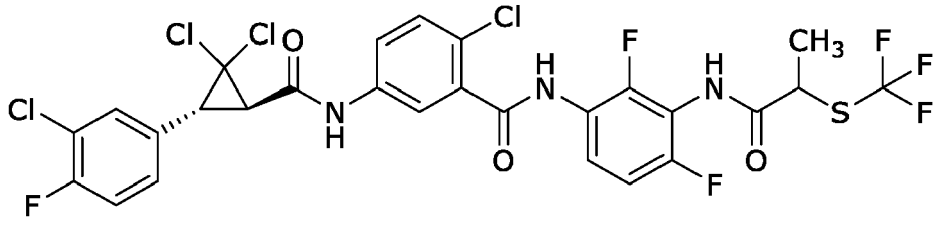
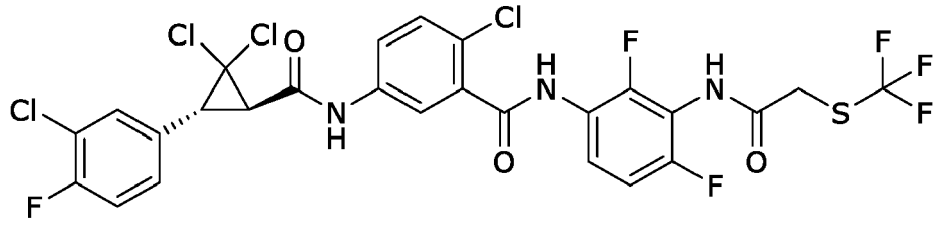
F9		**15**
F10		**15**
F11		**15**
F12		**15**
F13		**15**
F14		**15**

(continued)

Table 2. Structure and preparation method for F Series molecules		
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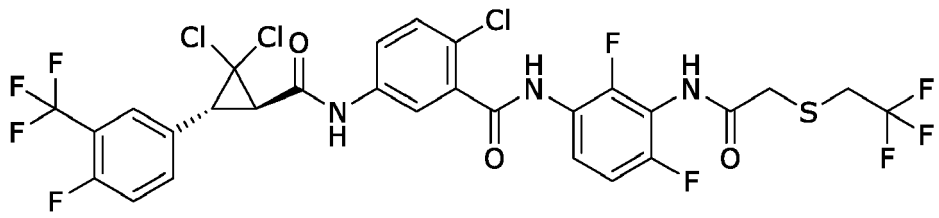
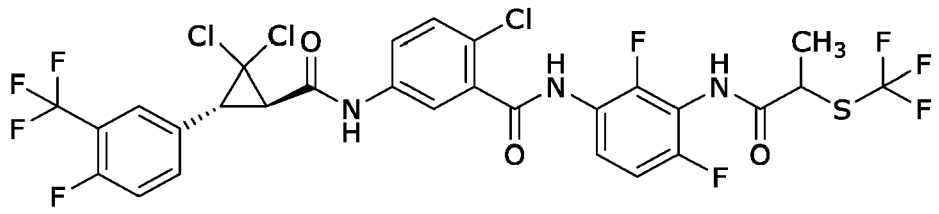
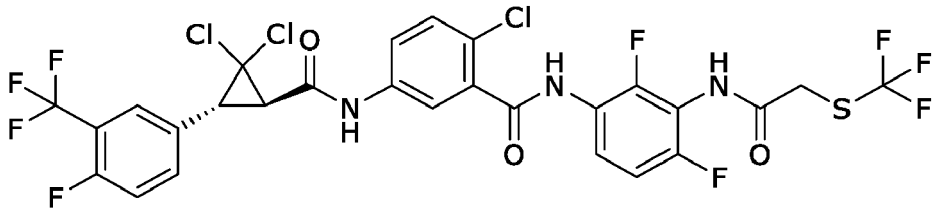
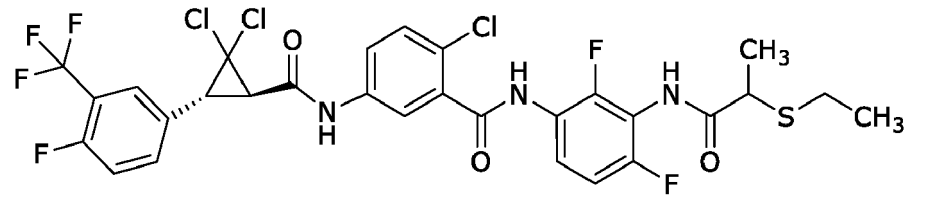
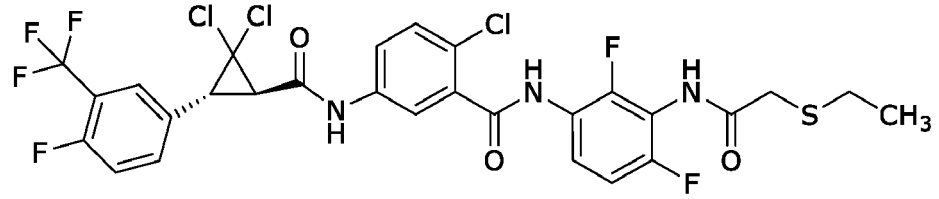
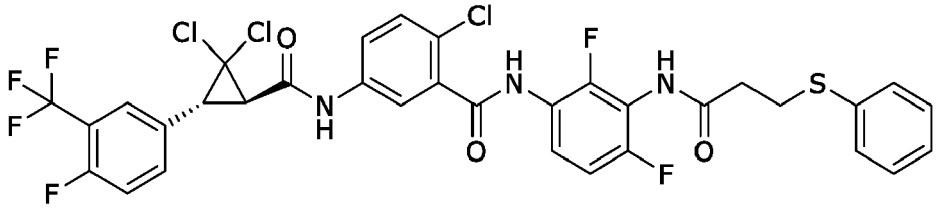
F15		15
F16		15
F17		15
F18		15
F19		15
F20		15

(continued)

Table 2. Structure and preparation method for F Series molecules		
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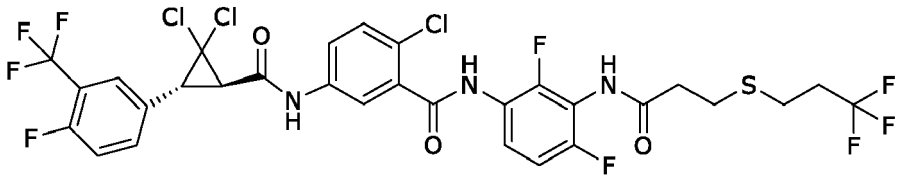
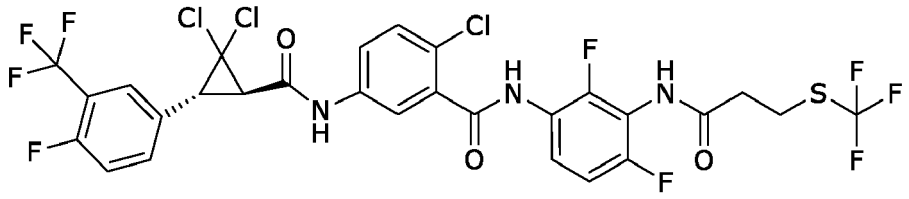
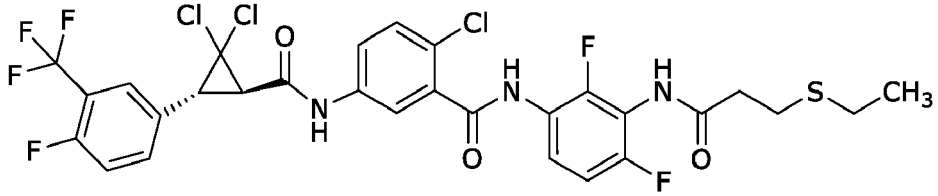
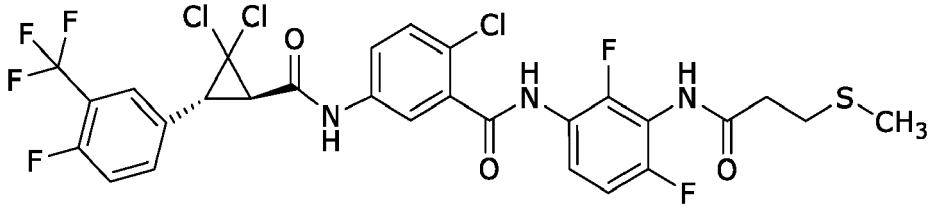
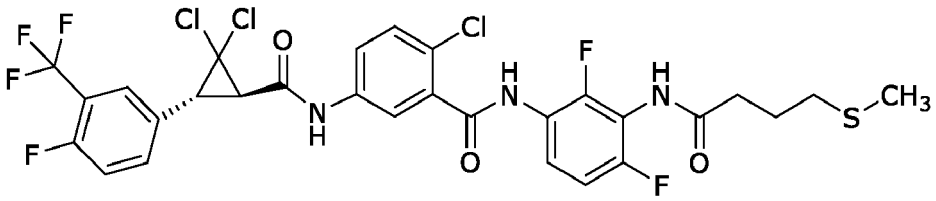
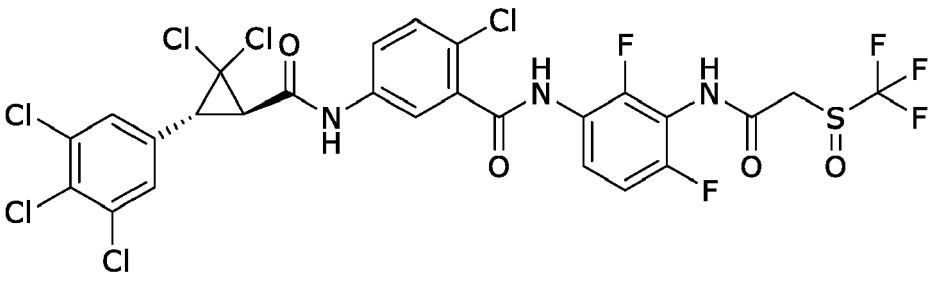
F21		**15**
F22		**15**
F23		**15**
F24		**15**
F25		**15**
F26		**16**

(continued)

Table 2. Structure and preparation method for F Series molecules		
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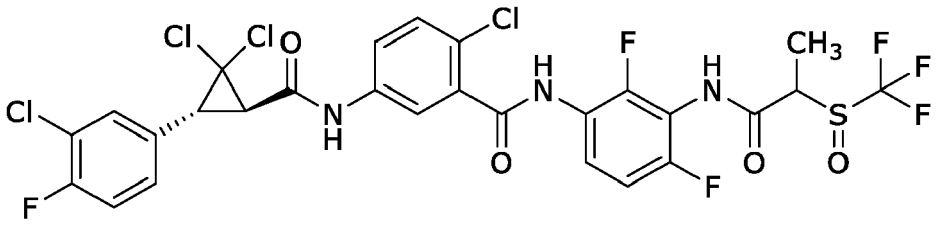
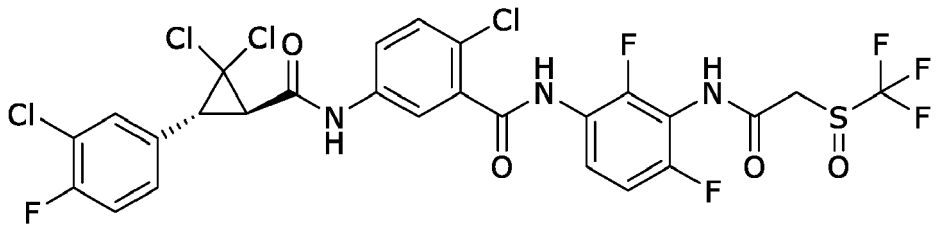
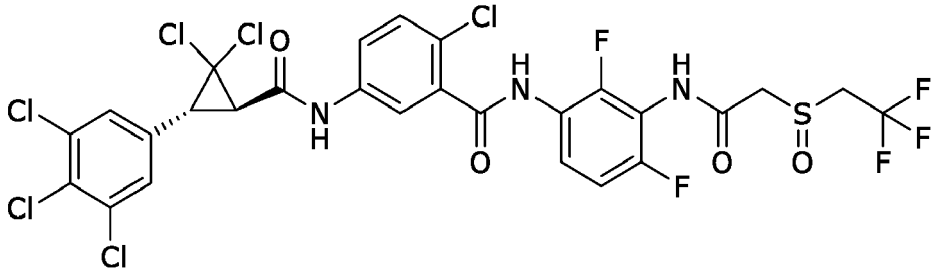
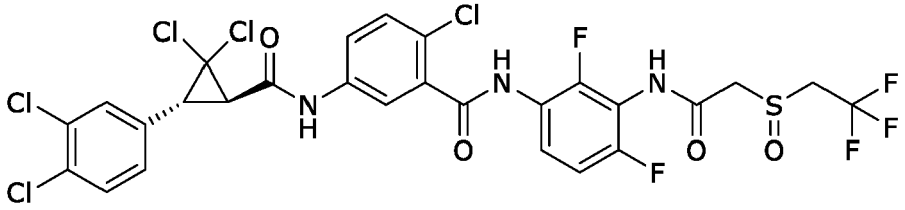
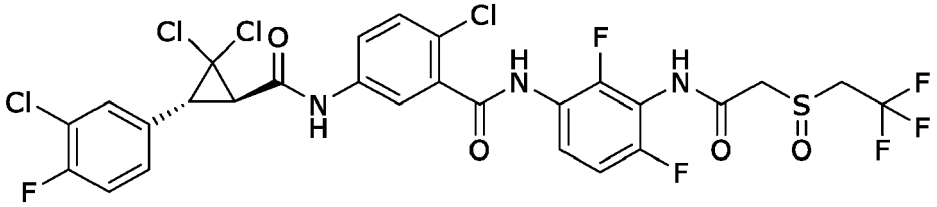
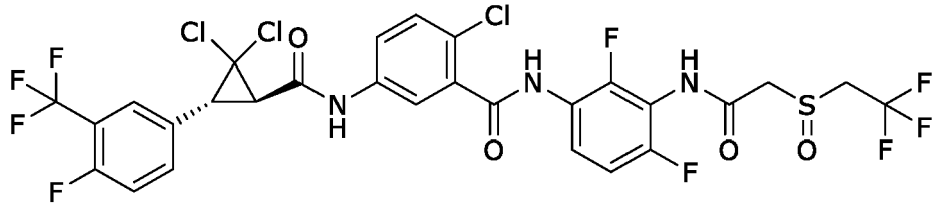
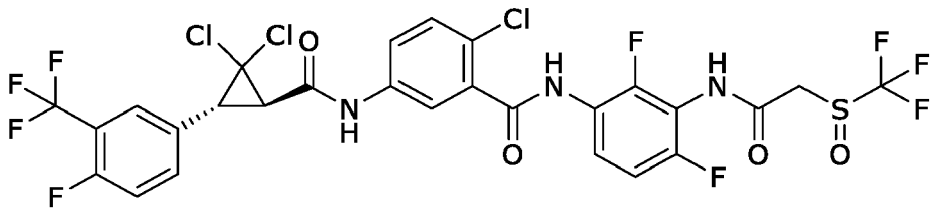
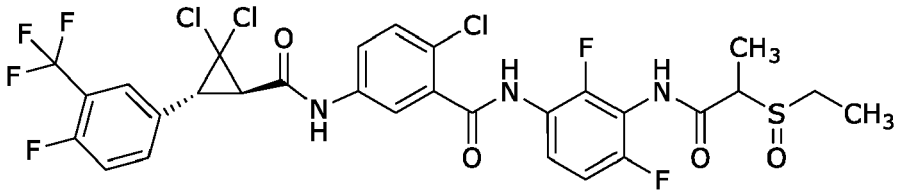
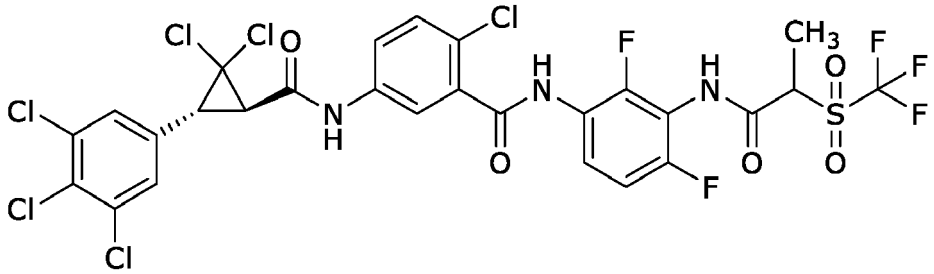
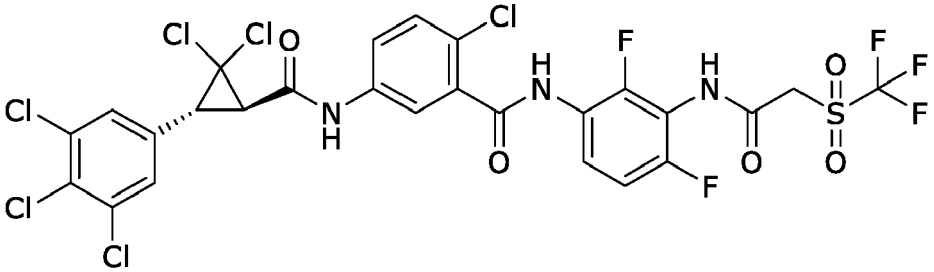
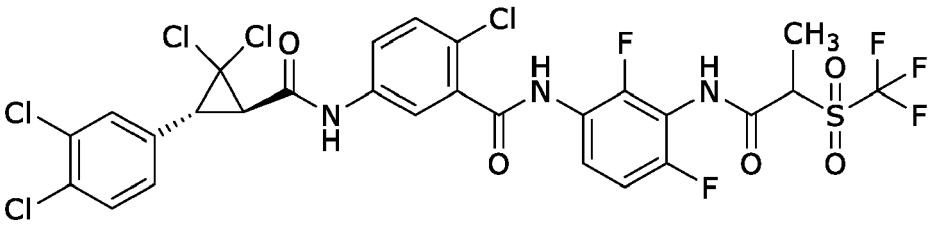
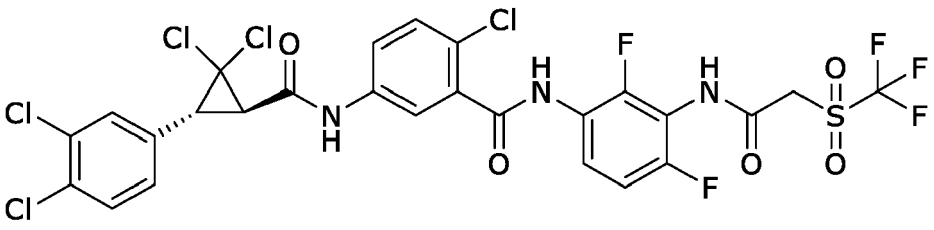
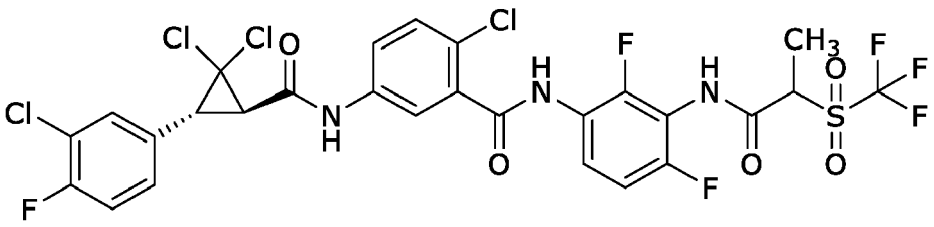
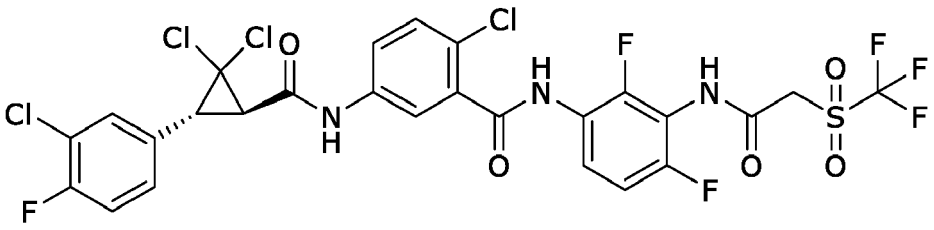
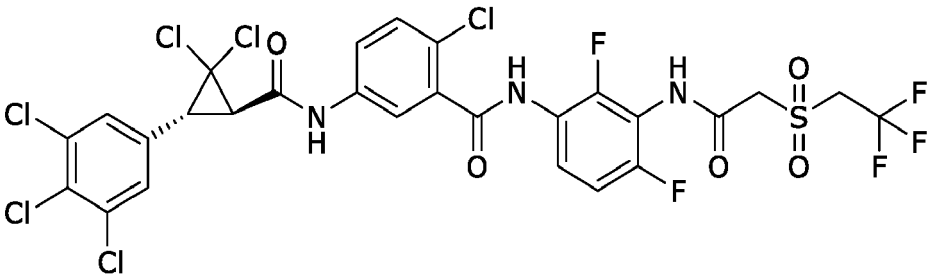
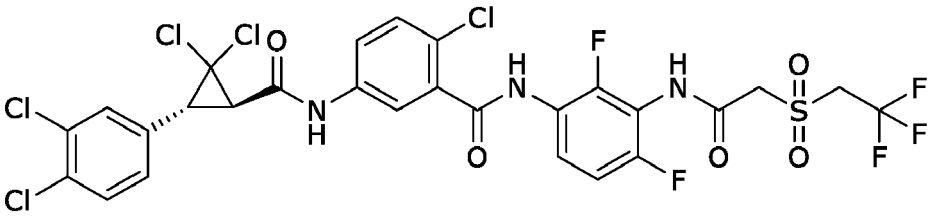
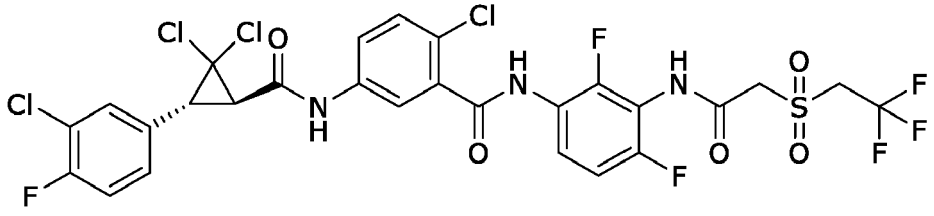
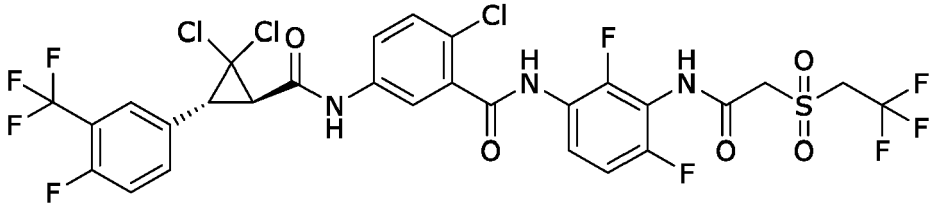
F27		**19**
F28		**19**
F29		**16**
F30		**16**
F31		**19**
F32		**17**

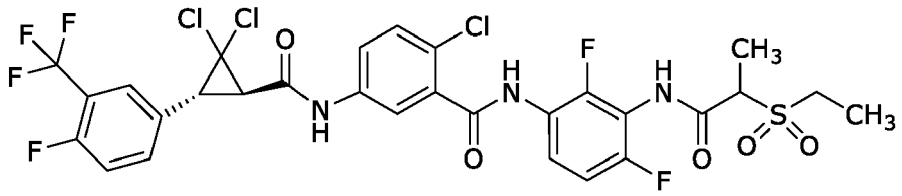
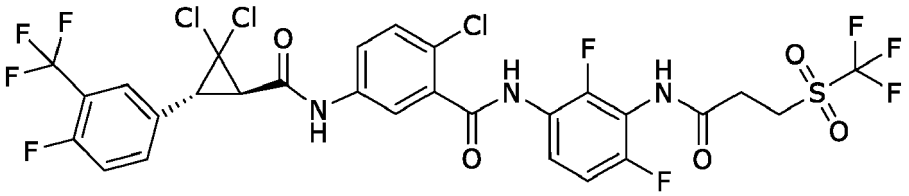
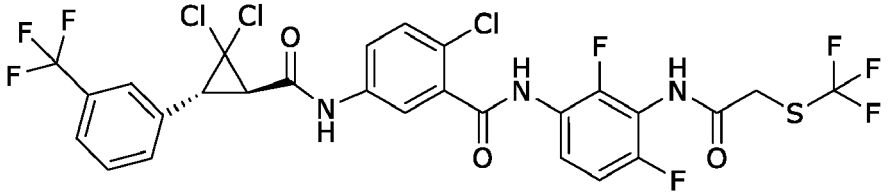
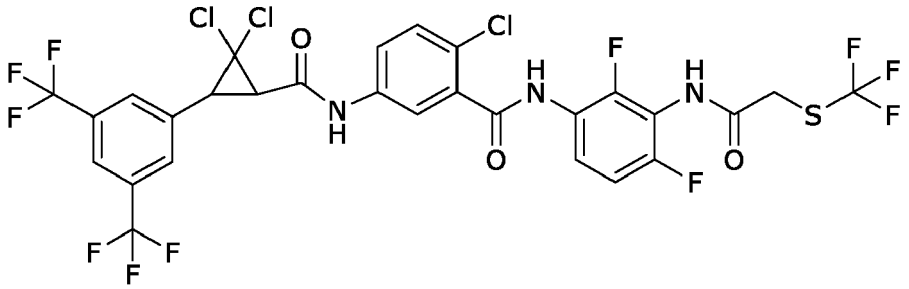
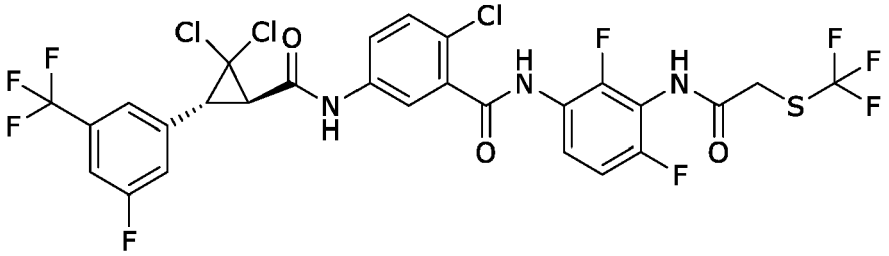
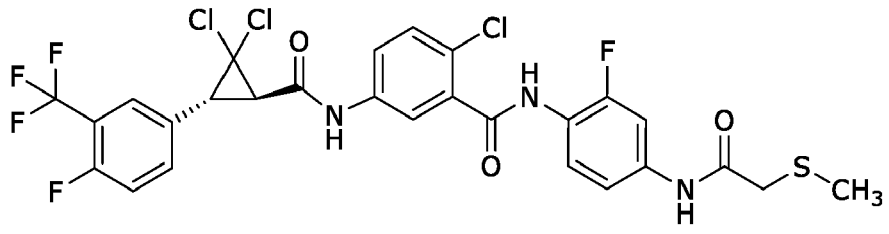
(continued)

Table 2. Structure and preparation method for F Series molecules		
No.	**Structure**	**Prep. ***
F33		**17**
F34		**18**
F35		**16**
F36		**16**
F37		**16**
F38		**16**

(continued)

Table 2. Structure and preparation method for F Series molecules		
No.	**Structure**	**Prep. ***
F39		19
F40		19
F41		16
F42		16
F43		19
F44		17

(continued)

Table 2. Structure and preparation method for F Series molecules		
No.	**Structure**	**Prep. ***
F45		**19**
F46		**15**
F47		**15**
F48		**15**
F49		**15**
F50		**15**

(continued)

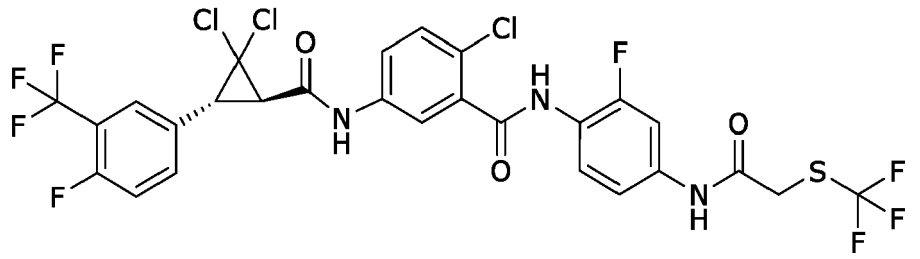
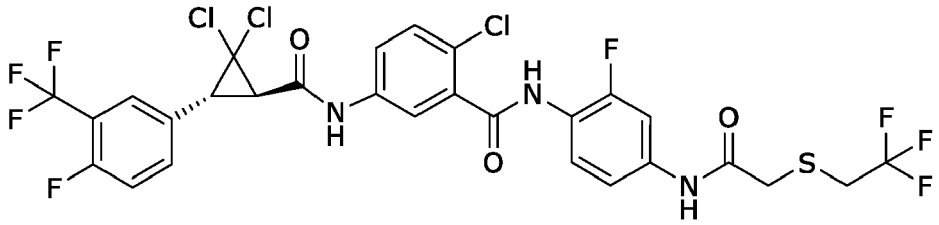
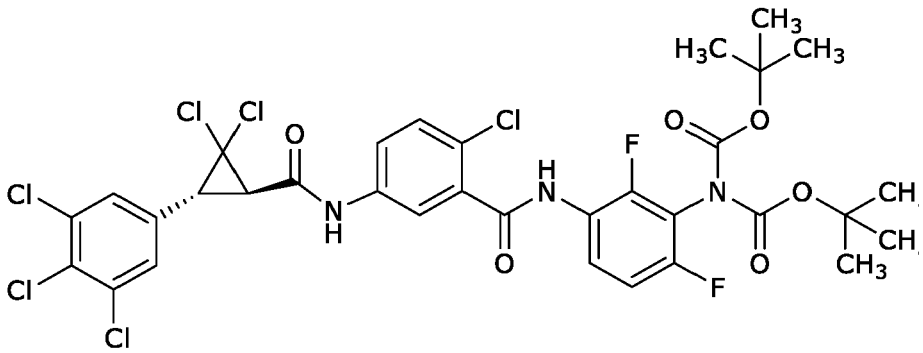
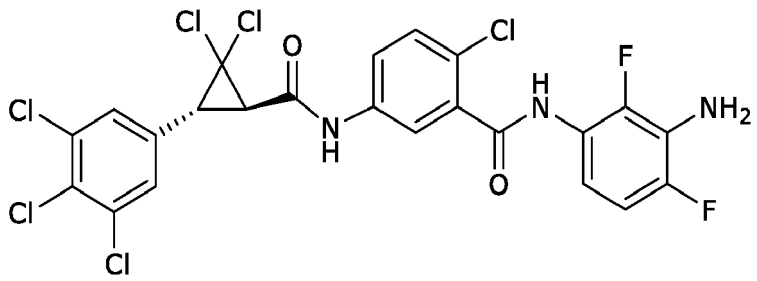
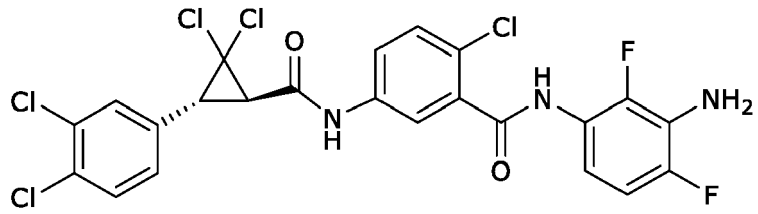
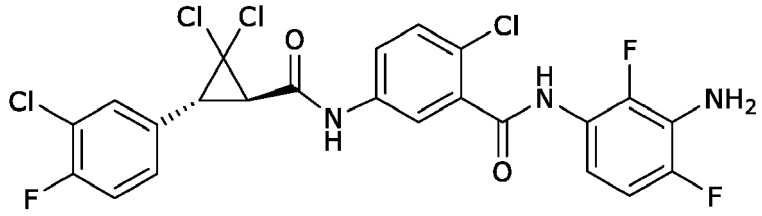
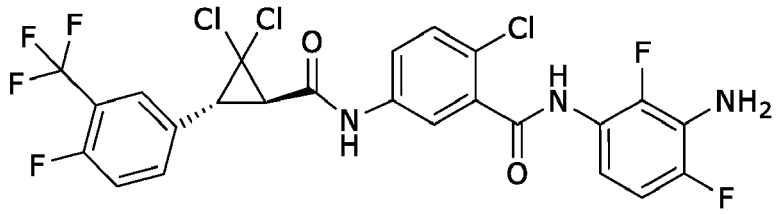
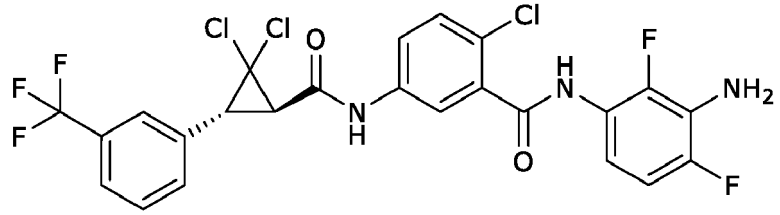
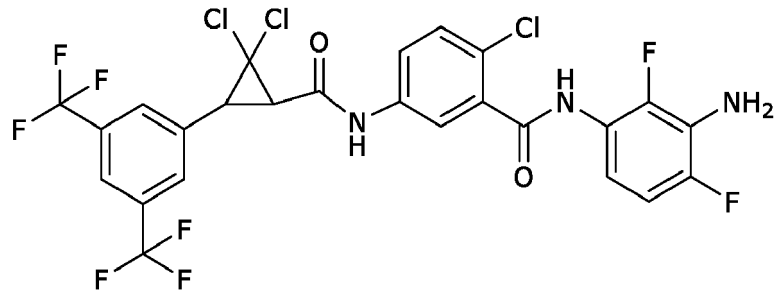
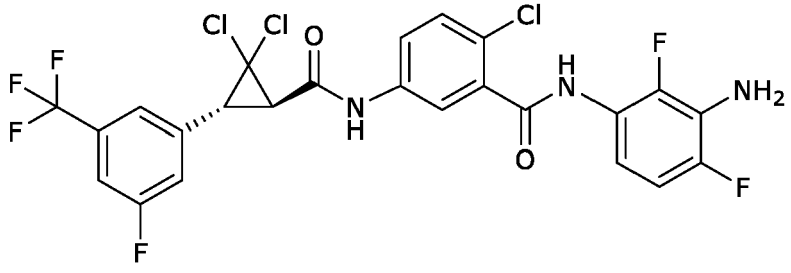
Table 2. Structure and preparation method for F Series molecules		
No.	**Structure**	**Prep. ***
F51		**15**
F52		**15**
***prepared according to example number**		

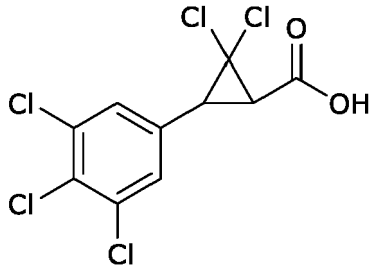
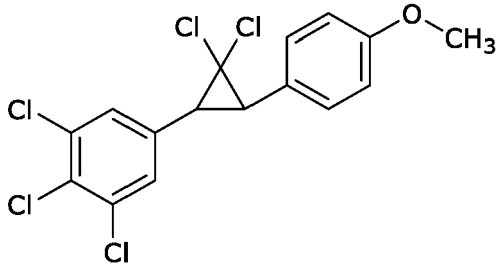
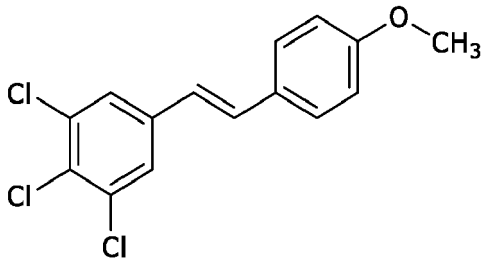
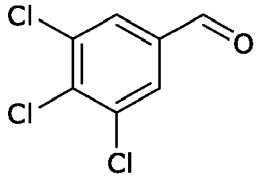
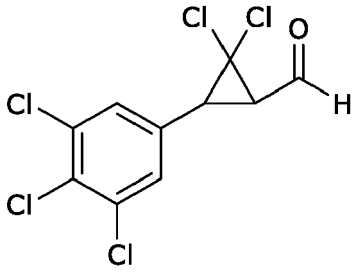
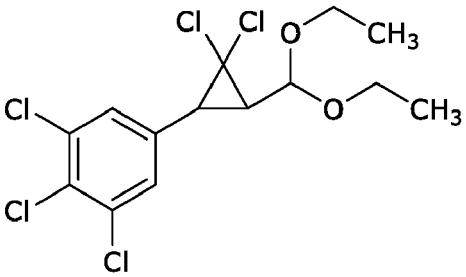
Table 3. Structure and preparation method for DP Series molecules		
No.	**Structure**	**Prep.***
DP1		**13**
DP2		**14**

(continued)

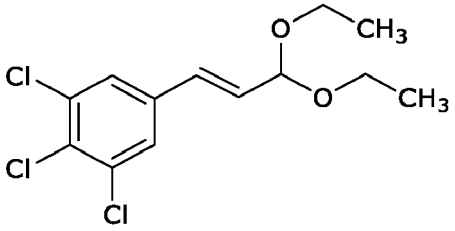
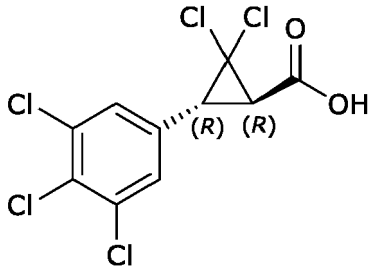
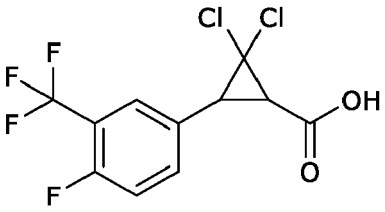
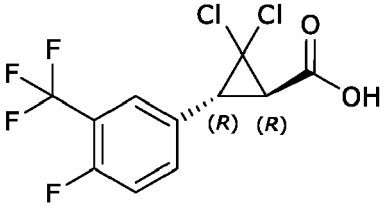
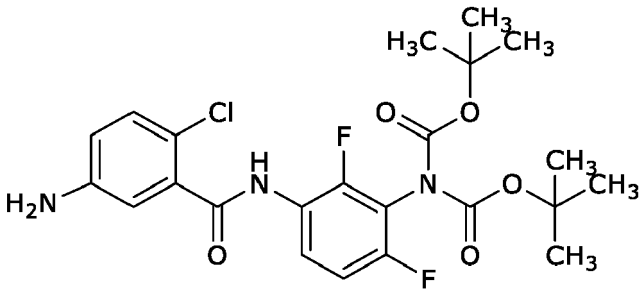
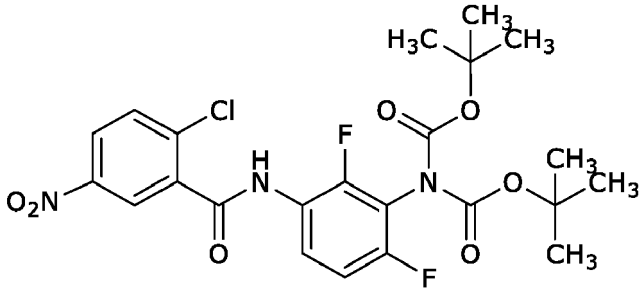
Table 3. Structure and preparation method for DP Series molecules

No.	Structure	Prep.*
DP3		14
DP4		14
DP5		14
DP6		14
DP7		14
DP8		14

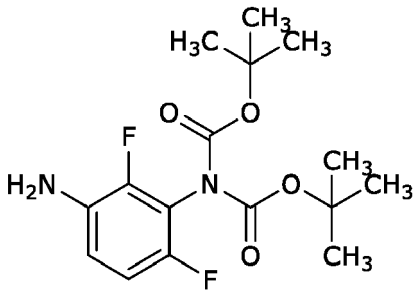
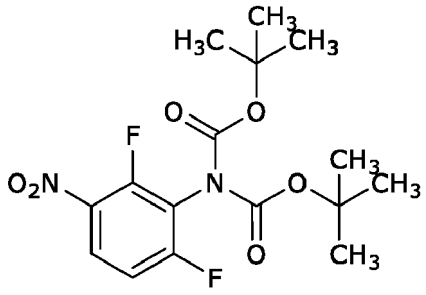
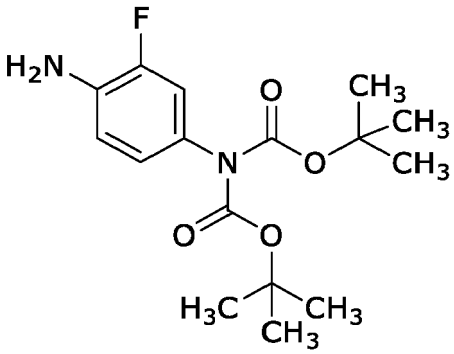
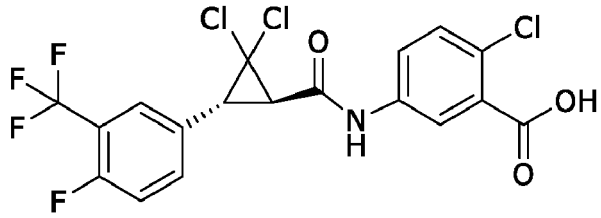
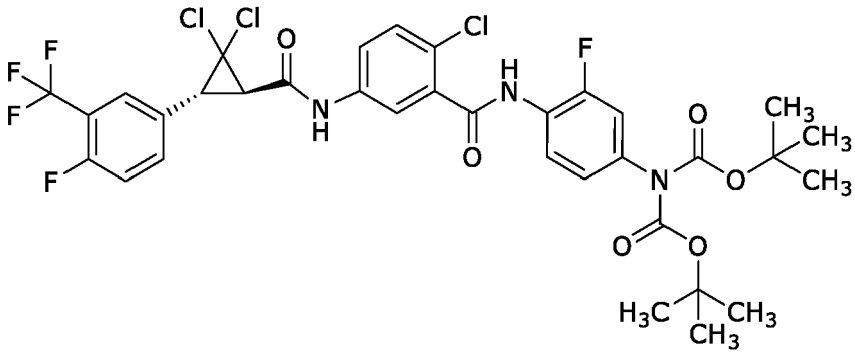
*prepared according to example number

Table 4. Structure and preparation method for C series molecules		
No.	**Structure**	**Prep***
C1		**1, 2**
C2		**3**
C3		**4**
C4		**5**
C5		**6**
C6		**7**

(continued)

Table 4. Structure and preparation method for C series molecules		
No.	**Structure**	**Prep***
C7		**8**
C8		**R1**
C9		**1**
C10		**R4**
C11		**9**
C12		**10**

(continued)

Table 4. Structure and preparation method for C series molecules		
No.	**Structure**	**Prep***
C13		11
C14		12
C15		20
C16		21
C17		22

(continued)

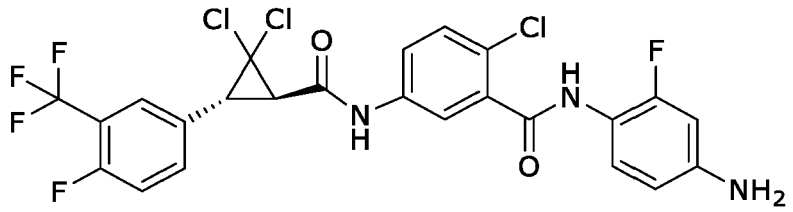
Table 4. Structure and preparation method for C series molecules		
No.	**Structure**	**Prep***
C18		**23**
***prepared according to example number**		

Table 5: Analytical data for molecules in Table 2

Cmpd. No.	mp (°C)	Mass Spec	NMR (^{1}H, ^{13}C, ^{19}F)
F1		ESIMS *m/z* 721 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.18 (s, 1H), 9.80 (s, 1H), 9.55 (s, 1H), 8.19 (td, *J* = 8.8, 5.7 Hz, 1H), 8.03 (d, *J* = 2.7 Hz, 1H), 7.87 - 7.78 (m, 3H), 7.53 - 7.43 (m, 2H), 7.27 - 7.16 (m, 1H), 3.72 (d, *J* = 8.3 Hz, 1H), 3.43 (d, *J* = 8.3 Hz, 1H), 2.43 (d, *J* = 8.5 Hz, 3H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -61.88, -85.97, -117.60, -122.79, -123.33, -128.29, -128.67
F2		HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{31}H_{19}Cl_3F_6N_4O_3S$, 746.0148; found, 746.0156	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.45 (s, 1H), 10.23 (s, 1H), 8.44 - 8.36 (m, 2H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.85 (ddd, *J* = 18.1, 8.1, 3.6 Hz, 2H), 7.75 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.69 - 7.54 (m, 3H), 7.37 - 7.31 (m, 2H), 7.21 (t, *J* = 9.2 Hz, 1H), 4.10 (s, 2H), 3.70 (d, *J* = 8.4 Hz, 1H), 3.51 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.91 (d, *J* = 12.5 Hz), -116.93 (q, *J* = 12.5 Hz), -120.61 (d, *J* = 3.3 Hz), -124.45 (d, *J* = 3.3 Hz)
F3	125-130	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{29}H_{20}Cl_3F_6N_3O_3S$, 709.0195; found, 709.0188	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.97 (s, 1H), 10.45 (s, 1H), 9.92 (s, 1H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.89 - 7.81 (m, 2H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.69 - 7.54 (m, 3H), 7.20 (td, *J* = 9.2, 1.8 Hz, 1H), 5.82 (ddt, *J* = 17.1, 10.1, 7.2 Hz, 1H), 5.22 - 5.07 (m, 2H), 3.70 (d, *J* = 8.4 Hz, 1H), 3.51 (d, *J* = 8.4 Hz, 1H), 3.33 (s, 2H; methylene obscured by residual water peak) 3.28 (d, *J* = 7.2 Hz, 2H); ^{19}F NMR (376 MHz, DMSO-d$_6$) δ -59.91 (d, *J* = 12.4 Hz), -116.93 (q, *J* = 12.4 Hz), -120.55 (d, *J* = 3.6 Hz), -124.52 (d, *J* = 3.5 Hz)
F4	106-110	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{32}H_{19}Cl_3F_7N_3O_3S$, 763.0101; found, 763.0094	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.44 (s, 1H), 10.04 (s, 1H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.89 - 7.80 (m, 2H), 7.75 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.68 - 7.54 (m, 3H), 7.53 - 7.46 (m, 2H), 7.25 - 7.15 (m, 3H), 3.88 (s, 2H), 3.69 (d, *J* = 8.4 Hz, 1H), 3.51 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d$_6$) δ -59.91 (d, *J* = 12.5 Hz), -115.71, -116.93 (q, *J* = 12.4 Hz), -120.42 (d, *J* = 3.3 Hz), -124.38 (d, *J* = 3.4 Hz)

(continued)

Table 5: Analytical data for molecules in Table 2			
Cmpd. No.	**mp (°C)**	**Mass Spec**	**NMR (^{1}H, ^{13}C, ^{19}F)**
F5		ESIMS *m/z* 767 ([M+H]$^+$)	^{1}H NMR (300 MHz, Acetone-d_6) δ 10.19 (s, 1H), 9.52 (s, 1H), 9.14 (s, 1H), 8.19 - 7.99 (m, 2H), 7.89 - 7.76 (m, 3H), 7.55 - 7.42 (m, 2H), 7.14 (td, *J* = 9.3, 2.0 Hz, 1H), 3.72 (dd, *J* = 8.3, 0.9 Hz, 1H), 3.55 (s, 2H), 3.43 (d, *J* = 8.3 Hz, 1H), 2.99 - 2.87 (m, 2H), 2.75 - 2.52 (m, 2H)
F6	109-115	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{27}H_{16}Cl_6F_5N_3O_3S$, 766.8964; found, 766.8962	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.94 (s, 1H), 10.46 (s, 1H), 10.08 (s, 1H), 7.92 (d, *J* = 2.5 Hz, 1H), 7.80 (s, 2H), 7.75 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.65 (td, *J* = 8.7, 5.7 Hz, 1H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.22 (td, *J* = 9.2, 1.8 Hz, 1H), 3.69 - 3.52 (m, 6H) ^{19}F NMR (376 MHz, DMSO-d_6) δ -64.94, -120.58 (d, *J* = 3.3 Hz), -124.52 (d, *J* = 3.4 Hz)
F7	167-172	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{27}H_{16}Cl_6F_5N_3O_3S$, 766.8964; found, 766.8966	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.48 (s, 1H), 10.31 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.80 (s, 2H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.67 (td, *J* = 8.7, 5.7 Hz, 1H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.23 (td, *J* = 9.3, 1.7 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 1H), 3.64 (d, *J* = 8.5 Hz, 1H), 3.56 (d, *J* = 8.5 Hz, 1H), 1.61 (d, *J* = 7.1 Hz, 3H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -39.11, -121.02, -124.68
F8	155-160	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{26}H_{14}Cl_6F_5N_3O_3S$, 752.8807; found, 752.8805	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.93 (s, 1H), 10.47 (s, 1H), 10.24 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.80 (s, 2H), 7.75 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.67 (td, *J* = 8.7, 5.7 Hz, 1H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.22 (t, *J* = 9.4, 1.5 Hz, 1H), 4.07 (s, 2H), 3.64 (d, *J* = 8.4 Hz, 1H), 3.55 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -40.97, -120.67, -124.46
F9	101-107	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{27}H_{17}Cl_5F_5N_3O_3S$, 732.9353 found, 732.9340	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.46 (s, 1H), 10.08 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.80 - 7.72 (m, 2H), 7.72 - 7.60 (m, 2H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.43 (dd, *J* = 8.5, 2.1 Hz, 1H), 7.21 (td, *J* = 9.3, 1.7 Hz, 1H), 3.69 - 3.54 (m, 5H), 3.47 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -64.94, -120.58 (d, *J* = 3.3 Hz), -124.52 (d, *J* = 3.4 Hz)
F10	219-222	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{27}H_{17}Cl_5F_5N_3O_3S$, 732.9353 found, 732.9344	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.47 (s, 1H), 10.31 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.75 (dt, *J* = 6.1, 2.8 Hz, 2H), 7.72 - 7.63 (m, 2H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.43 (dd, *J* = 8.5, 2.1 Hz, 1H), 7.23 (ddd, *J* = 10.6, 9.2, 1.6 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 1H), 3.61 (d, *J* = 8.4 Hz, 1H), 3.46 (d, *J* = 8.5 Hz, 1H), 1.61 (d, *J* = 7.1 Hz, 3H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -39.11, -121.02, -124.68
F11	213-216	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{26}H_{15}Cl_5F_5N_3O_3S$, 718.9197; found, 718.9187	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.47 (s, 1H), 10.23 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.79 - 7.72 (m, 2H), 7.71 - 7.63 (m, 2H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.43 (dd, *J* = 8.5, 2.1 Hz, 1H), 7.22 (t, *J* = 9.2, 1.7 Hz, 1H), 4.07 (s, 2H), 3.61 (d, *J* = 8.4 Hz, 1H), 3.46 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -40.97, -120.67, -124.47

(continued)

Table 5: Analytical data for molecules in Table 2			
Cmpd. No.	**mp (°C)**	**Mass Spec**	**NMR (^{1}H, ^{13}C, ^{19}F)**
F12	103-107	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{27}H_{17}Cl_4F_6N_3O_3S$, 716.9649; found, 716.9641	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.46 (s, 1H), 10.08 (s, 1H), 7.92 (d, *J* = 2.5 Hz, 1H), 7.79 - 7.69 (m, 2H), 7.65 (td, *J* = 8.6, 5.6 Hz, 1H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.51 - 7.43 (m, 2H), 7.21 (td, *J* = 9.2, 1.7 Hz, 1H), 3.71 - 3.54 (m, 5H), 3.44 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -64.94, -117.28, -120.58 (d, *J* = 3.2 Hz), -124.52 (d, *J* = 3.4 Hz)
F13	226-229	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{27}H_{17}Cl_4F_6N_3O_3S$, 716.9649; found, 716.9645	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.48 (s, 1H), 10.31 (s, 1H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.73 - 7.63 (m, 2H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.51 - 7.41 (m, 2H), 7.23 (td, *J* = 9.2, 1.7 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 1H), 3.59 (d, *J* = 8.4 Hz, 1H), 3.44 (d, *J* = 8.5 Hz, 1H), 1.62 (d, *J* = 7.1 Hz, 3H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -39.12, -117.28, -121.02, -124.67
F14	219-222	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{26}H_{15}Cl_4F_6N_3O_3S$, 702.9492; found, 702.9482	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.47 (s, 1H), 10.24 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.71 (dd, *J* = 7.2, 2.0 Hz, 1H), 7.65 (dd, *J* = 8.7, 5.7 Hz, 1H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.51 - 7.42 (m, 2H), 7.22 (td, *J* = 9.3, 1.8 Hz, 1H), 4.07 (s, 2H), 3.59 (d, *J* = 8.4 Hz, 1H), 3.44 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -40.97, -117.29, -120.68, -124.47
F15	100-105	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{28}H_{17}Cl_3F_9N_3O_3S$, 750.9912; found, 750.9912	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.97 (s, 1H), 10.47 (s, 1H), 10.09 (s, 1H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.90 - 7.81 (m, 2H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.70 - 7.54 (m, 3H), 7.22 (t, *J* = 9.2 Hz, 1H), 3.70 (d, *J* = 8.5 Hz, 1H), 3.67 - 3.57 (m, 4H), 3.52 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.92 (d, *J* = 12.6 Hz), -64.95, -116.94 (q, *J* = 12.5 Hz), -120.58 (d, *J* = 3.3 Hz), -124.52 (d, *J* = 3.3 Hz)
F16	210-213	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{28}H_{17}Cl_3F_9N_3O_3S$, 750.9912; found, 750.9912	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.97 (s, 1H), 10.48 (s, 1H), 10.32 (s, 1H), 7.94 (d, *J* = 2.6 Hz, 1H), 7.91 - 7.80 (m, 2H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.67 (q, *J* = 8.3 Hz, 1H), 7.64 - 7.53 (m, 2H), 7.24 (t, *J* = 9.1 Hz, 1H), 4.38 (q, *J* = 7.1 Hz, 1H), 3.70 (d, *J* = 8.4 Hz, 1H), 3.52 (d, *J* = 8.5 Hz, 1H), 1.62 (d, *J* = 7.1 Hz, 3H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -39.12, -59.92 (d, *J* = 12.4 Hz), -116.94 (q, *J* = 12.6 Hz), -121.02, -124.67
F17	227-230	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{27}H_{15}Cl_3F_9N_3O_3S$, 736.9756; found, 736.9753	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.47 (s, 1H), 10.23 (s, 1H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.90 - 7.79 (m, 2H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.71 - 7.63 (m, 1H), 7.63 - 7.52 (m, 2H), 7.22 (dd, *J* = 9.9, 8.2 Hz, 1H), 4.07 (s, 2H), 3.69 (d, *J* = 8.4 Hz, 1H), 3.51 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -40.98, -59.92 (d, *J* = 12.7 Hz), -116.94 (q, *J* = 12.6 Hz), -120.68 (d, *J* = 2.9 Hz), -124.46

(continued)

Table 5: Analytical data for molecules in Table 2			
Cmpd. No.	**mp (°C)**	**Mass Spec**	**NMR (^{1}H, ^{13}C, ^{19}F)**
F18		ESIMS *m*/*z* 713 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.23 (s, 1H), 9.49 (s, 1H), 9.02 (s, 1H), 8.12 - 7.99 (m, 2H), 7.81 (td, *J* = 8.4, 7.7, 2.7 Hz, 3H), 7.52 - 7.42 (m, 2H), 7.11 (td, *J* = 9.2, 1.9 Hz, 1H), 3.79 - 3.68 (m, 2H), 3.43 (d, *J* = 8.3 Hz, 1H), 2.70 (qd, *J* = 7.4, 3.2 Hz, 2H), 1.50 (d, *J* = 7.1 Hz, 3H), 1.25 (t, *J* = 7.4 Hz, 3H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -61.83, -117.55, -123.08, -128.65
F19		ESIMS *m*/*z* 699 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.21 (s, 1H), 9.51 (s, 1H), 9.10 (s, 1H), 8.12 - 7.98 (m, 2H), 7.81 (ddd, *J* = 11.4, 7.6, 2.4 Hz, 3H), 7.54 - 7.42 (m, 2H), 7.11 (td, *J* = 9.2, 1.9 Hz, 1H), 3.71 (d, *J* = 8.3 Hz, 1H), 3.49 - 3.39 (m, 3H), 2.68 (dq, *J* = 20.5, 7.4 Hz, 2H), 1.31 - 1.21 (m, 3H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -61.80, -117.46, -122.91, -128.49
F20	157-162	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{33}H_{22}Cl_3F_6N_3O_3S$, 759.0352; found, 759.0345	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.97 (s, 1H), 10.44 (s, 1H), 9.86 (s, 1H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.91 - 7.80 (m, 2H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.68 - 7.53 (m, 3H), 7.43 - 7.31 (m, 4H), 7.26 - 7.16 (m, 2H), 3.69 (d, *J* = 8.4 Hz, 1H), 3.51 (d, *J* = 8.5 Hz, 1H), 3.23 (t, *J* = 7.1 Hz, 2H), 2.71 (t, *J* = 7.1 Hz, 2H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.91 (d, *J* = 12.5 Hz), -116.93 (q, *J* = 12.5 Hz), -120.23 (d, *J* = 3.4 Hz, -124.13 (d, *J* = 3.9 Hz)
F21		ESIMS *m*/*z* 781 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.19 (s, 1H), 9.47 (s, 1H), 8.98 (s, 1H), 8.13 - 7.99 (m, 2H), 7.87 - 7.77 (m, 3H), 7.48 (dt, *J* = 9.8, 5.2 Hz, 2H), 7.11 (td, *J* = 9.2, 2.0 Hz, 1H), 3.71 (d, *J* = 8.3 Hz, 1H), 3.42 (d, *J* = 8.3 Hz, 1H), 2.99 - 2.88 (m, 2H), 2.87 - 2.75 (m, 4H), 2.64 - 2.47 (m, 2H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -61.86, -66.83, -117.56, -122.94, -128.40
F22		ESIMS *m*/*z* 753 ([M+H]$^+$)	^{1}H NMR (300 MHz, Acetone-d_6) δ 10.19 (s, 1H), 9.50 (s, 1H), 9.10 (s, 1H), 8.15 - 7.99 (m, 2H), 7.89 - 7.76 (m, 3H), 7.55 - 7.41 (m, 2H), 7.13 (td, *J* = 9.3, 2.0 Hz, 1H), 3.72 (dd, *J* = 8.3, 0.9 Hz, 1H), 3.43 (d, *J* = 8.3 Hz, 1H), 3.30 (t, *J* = 6.7 Hz, 2H), 3.02 (t, *J* = 6.8 Hz, 2H)
F23		ESIMS *m*/*z* 713 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.19 (s, 1H), 9.47 (s, 1H), 8.94 (s, 1H), 8.12 - 7.99 (m, 2H), 7.87 - 7.77 (m, 3H), 7.53 - 7.43 (m, 2H), 7.16 - 7.06 (m, 1H), 3.71 (d, *J* = 8.3 Hz, 1H), 3.43 (d, *J* = 8.3 Hz, 1H), 2.95 - 2.83 (m, 3H), 2.78 (d, *J* = 7.1 Hz, 1H), 2.59 (q, *J* = 7.4 Hz, 2H), 1.23 (t, *J* = 7.4 Hz, 3H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -61.86, -117.57, -123.00, -128.42

(continued)

Table 5: Analytical data for molecules in Table 2			
Cmpd. No.	**mp (°C)**	**Mass Spec**	**NMR (^{1}H, ^{13}C, ^{19}F)**
F24		ESIMS *m/z* 699 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.20 (s, 1H), 9.47 (s, 1H), 8.96 (s, 1H), 8.12 - 7.99 (m, 2H), 7.87 - 7.77 (m, 3H), 7.48 (dt, *J* = 8.1, 5.1 Hz, 2H), 7.11 (td, *J* = 9.3, 1.9 Hz, 1H), 3.71 (d, *J* = 8.3 Hz, 1H), 3.43 (d, *J* = 8.3 Hz, 1H), 2.82 (dt, *J* = 12.1, 6.0 Hz, 4H), 2.12 (s, 3H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -61.85, -117.60, -122.97, -128.39
F25		ESIMS *m/z* 713 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.22 (s, 1H), 9.48 (s, 1H), 8.89 (s, 1H), 8.11 - 7.99 (m, 2H), 7.87 - 7.77 (m, 3H), 7.48 (dd, *J* = 9.0, 5.9 Hz, 2H), 7.11 (td, *J* = 9.2, 1.9 Hz, 1H), 3.71 (d, *J* = 8.3 Hz, 1H), 3.43 (d, *J* = 8.3 Hz, 1H), 2.59 (q, *J* = 7.3, 6.9 Hz, 4H), 2.07 (s, 3H), 1.97 (q, *J* = 7.2 Hz, 2H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -61.86, -117.62, -123.22, -128.70
F26	156-163	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{26}H_{14}Cl_6F_5N_3O_4S$, 768.8756; found, 768.8745	^{1}H NMR (500 MHz, DMSO-d_6) δ 10.93 (s, 1H), 10.51 (s, 1H), 10.49 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.80 (d, *J* = 0.6 Hz, 2H), 7.75 (dd, *J* = 8.7, 2.6 Hz, 1H), 7.69 (td, *J* = 8.6, 5.6 Hz, 1H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.29 - 7.22 (m, 1H), 4.61 (d, *J* = 14.5 Hz, 1H), 4.44 (d, *J* = 14.5 Hz, 1H), 3.64 (d, *J* = 8.5 Hz, 1H), 3.55 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (471 MHz, DMSO-d_6) δ -72.07, -120.22 - -120.39 (m), -123.85 (d, *J* = 8.3 Hz)
F27	157-163	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{27}H_{17}Cl_4F_6N_3O_4S$, 732.9598; found, 732.9599	^{1}H NMR (500 MHz, DMSO-d_6) Mixture of diastereomers δ 10.94 (s, 1H), 10.54 - 10.50 (m, 1H), 10.49 - 10.44 (m, 1H), 7.92 (d, *J* = 2.5 Hz, 1H), 7.75 (dd, *J* = 8.8, 2.5 Hz, 1H), 7.73 - 7.63 (m, 2H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.50 - 7.43 (m, 2H), 7.25 (t, *J* = 9.0 Hz, 1H), 4.47 (q, *J* = 7.1 Hz, 1H), 3.59 (d, *J* = 8.5 Hz, 1H), 3.44 (d, *J* = 8.4 Hz, 1H), 1.62 (d, *J* = 7.1 Hz, 2H), 1.57 - 1.52 (m, 1H); ^{19}F NMR (471 MHz, DMSO-d_6) Mixture of diastereomers δ -67.79, -70.02, -117.28 (q, *J* = 7.2, 6.7 Hz), -120.15 - -120.97 (m), -123.76 - -124.51 (m)
F28	135-140	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{26}H_{15}Cl_4F_6N_3O_4S$, 718.9442; found, 718.9446	^{1}H NMR (500 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.51 (s, 1H), 10.49 (s, 1H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.75 (dd, *J* = 8.7, 2.6 Hz, 1H), 7.70 (dt, *J* = 9.0, 4.4 Hz, 2H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.50 - 7.43 (m, 2H), 7.29 - 7.22 (m, 1H), 4.61 (d, *J* = 14.5 Hz, 1H), 4.44 (d, *J* = 14.5 Hz, 1H), 3.59 (d, *J* = 8.4 Hz, 1H), 3.44 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (471 MHz, DMSO-d_6) δ -72.08, -117.28 (td, *J* = 8.1, 5.4 Hz), -120.28 - -120.35 (m), -123.85 (d, *J* = 8.3 Hz)
F29	122-128	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{27}H_{16}Cl_6F_5N_3O_4S$, 782.8913; found, 782.8910	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.93 (s, 1H), 10.48 (s, 1H), 10.38 (s, 1H), 7.92 (d, *J* = 2.5 Hz, 1H), 7.80 (s, 2H), 7.75 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.72 - 7.62 (m, 1H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.29 - 7.18 (m, 1H), 4.25 (d, *J* = 14.0 Hz, 1H), 4.20 - 4.06 (m, 3H), 3.64 (d, *J* = 8.5 Hz, 1H), 3.55 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.59, -120.20, -123.86

(continued)

Table 5: Analytical data for molecules in Table 2			
Cmpd. No.	**mp (°C)**	**Mass Spec**	**NMR (^{1}H, ^{13}C, ^{19}F)**
F30	131-137	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{27}H_{17}Cl_5F_5N_3O_4S$, 748.9303; found, 748.9305	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.48 (s, 1H), 10.44 - 10.29 (m, 1H), 7.92 (d, *J* = 2.5 Hz, 1H), 7.81 - 7.72 (m, 2H), 7.72 - 7.64 (m, 2H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.43 (dd, *J* = 8.4, 2.1 Hz, 1H), 7.29 - 7.19 (m, 1H), 4.25 (d, *J* = 14.0 Hz, 1H), 4.20 - 4.06 (m, 3H), 3.61 (d, *J* = 8.5 Hz, 1H), 3.46 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.59, -120.19, -123.87
F31	137-142	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{27}H_{17}Cl_4F_6N_3O_4S$, 732.9598; found, 732.9611	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.48 (s, 1H), 10.38 (s, 1H), 7.92 (d, *J* = 2.5 Hz, 1H), 7.80 - 7.63 (m, 3H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.46 (dd, *J* = 8.0, 4.2 Hz, 2H), 7.24 (t, *J* = 9.0 Hz, 1H), 4.25 (d, *J* = 14.1 Hz, 1H), 4.20 - 4.06 (m, 3H), 3.59 (d, *J* = 8.4 Hz, 1H), 3.44 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.59, -117.29, -120.19 (d, *J* = 2.7 Hz), -123.84
F32	136-142	HRMS-ESI (*m*/*z*) [M+H]$^+$ calcd for $C_{28}H_{17}Cl_3F_9N_3O_4S$, 766.9862; found, 766.9867	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.48 (s, 1H), 10.38 (s, 1H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.90 - 7.79 (m, 2H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.68 (td, *J* = 8.6, 5.6 Hz, 1H), 7.63 - 7.53 (m, 2H), 7.24 (td, *J* = 9.2, 1.7 Hz, 1H), 4.26 (d, *J* = 14.0 Hz, 1H), 4.21 - 4.03 (m, 3H), 3.70 (d, *J* = 8.4 Hz, 1H), 3.51 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.59, -59.92 (d, *J* = 12.7 Hz), -116.95 (q, *J* = 12.5 Hz), -120.19 (d, *J* = 2.8 Hz), -123.84 (d, *J* = 3.2 Hz)
F33	122-126	HRMS-ESI (*m*/*z*) [M+H]$^+$ calcd for $C_{27}H_{15}Cl_3F_9N_3O_4S$, 752.9705; found, 752.9702	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.51 (s, 1H), 10.49 (s, 1H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.90 - 7.80 (m, 2H), 7.76 (dd, *J* = 8.7, 2.6 Hz, 1H), 7.73 - 7.65 (m, 1H), 7.58 (dd, *J* = 16.4, 9.2 Hz, 2H), 7.25 (t, *J* = 9.2 Hz, 1H), 4.61 (d, *J* = 14.6 Hz, 1H), 4.44 (d, *J* = 14.4 Hz, 1H), 3.69 (d, *J* = 8.4 Hz, 1H), 3.51 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.91 (d, *J* = 12.4 Hz), -72.08, -116.95 (q, *J* = 12.6 Hz), - 120.32, -123.86
F34		ESIMS *m*/*z* 729 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.21 (s, 1H), 9.51 (s, 1H), 9.32 - 9.09 (m, 1H), 8.23 - 7.96 (m, 2H), 7.82 (td, *J* = 6.0, 3.3 Hz, 3H), 7.47 (dt, *J* = 8.1, 5.1 Hz, 2H), 7.19 - 7.05 (m, 1H), 4.06 - 3.79 (m, 1H), 3.71 (d, *J* = 8.3 Hz, 1H), 3.43 (d, *J* = 8.3 Hz, 1H), 2.95 - 2.71 (m, 2H), 1.55 (dd, *J* = 42.0, 7.1 Hz, 3H), 1.34 (td, *J* = 7.5, 3.7 Hz, 3H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -61.84, -117.57, -122.61, -128.05
F35	148-153	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{27}H_{16}Cl_6F_5N_3O_5S$, 798.8862; found, 798.8853	^{1}H NMR (500 MHz, DMSO-d_6) δ 10.93 (s, 1H), 10.60 (s, 1H), 10.50 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.80 (s, 2H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.71 (td, *J* = 8.6, 5.6 Hz, 1H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.30 - 7.23 (m, 1H), 5.04 (q, *J* = 7.0 Hz, 1H), 3.64 (d, *J* = 8.4 Hz, 1H), 3.55 (d, *J* = 8.5 Hz, 1H), 1.77 - 1.63 (m, 3H); ^{19}F NMR (471 MHz, DMSO-d_6) δ -74.47, -120.43 (d, *J* = 7.3 Hz), -123.87

(continued)

Table 5: Analytical data for molecules in Table 2			
Cmpd. No.	**mp (°C)**	**Mass Spec**	**NMR (^{1}H, ^{13}C, ^{19}F)**
F36	155-159	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{26}H_{14}Cl_6F_5N_3O_5S$, 784.8705; found, 784.8701	^{1}H NMR (500 MHz, DMSO-d_6) δ 10.93 (s, 1H), 10.52 (s, 1H), 10.50 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.83 - 7.67 (m, 4H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.29 - 7.23 (m, 1H), 5.14 (s, 2H), 3.64 (d, *J* = 8.4 Hz, 1H), 3.55 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (471 MHz, DMSO-d_6) δ -77.04, -120.46 (d, *J* = 7.5 Hz), -123.99 (d, *J* = 8.4 Hz)
F37	146-151	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{27}H_{17}Cl_5F_5N_3O_5S$, 764.9252; found, 764.9246	^{1}H NMR (500 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.59 (s, 1H), 10.50 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.84 - 7.63 (m, 4H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.43 (dd, *J* = 8.4, 2.1 Hz, 1H), 7.29 - 7.22 (m, 1H), 5.04 (q, *J* = 6.9 Hz, 1H), 3.61 (d, *J* = 8.5 Hz, 1H), 3.46 (d, *J* = 8.5 Hz, 1H), 1.71 (d, *J* = 6.9 Hz, 3H); ^{19}F NMR (471 MHz, DMSO-d_6) δ -74.47, -120.43, -123.87
F38	172-177	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{26}H_{15}Cl_5F_5N_3O_5S$, 750.9095; found,750.9092	^{1}H NMR (500 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.52 (s, 1H), 10.50 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.76 (td, *J* = 4.6, 4.1, 2.5 Hz, 2H), 7.70 (t, *J* = 7.8 Hz, 2H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.43 (dd, *J* = 8.5, 2.1 Hz, 1H), 7.26 (td, *J* = 9.2, 1.7 Hz, 1H), 5.15 (s, 2H), 3.61 (d, *J* = 8.5 Hz, 1H), 3.46 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (471 MHz, DMSO-d_6) δ -77.04, -120.47 (d, *J* = 7.9 Hz), -123.98 (d, *J* = 8.3 Hz)
F39	117-122	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{27}H_{17}Cl_4F_6N_3O_5S$, 748.9547; found, 748.9550	^{1}H NMR (500 MHz, DMSO-d_6) δ 10.94 (s, 1H), 10.60 (s, 1H), 10.50 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.73 - 7.66 (m, 2H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.51 - 7.41 (m, 2H), 7.26 (td, *J* = 9.2, 1.6 Hz, 1H), 5.04 (q, *J* = 6.9 Hz, 1H), 3.59 (d, *J* = 8.4 Hz, 1H), 3.44 (d, *J* = 8.5 Hz, 1H), 1.71 (d, *J* = 7.4 Hz, 3H); ^{19}F NMR (471 MHz, DMSO-d_6) δ -74.47, -117.23 - -117.34 (m), -120.43 (t, *J* = 7.4 Hz), -123.88 (d, *J* = 6.6 Hz)
F40	111-116	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{26}H_{15}Cl_4F_6N_3O_5S$, 734.9391; found, 734.9384	^{1}H NMR (500 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.52 (s, 1H), 10.50 (s, 1H), 7.92 (d, *J* = 2.6 Hz, 1H), 7.80 - 7.67 (m, 3H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.52 - 7.42 (m, 2H), 7.29 - 7.22 (m, 1H), 5.14 (s, 2H), 3.59 (d, *J* = 8.4 Hz, 1H), 3.44 (d, *J* = 8.4 Hz, 1H); ^{19}F NMR (471 MHz, DMSO-d_6) δ -77.04, -117.26 - -117.31 (m), -120.47 (t, *J* = 8.0 Hz), -123.98 (d, *J* = 8.2 Hz)
F41	140-145	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{27}H_{16}Cl_6F_5N_3O_5S$, 798.8862; found, 798.8862	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.94 (s, 1H), 10.49 (s, 2H), 7.92 (d, *J* = 2.5 Hz, 1H), 7.80 (s, 2H), 7.75 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.73 - 7.65 (m, 1H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.30 - 7.20 (m, 1H), 4.77 (q, *J* = 10.0 Hz, 2H), 4.56 (s, 2H), 3.64 (d, *J* = 8.4 Hz, 1H), 3.55 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.32, -120.17 (d, *J* = 2.6 Hz), -123.78 (d, *J* = 2.6 Hz)
F42	142-146	HRMS-ESI (*m/z*) [M+]$^+$ calcd for $C_{27}H_{17}Cl_5F_5N_3O_5S$, 764.9252; found, 764.9242	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.49 (s, 2H), 7.92 (d, *J* = 2.5 Hz, 1H), 7.75 (dd, *J* = 6.3, 2.3 Hz, 2H), 7.69 (d, *J* = 8.2 Hz, 2H), 7.56 (d, *J* = 8.7 Hz, 1H), 7.43 (dd, *J* = 8.4, 2.1 Hz, 1H), 7.30 - 7.20 (m, 1H), 4.77 (q, *J* = 10.1 Hz, 2H), 4.56 (s, 2H), 3.61 (d, *J* = 8.4 Hz, 1H), 3.46 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.32, -120.17 (d, *J* = 2.7 Hz), -123.77 (d, *J* = 2.7 Hz)

(continued)

Table 5: Analytical data for molecules in Table 2			
Cmpd. No.	**mp (°C)**	**Mass Spec**	**NMR (^{1}H, ^{13}C, ^{19}F)**
F43	126-131	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{27}H_{17}Cl_4F_6N_3O_5S$, 748.9547; found, 748.9549	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.95 (s, 1H), 10.49 (br s, 2H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.81 - 7.64 (m, 3H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.51 - 7.42 (m, 2H), 7.25 (dd, *J* = 10.1, 8.4 Hz, 1H), 4.77 (q, *J* = 10.0 Hz, 2H), 4.56 (s, 2H), 3.59 (d, *J* = 8.4 Hz, 1H), 3.44 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.32, -117.29, -120.17 (d, *J* = 2.6 Hz, -123.77 (d, *J* = 3.1 Hz)
F44	132-136	HRMS-ESI (*m*/*z*) [M+H]$^+$ calcd for $C_{28}H_{17}Cl_3F_9N_3O_5S$, 782.9811; found, 782.9803	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.49 (s, 2H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.89 - 7.79 (m, 2H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.70 (td, *J* = 8.7, 5.7 Hz, 1H), 7.64 - 7.53 (m, 2H), 7.25 (td, *J* = 9.2, 1.7 Hz, 1H), 4.80 (d, *J* = 10.1 Hz, 1H), 4.75 (d, *J* = 10.1 Hz, 1H), 4.56 (s, 2H), 3.69 (d, *J* = 8.4 Hz, 1H), 3.51 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.33, -59.92 (d, *J* = 12.6 Hz), -116.94 (q, *J* = 12.4 Hz), -120.18 (d, *J* = 2.7 Hz), -123.77 (d, *J* = 2.7 Hz)
F45		ESIMS *m*/*z* 745 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.19 (s, 1H), 9.50 (s, 1H), 9.28 (s, 1H), 8.11 (td, *J* = 8.7, 5.6 Hz, 1H), 8.03 (d, *J* = 2.6 Hz, 1H), 7.87 - 7.78 (m, 3H), 7.53 - 7.43 (m, 2H), 7.15 (td, *J* = 9.2, 2.0 Hz, 1H), 4.28 (q, *J* = 7.1 Hz, 1H), 3.72 (d, *J* = 8.3 Hz, 1H), 3.43 (d, *J* = 8.3 Hz, 1H), 3.24 (qd, *J* = 7.4, 2.4 Hz, 2H), 1.69 (d, *J* = 7.1 Hz, 3H), 1.35 (t, *J* = 7.5 Hz, 3H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -61.85, -117.59, -122.62, - 128.07
F46		ESIMS *m*/*z* 785 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.21 (s, 1H), 9.49 (s, 1H), 9.22 (s, 1H), 8.18 - 8.01 (m, 2H), 7.87 - 7.77 (m, 3H), 7.48 (dd, *J* = 9.2, 6.9 Hz, 2H), 7.19 - 7.09 (m, 1H), 4.00 (t, *J* = 7.2 Hz, 2H), 3.72 (d, *J* = 8.3 Hz, 1H), 3.44 (d, *J* = 8.3 Hz, 1H), 3.21 (t, *J* = 7.2 Hz, 2H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -61.88, -79.64, -117.63, -123.07, -128.35
F47		ESIMS *m*/*z* 721 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.20 (s, 1H), 9.51 (s, 1H), 9.32 (s, 1H), 8.11 (td, *J* = 8.7, 5.5 Hz, 1H), 8.04 (d, *J* = 2.6 Hz, 1H), 7.86 - 7.71 (m, 3H), 7.74 - 7.62 (m, 2H), 7.48 (d, *J* = 8.7 Hz, 1H), 7.14 (td, *J* = 9.2, 1.9 Hz, 1H), 4.13 (s, 2H), 3.73 (d, *J* = 8.3 Hz, 1H), 3.45 (d, *J* = 8.3 Hz, 1H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -42.82, -63.06, -123.20, -128.53
F48		ESIMS *m*/*z* 786 ([M+H]$^-$)	^{1}H NMR (400 MHz, DMSO- d_6) δ 10.96 (s, 1H), 10.48 (s, 1H), 10.24 (s, 1H), 8.22 (s, 2H), 8.13 (s, 1H), 7.94 (d, *J* = 2.6 Hz, 1H), 7.77 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.68 (td, *J* = 8.7, 5.6 Hz, 1H), 7.57 (d, *J* = 8.7 Hz, 1H), 7.23 (td, *J* = 9.2, 1.8 Hz, 1H), 4.07 (s, 2H), 3.86 (d, *J* = 8.5 Hz, 1H), 3.70 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO- d_6) δ -40.99, -61.20, -120.67, -124.46

(continued)

Table 5: Analytical data for molecules in Table 2			
Cmpd. No.	**mp (°C)**	**Mass Spec**	**NMR (^{1}H, ^{13}C, ^{19}F)**
F49	204-207	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{27}H_{15}Cl_3F_9N_3O_3S$, 736.9756; found, 736.9770	^{1}H NMR (400 MHz, DMSO- d_6) δ 10.96 (s, 1H), 10.48 (s, 1H), 10.24 (s, 1H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.79 - 7.63 (m, 5H), 7.56 (d, *J* = 8.8 Hz, 1H), 7.28 - 7.17 (m, 1H), 4.07 (s, 2H), 3.74 (d, *J* = 8.5 Hz, 1H), 3.59 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO- d_6) δ -40.97, -61.09, -110.49, -120.66, -124.45
F50	206-210	HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{27}H_{19}Cl_3F_5N_3O_3S$, 665.0133; found, 665.0133	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.37 - 10.25 (m, 2H), 7.96 - 7.80 (m, 3H), 7.75 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.71 (dd, *J* = 12.9, 2.3 Hz, 1H), 7.69 - 7.57 (m, 2H), 7.55 (d, *J* = 8.8 Hz, 1H), 7.34 - 7.25 (m, 1H), 3.69 (d, *J* = 8.4 Hz, 1H), 3.51 (d, *J* = 8.5 Hz, 1H), 3.28 (s, 2H), 2.17 (s, 3H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.91 (d, *J* = 12.5 Hz), -116.94 (q, *J* = 12.4 Hz), -120.41
F51		HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{27}H_{16}Cl_3F_8N_3O_3S$, 718.9850; found, 718.9848	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.97 (s, 1H), 10.60 (s, 1H), 10.34 (s, 1H), 7.91 (d, *J* = 2.6 Hz, 1H), 7.87 (d, *J* = 6.8 Hz, 2H), 7.75 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.73 - 7.64 (m, 2H), 7.63 - 7.52 (m, 2H), 7.28 (dd, *J* = 8.6, 2.4 Hz, 1H), 4.04 (s, 2H), 3.69 (d, *J* = 8.4 Hz, 1H), 3.51 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -40.81, -59.91 (d, *J* = 12.3 Hz), -116.94 (q, *J* = 12.5 Hz), -120.16
F52		HRMS-ESI (*m*/*z*) [M+]$^+$ calcd for $C_{28}H_{18}Cl_3F_8N_3O_3S$, 733.0007; found, 733.0005	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.43 (s, 1H), 10.32 (s, 1H), 7.91 (d, *J* = 2.6 Hz, 1H), 7.89 - 7.81 (m, 2H), 7.75 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.72 - 7.65 (m, 2H), 7.62 - 7.54 (m, 2H), 7.31 - 7.26 (m, 1H), 3.69 (d, *J* = 8.5 Hz, 1H), 3.63 (q, *J* = 10.7 Hz, 2H), 3.55 - 3.50 (m, 3H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -59.91 (d, *J* = 12.3 Hz), -65.01, -116.94 (q, *J* = 12.5 Hz), -120.35

Table 6: Analytical data for molecules in Table 3		
Cmpd. No.	**Mass Spec**	**NMR (^{1}H, ^{13}C, ^{19}F)**
DP1	ESIMS 813 ([M-H]$^-$)	^{1}H NMR (300 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.52 (s, 1H), 7.93 (d, *J* = 2.6 Hz, 1H), 7.81 (s, 2H), 7.79 - 7.69 (m, 2H), 7.57 (d, *J* = 8.8 Hz, 1H), 7.28 (td, *J* = 9.2, 1.6 Hz, 1H), 3.64 (d, *J* = 8.5 Hz, 1H), 3.56 (d, *J* = 8.5 Hz, 1H), 1.40 (s, 18H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -123.50 (d, *J* = 2.0 Hz), -126.50 (d, *J* = 2.0 Hz)
DP2	ESIMS 614 ([M+H]$^+$)	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.94 (s, 1H), 10.18 (s, 1H), 7.90 (d, *J* = 2.5 Hz, 1H), 7.80 (s, 2H), 7.75 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.54 (d, *J* = 8.7 Hz, 1H), 6.91 (ddd, *J* = 10.6, 8.8, 1.8 Hz, 1H), 6.80 (td, *J* = 8.5, 5.6 Hz, 1H), 5.31 (s, 2H), 3.64 (d, *J* = 8.5 Hz, 1H), 3.56 (d, *J* = 9.4 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -133.96 (d, *J* = 14.0 Hz), -138.08 (d, *J* = 13.9 Hz)
DP3	ESIMS 580 ([M+H]$^+$)	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.96 (s, 1H), 10.18 (s, 1H), 7.89 (d, *J* = 2.6 Hz, 1H), 7.75 (dd, *J* = 9.7, 2.3 Hz, 2H), 7.69 (d, *J* = 8.3 Hz, 1H), 7.54 (d, *J* = 8.7 Hz, 1H), 7.43 (dd, *J* = 8.4, 2.1 Hz, 1H), 6.91 (ddd, *J* = 10.6, 8.8, 1.8 Hz, 1H), 6.80 (td, *J* = 8.4, 5.5 Hz, 1H), 5.31 (s, 2H), 3.61 (d, *J* = 8.5 Hz, 1H), 3.47 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -133.96 (d, *J* = 14.0 Hz), -138.07 (d, *J* = 13.9 Hz)

(continued)

Table 6: Analytical data for molecules in Table 3		
Cmpd. No.	**Mass Spec**	**NMR (^{1}H, ^{13}C, ^{19}F)**
DP4	ESIMS 564 ([M+H]$^+$)	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.97 (s, 1H), 10.17 (s, 1H), 7.90 (d, *J* = 2.6 Hz, 1H), 7.73 (ddd, *J* = 13.9, 7.9, 2.2 Hz, 2H), 7.54 (d, *J* = 8.7 Hz, 1H), 7.51 - 7.42 (m, 2H), 6.91 (ddd, *J* = 10.6, 8.9, 1.8 Hz, 1H), 6.80 (td, *J* = 8.5, 5.6 Hz, 1H), 5.30 (s, 2H), 3.59 (d, *J* = 8.5 Hz, 1H), 3.45 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -117.28, -133.95 (d, *J* = 13.8 Hz), -138.07 (d, *J* = 13.8 Hz)
DP5	ESIMS *m/z* 597 ([M+H]$^+$)	^{1}H NMR (400 MHz, Acetone-d_6) δ 10.19 (s, 1H), 9.28 (s, 1H), 8.01 (d, *J* = 2.6 Hz, 1H), 7.82 (dq, *J* = 9.1, 2.7 Hz, 3H), 7.52 - 7.43 (m, 2H), 7.37 (td, *J* = 8.6, 5.5 Hz, 1H), 6.94 - 6.84 (m, 1H), 4.77 (d, *J* = 8.5 Hz, 2H), 3.72 (d, *J* = 8.3 Hz, 1H), 3.43 (d, *J* = 8.3 Hz, 1H); ^{19}F NMR (376 MHz, Acetone-d_6) δ -61.82, -117.59, -137.17, -144.17
DP6	ESIMS *m/z* 579 ([M+H]$^+$)	^{1}H NMR (400 MHz, $CDCl_3$) δ 9.33 (s, 1H), 8.30 (d, *J* = 2.1 Hz, 1H), 7.96 (dd, *J* = 8.8, 2.7 Hz, 1H), 7.66 (d, *J* = 2.7 Hz, 1H), 7.59 (d, *J* = 7.7 Hz, 1H), 7.52 - 7.41 (m, 3H), 7.37 (dd, *J* = 18.7, 8.3 Hz, 2H), 6.82 - 6.72 (m, 1H), 3.74 (s, 2H), 3.60 (d, *J* = 8.2 Hz, 1H), 2.96 (d, *J* = 8.2 Hz, 1H); ^{19}F NMR (376 MHz, $CDCl_3$) δ -62.63, -134.53, -145.15
DP7	ESIMS *m/z* 648 ([M+H]$^-$)	^{1}H NMR (400 MHz, DMSO-d_6) δ 10.94 (s, 1H), 10.18 (s, 1H), 8.22 (s, 2H), 8.13 (s, 1H), 7.91 (d, *J* = 2.6 Hz, 1H), 7.76 (dd, *J* = 8.8, 2.6 Hz, 1H), 7.55 (d, *J* = 8.8 Hz, 1H), 6.91 (ddd, *J* = 10.6, 8.9, 1.8 Hz, 1H), 6.81 (td, *J* = 8.4, 5.6 Hz, 1H), 5.31 (s, 2H), 3.86 (d, *J* = 8.5 Hz, 1H), 3.70 (d, *J* = 8.5 Hz, 1H); ^{19}F NMR (376 MHz, DMSO-d_6) δ -61.19, -133.97 (d, *J* = 13.8 Hz), -138.09 (d, *J* = 14.0 Hz)
DP8	ESIMS *m/z* 597 ([M+H]$^+$)	^{1}H NMR (400 MHz, acetone-d_6) δ 10.17 (s, 1H), 9.25 (s, 1H), 8.01 (d, *J* = 2.6 Hz, 1H), 7.81 (dd, *J* = 8.7, 2.6 Hz, 1H), 7.73 - 7.67 (m, 1H), 7.61 (dt, *J* = 9.5, 1.9 Hz, 1H), 7.55 (dt, *J* = 8.7, 1.9 Hz, 1H), 7.48 (d, *J* = 8.7 Hz, 1H), 7.38 (td, *J* = 8.6, 5.5 Hz, 1H), 6.89 (ddd, *J* = 10.9, 9.1, 2.0 Hz, 1H), 4.77 (s, 2H), 3.77 (d, *J* = 8.3 Hz, 1H), 3.50 (d, *J* = 8.4 Hz, 1H); ^{19}F NMR (376 MHz, acetone-d_6) δ -63.19, -111.80, -137.23, -144.25

BAW & CL Rating Table	
% Control (or Mortality)	Rating
50-100	A
More than 0 - Less than 50	B
Not Tested	C
No activity noticed in this bioassay	D

GPA & YFM Rating Table	
% Control (or Mortality)	Rating
80-100	A
More than 0 - Less than 80	B
Not Tested	C
No activity noticed in this bioassay	D

Table ABC: Biological Results				
No.	Species			
	BAW	CL	GPA	YFM
F1	A	A	C	C
F2	A	A	C	C
F3	A	A	B	C
F4	A	A	C	C
F5	A	A	C	D
F6	A	A	C	C
F7	A	A	C	C
F8	A	A	C	C
F9	A	A	C	C
F10	A	A	C	C
F11	A	A	C	C
F12	A	A	C	C
F13	A	A	C	C
F14	A	A	C	C
F15	A	A	C	A
F16	A	A	C	A
F17	A	A	C	A
F18	A	A	C	A
F19	A	A	C	A
F20	A	A	C	C
F21	A	A	C	A
F22	A	A	C	D
F23	A	A	C	A
F24	A	A	C	A
F25	A	A	C	A
F26	A	A	C	C
F27	A	A	C	C
F28	A	A	C	C
F29	A	A	C	C
F30	A	A	C	C
F31	A	A	C	C
F32	A	A	C	A
F33	A	A	C	C
F34	A	A	B	A
F35	A	A	C	C
F36	A	A	C	C

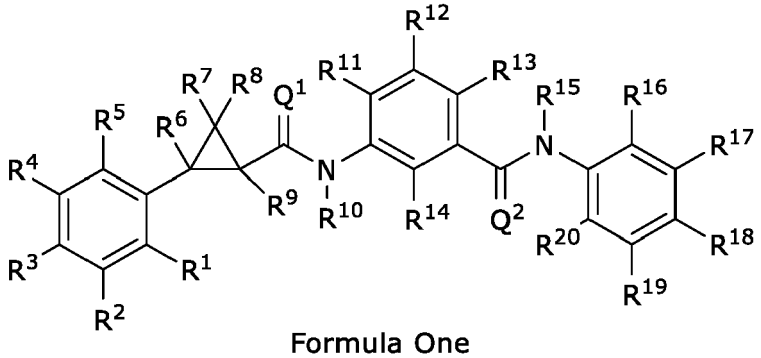
(continued)

Table ABC: Biological Results				
No.	**Species**			
	BAW	**CL**	**GPA**	**YFM**
F37	A	A	C	C
F38	A	A	C	C
F39	A	A	C	C
F40	A	A	C	C
F41	A	A	C	C
F42	A	A	C	C
F43	A	A	C	C
F44	A	A	C	C
F45	A	A	C	D
F46	A	A	C	A
F47	A	A	C	C
F48	A	A	C	C
F49	A	A	C	C
F50	A	A	C	C
F51	A	A	C	C
F52	A	A	C	C

Table ABC-DP: Biological Results				
No.	**Species**			
	BAW	**CL**	**GPA**	**YFM**
DP1	B	D	C	D
DP2	A	A	C	A
DP3	A	A	C	A
DP4	A	A	C	A
DP5	A	A	C	A
DP6	A	A	A	B
DP7	A	A	C	A
DP8	A	A	C	A

Claims

1. A molecule according to **Formula One**

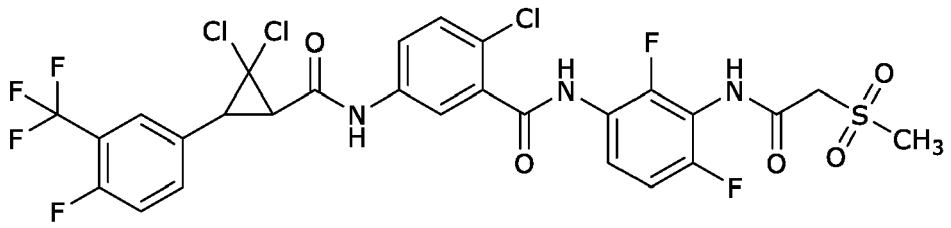


Formula One

wherein:

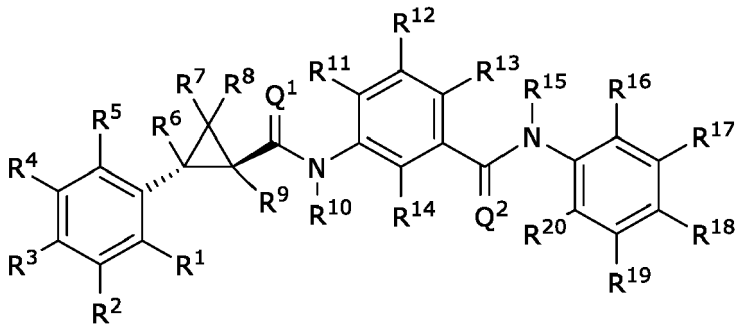
(A) R^1 is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, SF_5, and $(C_1\text{-}C_3)$haloalkyl;
(B) R^2 is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, SF_5, and $(C_1\text{-}C_3)$haloalkyl;
(C) R^3 is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, SF_5, and $(C_1\text{-}C_3)$haloalkyl;
(D) R^4 is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, SF_5, and $(C_1\text{-}C_3)$haloalkyl;
(E) R^5 is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, SF_5, and $(C_1\text{-}C_3)$haloalkyl;
(F) R^6 is H;
(G) R^7 is selected from the group consisting of F, Cl, and Br;
(H) R^8 is selected from the group consisting of F, Cl, and Br;
(I) R^9 is H;
(J) Q^1 is selected from the group consisting of O and S;
(K) Q^2 is selected from the group consisting of O and S;
(L) R^{10} is H;
(M) R^{11} is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, and $(C_1\text{-}C_3)$alkoxy;
(N) R^{12} is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, and $(C_1\text{-}C_3)$alkoxy;
(O) R^{13} is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, and $(C_1\text{-}C_3)$alkoxy;
(P) R^{14} is selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, and $(C_1\text{-}C_3)$alkoxy;
(Q) R^{15} is H;
(R) R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are independently selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, NH_2, OH, SF_5, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, $(C_2\text{-}C_3)$alkenyl, $(C_2\text{-}C_3)$haloalkenyl, and $N(R^{21})C(=O)(R^{22})$, wherein at least one and no more than two of R^{16}, R^{17}, R^{18}, R^{19}, and R^{20} are $N(R^{21})C(=O)(R^{22})$;
(S) R^{21} is selected from the group consisting of H, $(C_1\text{-}C_3)$alkyl, $(C_2\text{-}C_3)$alkenyl, $(C_2\text{-}C_3)$alkynyl, $(C_1\text{-}C_3)$haloalkyl, $(C_2\text{-}C_3)$haloalkenyl, $(C_1\text{-}C_3)$alkylphenyl, $(C_1\text{-}C_3)$alkylO$(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$alkylOC(=O)$(C_1\text{-}C_3)$alkyl, C(=O)$(C_1\text{-}C_3)$alkyl, and phenyl;
(T) R^{22} is selected from the group consisting of $(C_1\text{-}C_6)$alkyl-S(=O)$_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$alkyl-S(=O)$_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$alkyl-S(=O)$_n$-aryl, $(C_1\text{-}C_6)$alkyl-S(=O)$_n$-heterocyclyl, $(C_2\text{-}C_6)$alkenyl-S(=O)$_n$-$(C_1\text{-}C_6)$alkyl, $(C_2\text{-}C_6)$alkenyl-S(=O)$_n$-$(C_2\text{-}C_6)$alkenyl, $(C_2\text{-}C_6)$alkenylS(=O)$_n$-aryl, $(C_2\text{-}C_6)$alkenyl-S(=O)$_n$-heterocyclyl,

wherein n = 0, 1, or 2, and
wherein each said alkyl and alkenyl may be substituted with one or more substituents selected from the group consisting of F, Cl, Br, I, CN, OH, oxo, NO_2, NH_2, NH$(C_1\text{-}C_3)$alkyl, N$((C_1\text{-}C_3)$alkyl$)_2$, O$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_3)$alkylO$(C_1\text{-}C_3)$alkyl, and $(C_3\text{-}C_6)$cycloalkyl and wherein each said aryl and heterocyclyl may be substituted with one or more substituents selected from the group consisting of $(C_1\text{-}C_3)$alkyl, F, Cl, Br, I, CN, OH, oxo, NO_2, NH_2, NH$(C_1\text{-}C_3)$alkyl, N$((C_1\text{-}C_3)$alkyl$)_2$, O$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_3)$alkylO$(C_1\text{-}C_3)$alkyl, and $(C_3\text{-}C_6)$cycloalkyl; and
N-oxides, salts, solvates, esters, crystal polymorphs, isotopes, resolved stereoisomers, and tautomers of the molecules of Formula One,
with the proviso that the following molecule is excluded



Molecule F1299.

2. A molecule according to claim 1 wherein said molecule has a structure according to Formula Two



Formula Two

3. A molecule according to any of the previous claims wherein R^1 is selected from the group consisting of H, F, Cl, Br, SF_5, and CF_3; and/or

wherein R^2 is selected from the group consisting of H, F, Cl, Br, SF_5, and CF_3; and/or
wherein R^3 is selected from the group consisting of H, F, Cl, Br, SF_5, and CF_3; and/or
wherein R^4 is selected from the group consisting of H, F, Cl, Br, SF_5, and CF_3; and/or
wherein R^5 is selected from the group consisting of H, F, Cl, Br, SF_5, and CF_3; and/or
wherein R^7 is Cl; and/or
wherein R^8 is Cl; and/or
wherein Q^1 is O; and/or
wherein Q^2 is O; and/or
wherein R^{11} is H; and/or
wherein R^{12} is selected from the group consisting of H, F, Cl, CH_3, and CF_3; and/or
wherein R^{13} is selected from the group consisting of F, Cl, CH_3, and OCH_3; and/or
wherein R^{14} is selected from the group consisting of H, F, and Cl; and/or wherein:

(a) R^{16}, R^{18}, R^{19}, and R^{20} are independently selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, NH_2, OH, SF_5, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, $(C_2\text{-}C_3)$alkenyl, and $(C_2\text{-}C_3)$haloalkenyl, and R^{17} is $N(R^{21})C(=O)(R^{22})$; or
(b) R^{16}, R^{17}, R^{19}, and R^{20} are independently selected from the group consisting of H, F, Cl, Br, I, CN, NO_2, NH_2, OH, SF_5, $(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$haloalkyl, $(C_2\text{-}C_3)$alkenyl, and $(C_2\text{-}C_3)$haloalkenyl, and R^{18} is $N(R^{21})C(=O)(R^{22})$;

and/or wherein R^{21} is H; and/or
wherein R^{22} is selected from the group consisting of $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-aryl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-heterocyclyl, wherein n = 0, 1, or 2, and wherein each said alkyl and alkenyl may be substituted with one or more substituents selected from the group consisting of F, Cl, Br, I, CN, OH, oxo, NO_2, NH_2, $NH(C_1\text{-}C_3)$alkyl, $N((C_1\text{-}C_3)\text{alkyl})_2$, $O(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_3)$alkyl$O(C_1\text{-}C_3)$alkyl, and $(C_3\text{-}C_6)$cycloalkyl and wherein each said aryl and heterocyclyl may be substituted with one or more substituents selected from the group consisting of $(C_1\text{-}C_3)$alkyl, F, Cl, Br, I, CN, OH, oxo, NO_2, NH_2, $NH(C_1\text{-}C_3)$alkyl, $N((C_1\text{-}C_3)\text{alkyl})_2$, $O(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_3)$alkyl$O(C_1\text{-}C_3)$alkyl, and $(C_3\text{-}C_6)$cycloalkyl.

4. A molecule according to any of the previous claims wherein at least one of R^2, R^3, and R^4, is SF_5; and/or

wherein R^7 and R^8 are not the same substituent; and/or
wherein R^{22} is selected from the group consisting of $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-phenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-pyridyl, wherein n = 0, 1, or 2, and wherein each said alkyl and alkenyl may be substituted with one or more substituents selected from the group consisting of F, Cl, Br, and I, and wherein each said phenyl and pyridyl may be substituted with one or more substituents selected from the group consisting of F, Cl, Br, and I.

5. A molecule according to any of the previous claims wherein:

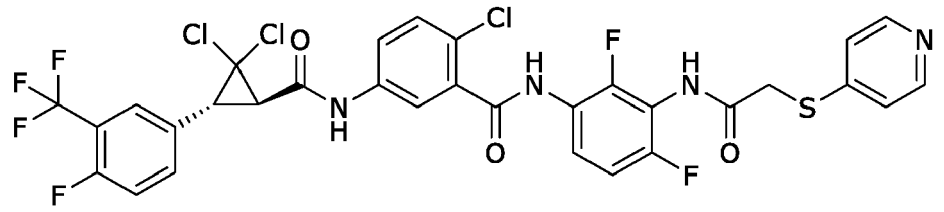
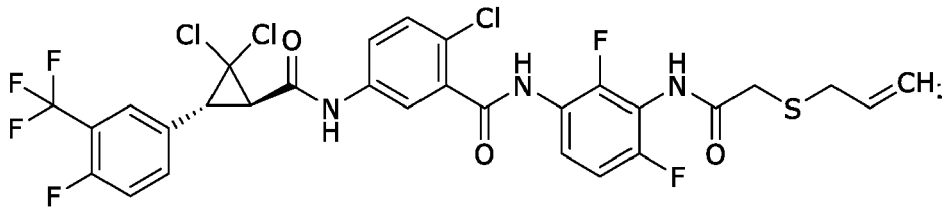
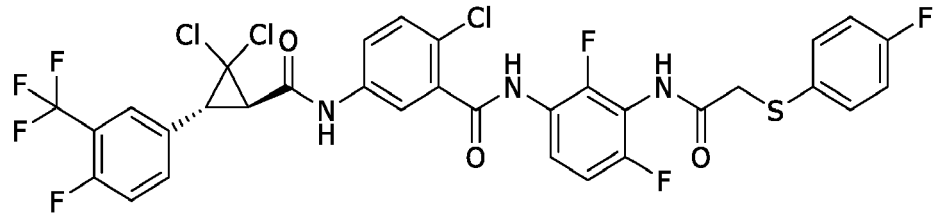
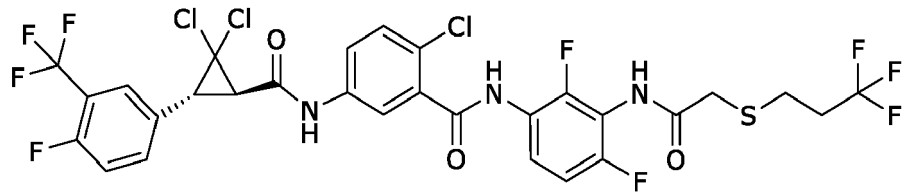
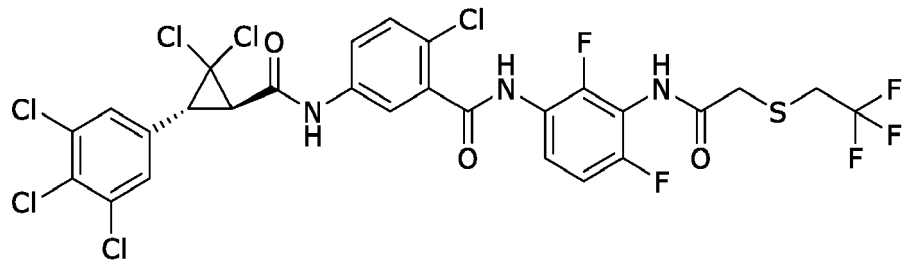
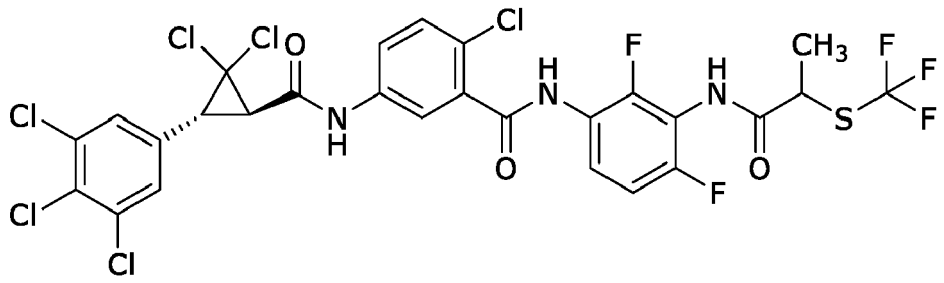
R^1 is H;
R^2 is selected from the group consisting of H, F, Cl, and CF_3;
R^3 is selected from the group consisting of H, F, and Cl;
R^4 is selected from the group consisting of H, F, Cl, and CF_3;
R^5 is H;
R^7 is Cl;
R^8 is Cl;
Q^1 is O;
Q^2 is O;
R^{11} is H;
R^{12} is H;
R^{13} is Cl;
R^{14} is H;
R^{16} is F;
R^{17} is $N(R^{21})C(=O)(R^{22})$;
R^{18} is F;
R^{19} is H;
R^{20} is H;
R^{21} is H; and
R^{22} is selected from the group consisting of $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-phenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-pyridyl,
wherein n = 0, 1, or 2,
wherein each said alkyl, alkenyl, phenyl, and pyridyl may be substituted with one or more substituents selected from the group consisting of F and Cl.

6. A molecule according to any of the previous claims wherein:

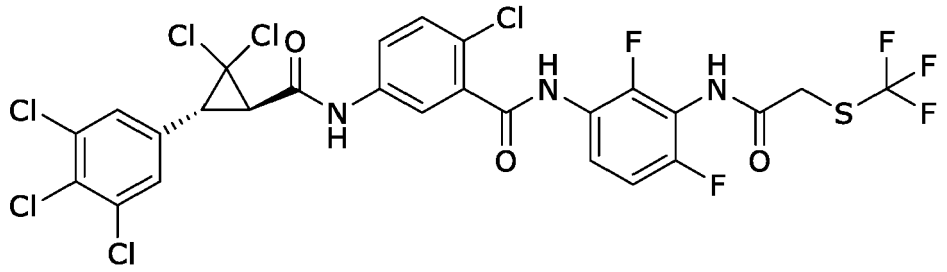
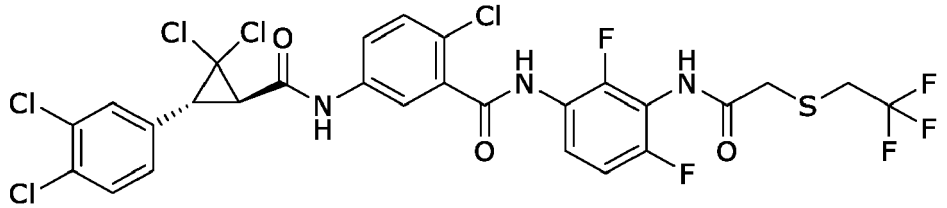
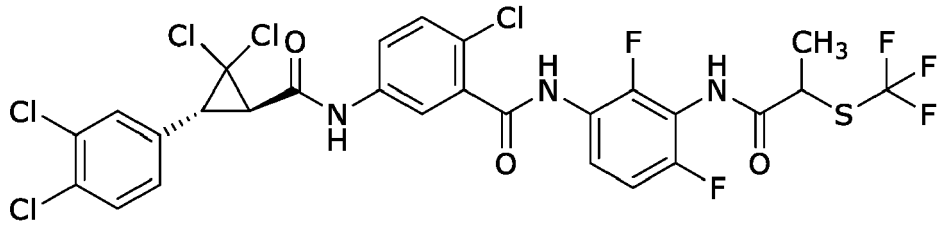
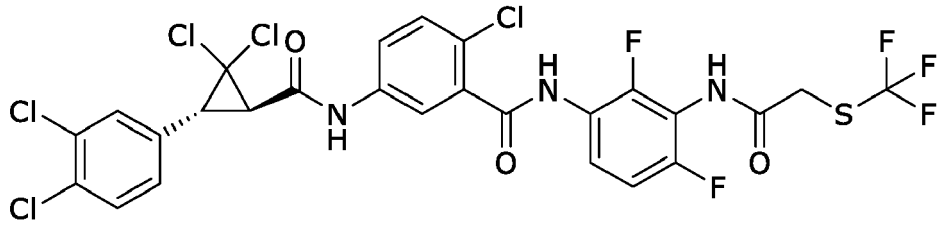
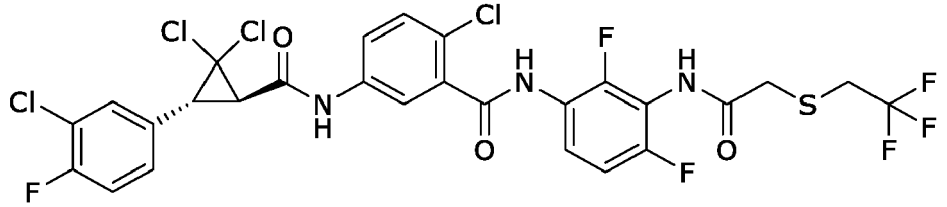
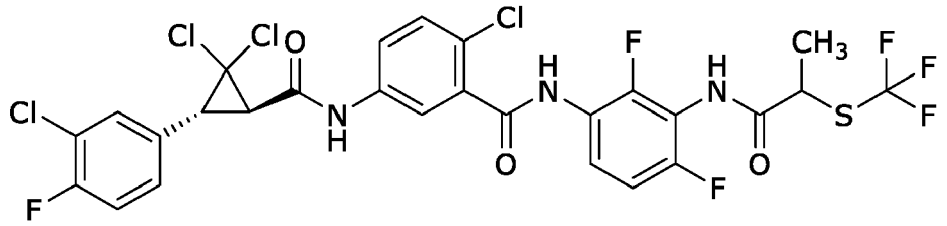
R^1 is H;
R^2 is selected from the group consisting of H, F, Cl, and CF_3;
R^3 is selected from the group consisting of H, F, and Cl;
R^4 is selected from the group consisting of H, F, Cl, and CF_3;
R^5 is H;
R^7 is Cl;
R^8 is Cl;
Q^1 is O;
Q^2 is O;
R^{11} is H;
R^{12} is H;
R^{13} is Cl;
R^{14} is H;
R^{16} is F;
R^{17} is H;
R^{18} is $N(R^{21})C(=O)(R^{22})$;
R^{19} is H;
R^{20} is H;
R^{21} is H; and
R^{22} is selected from the group consisting of $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-phenyl, $(C_1\text{-}C_6)$alkyl-$S(=O)_n$-pyridyl,
wherein n = 0, 1, or 2,

wherein each said alkyl, alkenyl, phenyl, and pyridyl may be substituted with one or more substituents selected from the group consisting of F and Cl.

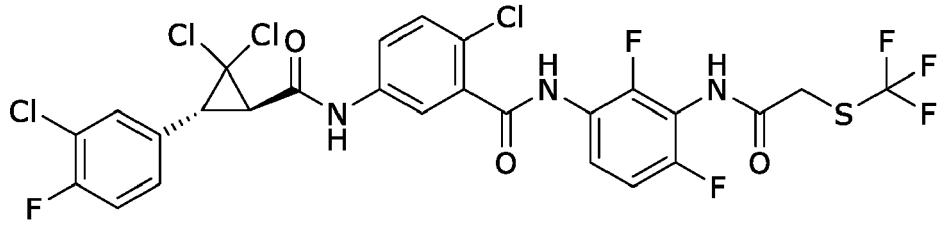
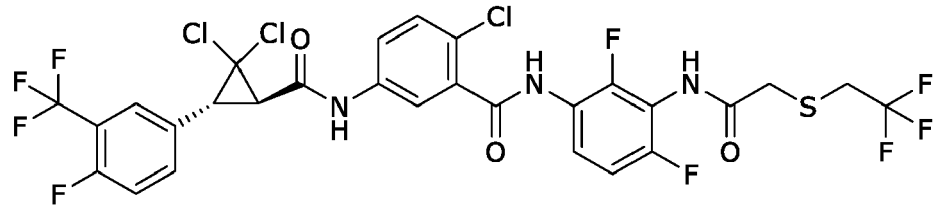
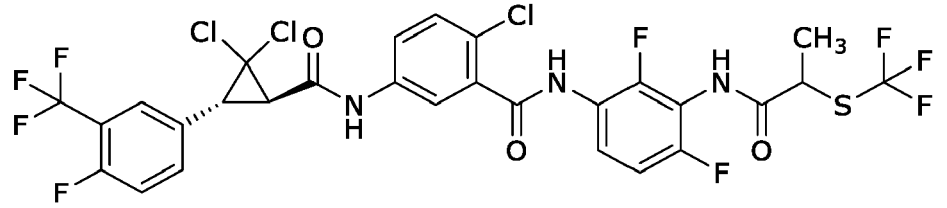
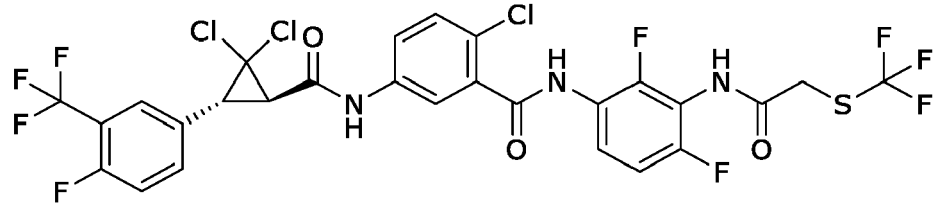
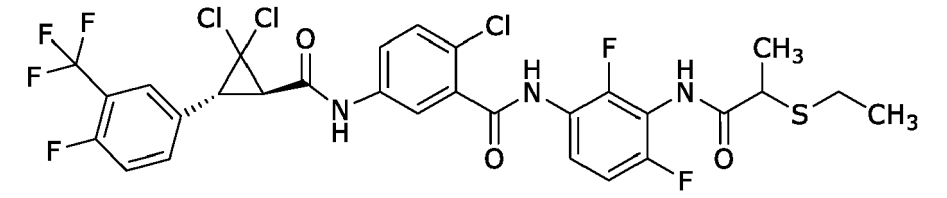
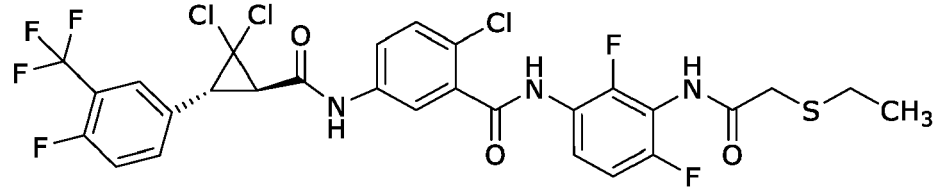
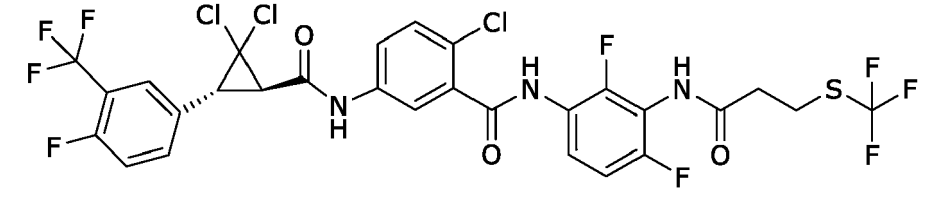
7. A molecule according to claim 1 wherein said molecule is selected from one of the molecules in the following table:

No.	Structure
F2	
F3	
F4	
F5	
F6	
F7	

(continued)

No.	Structure
F8	
F9	
F10	
F11	
F12	
F13	

(continued)

No.	Structure
F14	
F15	
F16	
F17	
F18	
F19	
F22	

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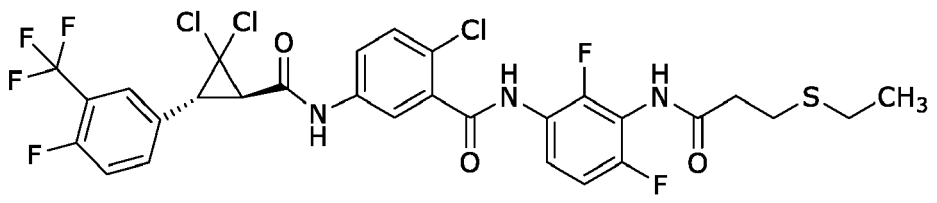
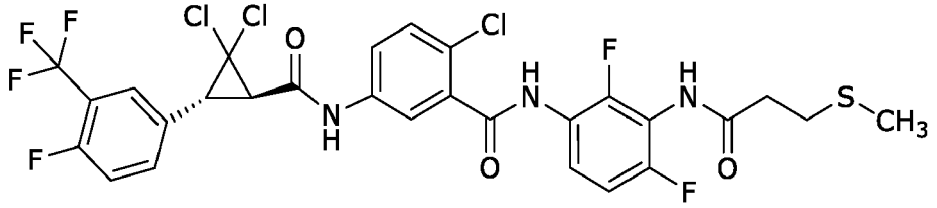
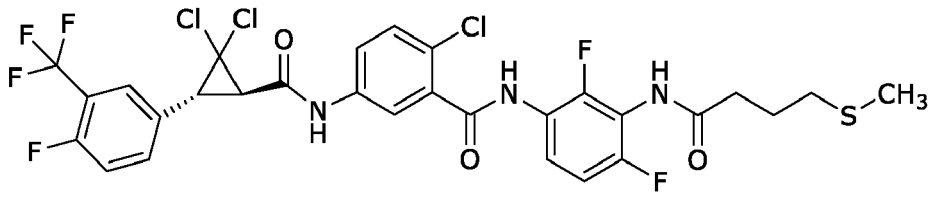
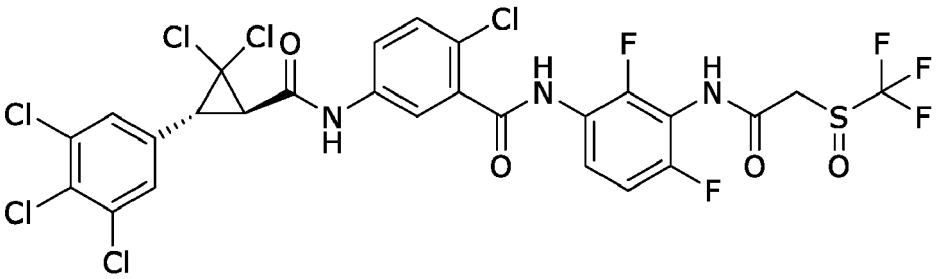
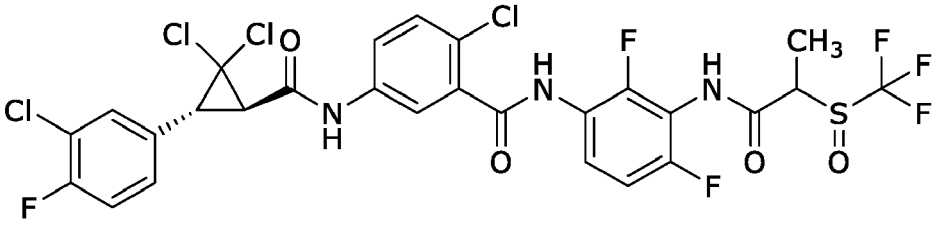
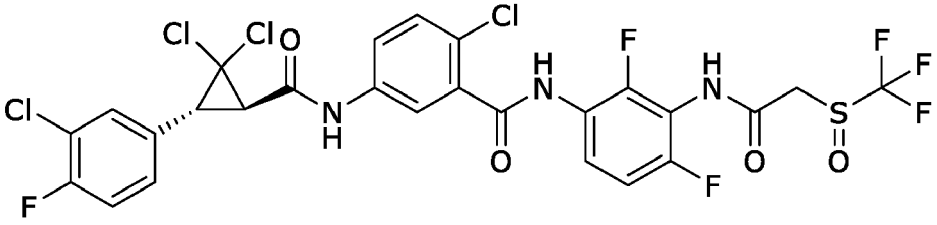
No.	Structure
F23	
F24	
F25	
F26	
F27	
F28	

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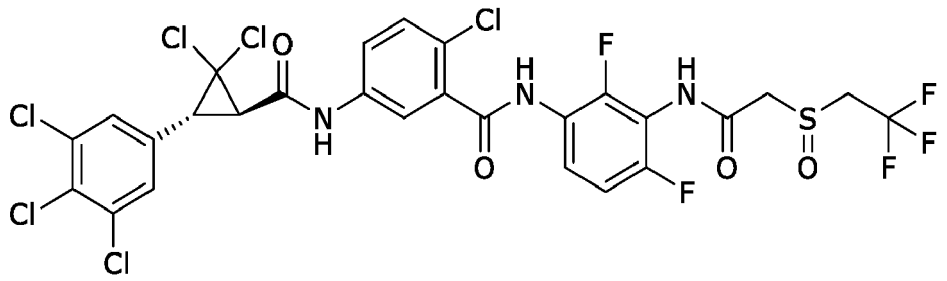
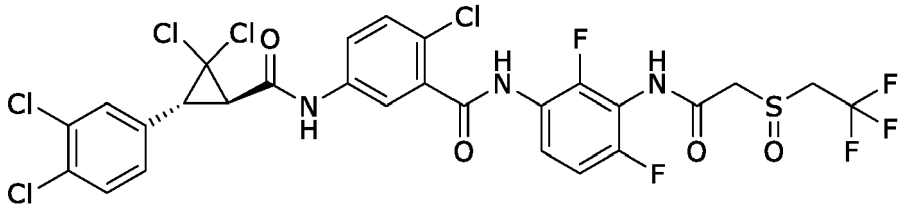
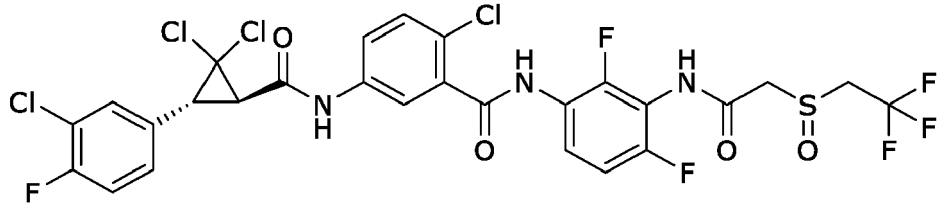
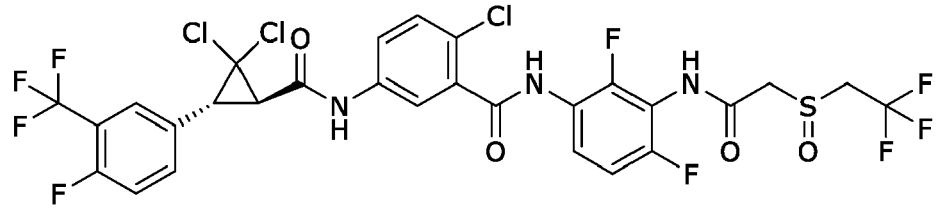
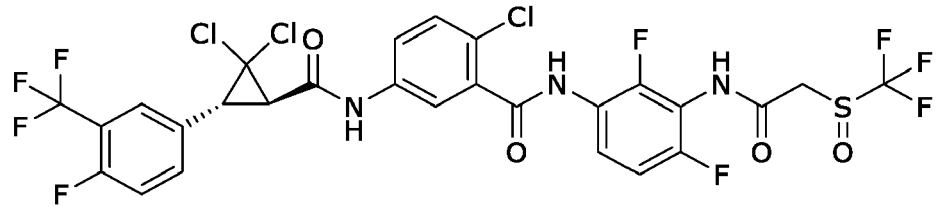
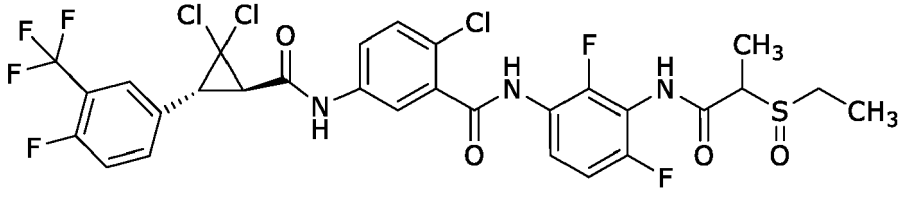
No.	Structure
F29	
F30	
F31	
F32	
F33	
F34	

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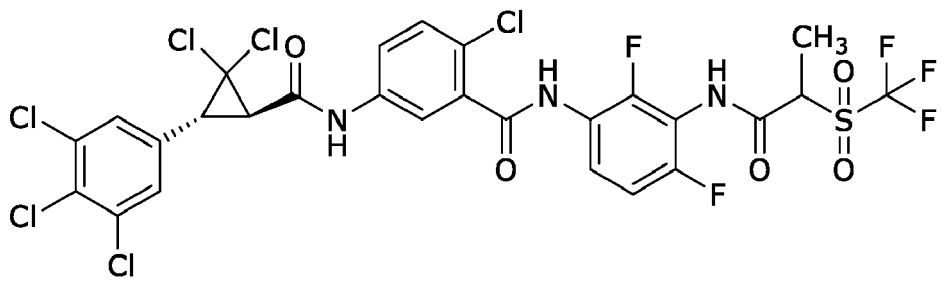
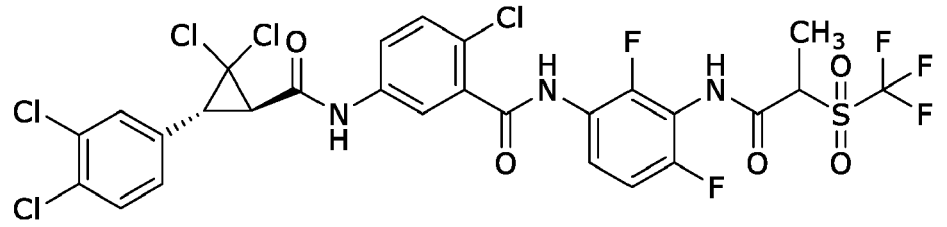
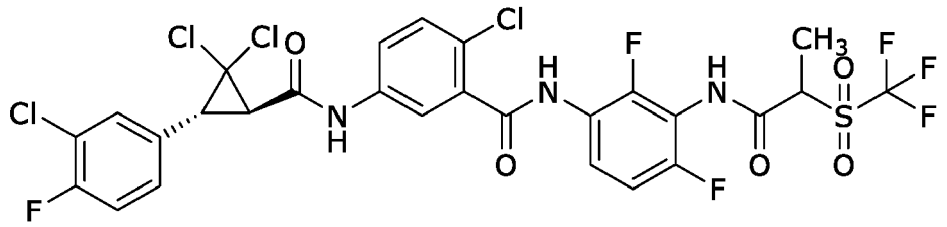
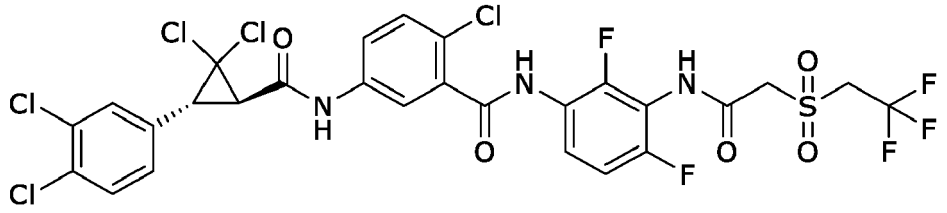
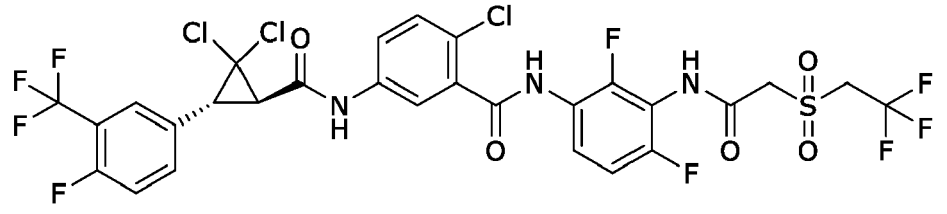
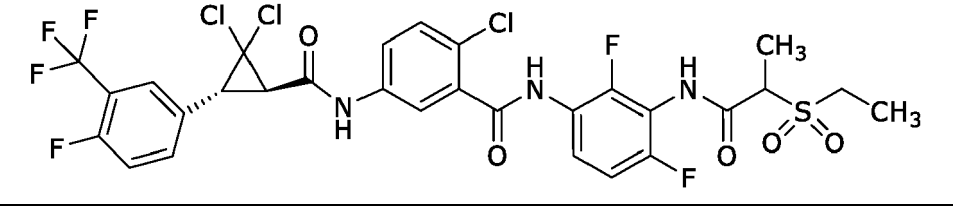
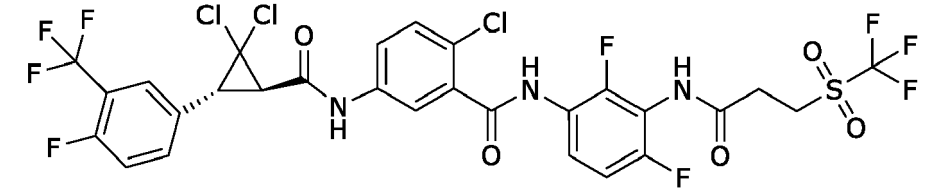
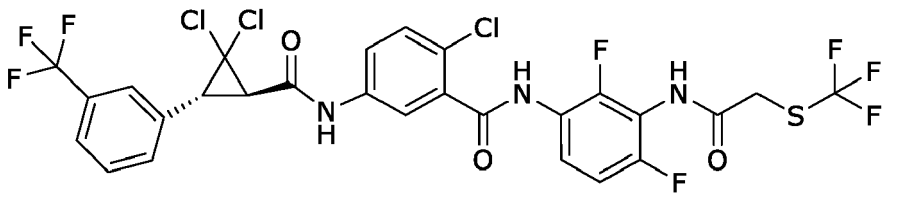
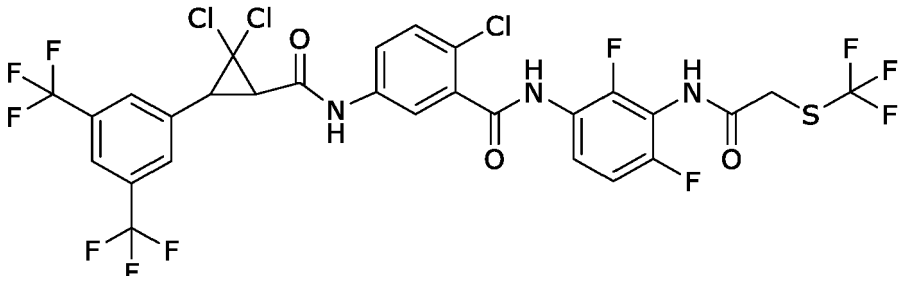
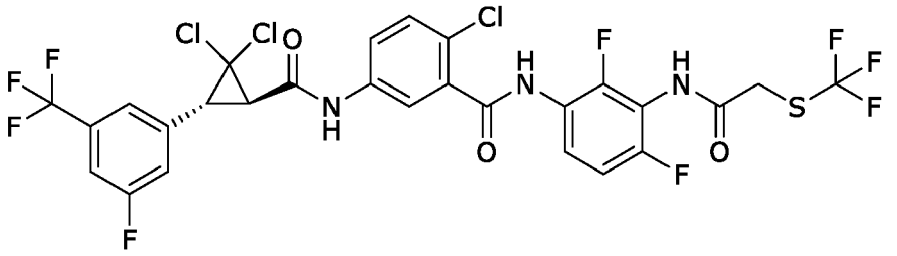
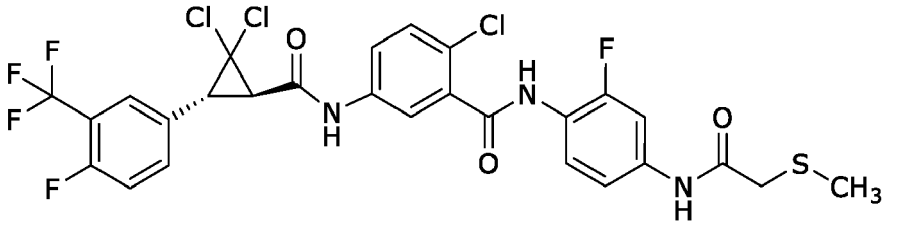
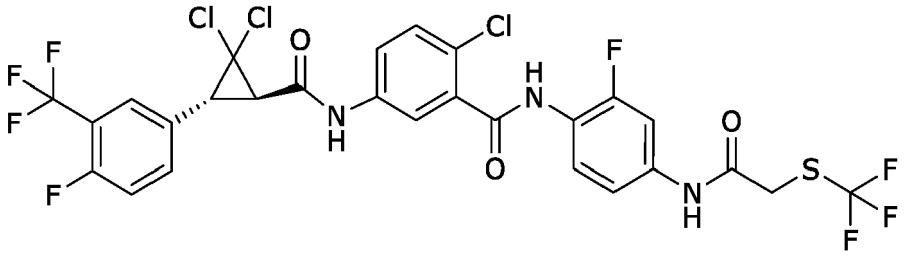
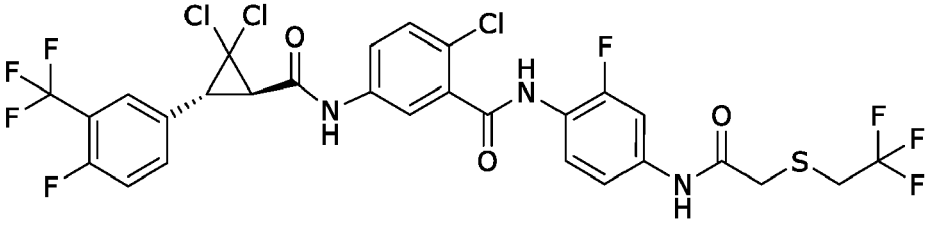
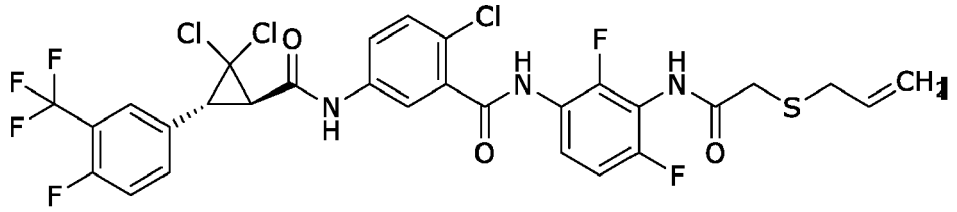
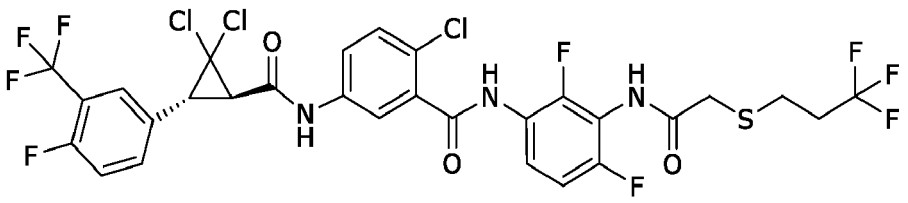
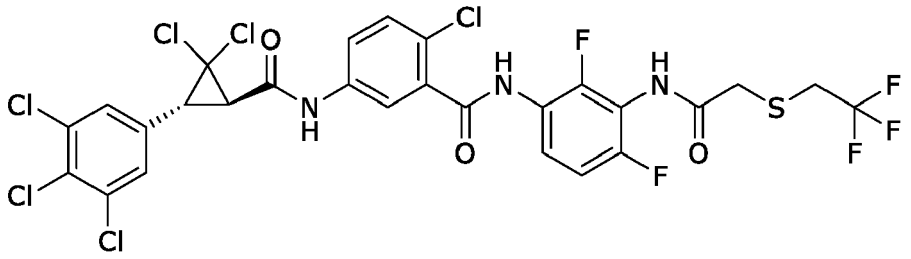
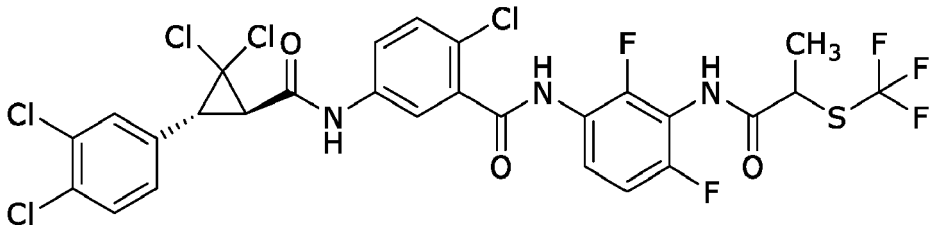
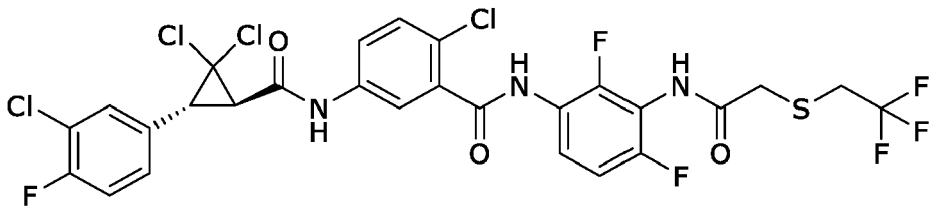
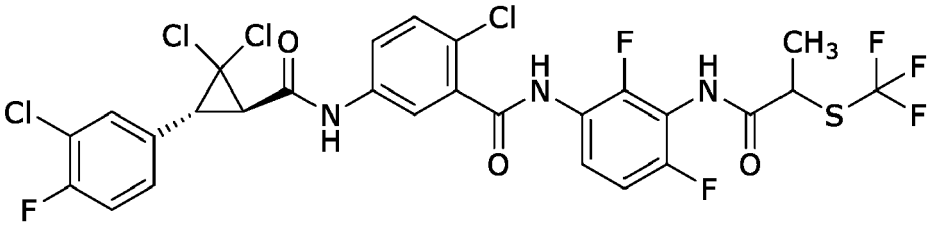
No.	Structure
F35	
F37	
F39	
F42	
F44	
F45	
F46	

(continued)

No.	Structure
F47	
F48	
F49	
F50	
F51	
F52	

8. A molecule according to claim 1 wherein said molecule is selected from one of the molecules in the following table:

No.	Structure
F3	
F5	
F6	
F10	
F12	
F13	

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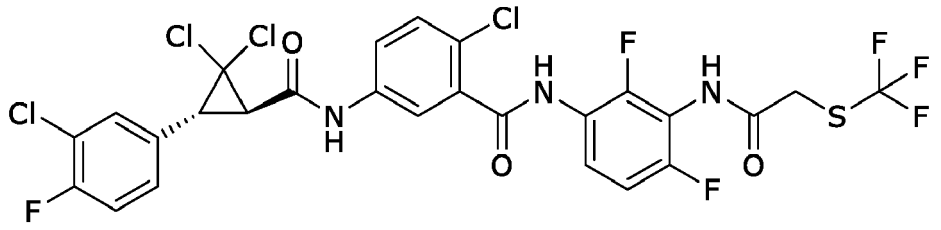
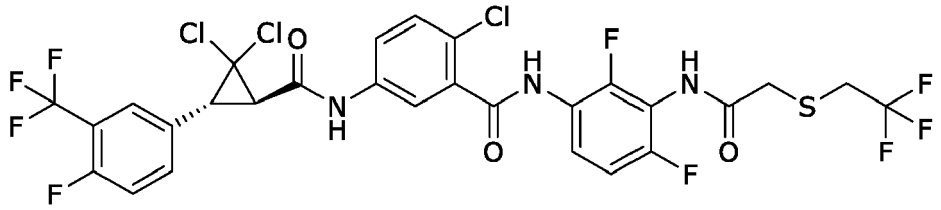
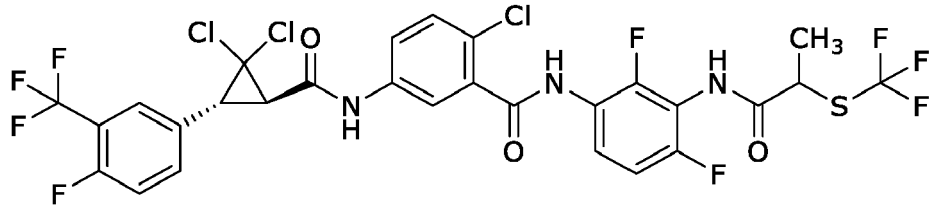
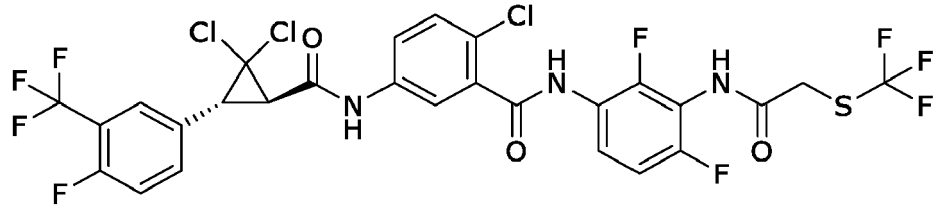
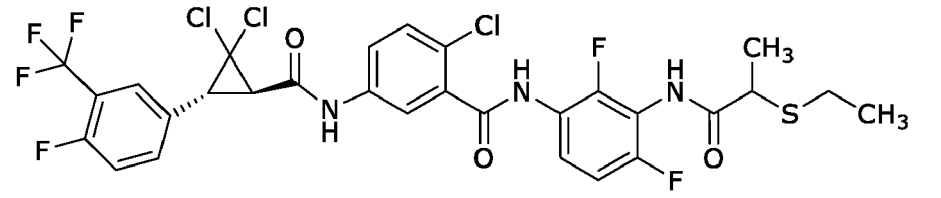
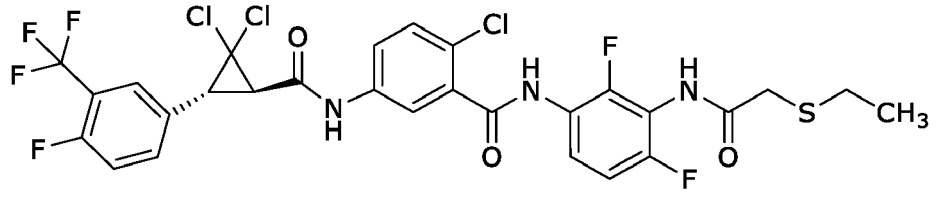
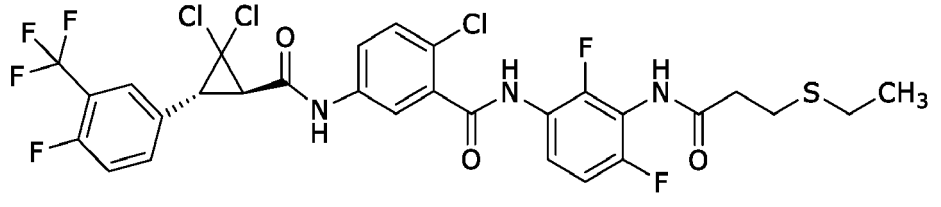
No.	Structure
F14	
F15	
F16	
F17	
F18	
F19	
F23	

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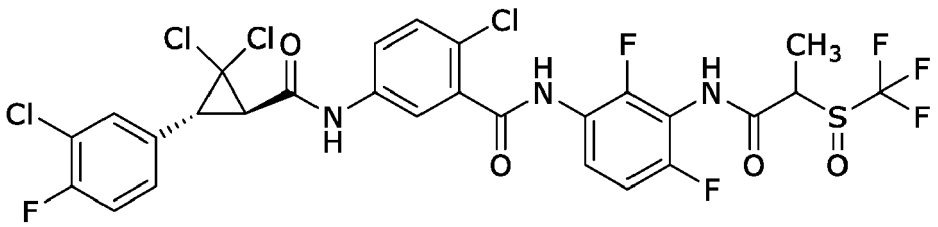
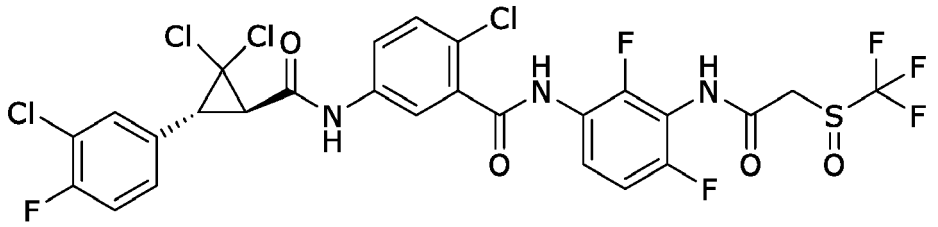
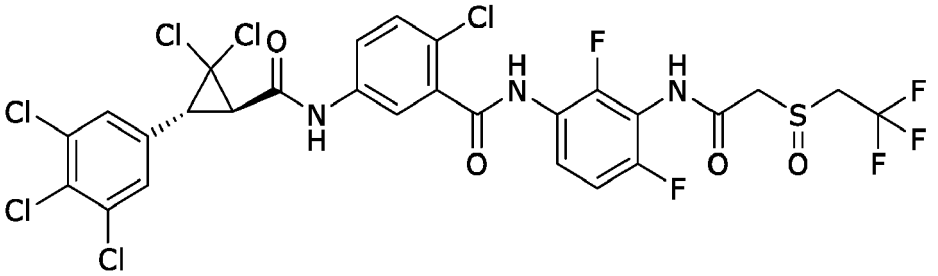
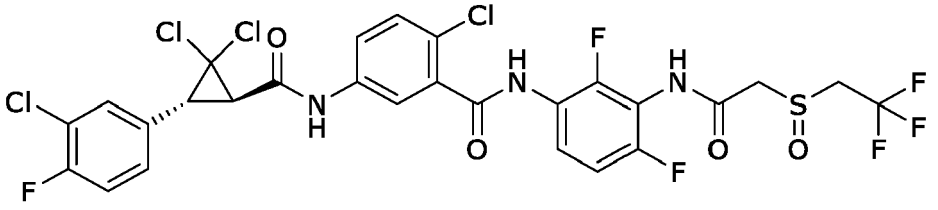
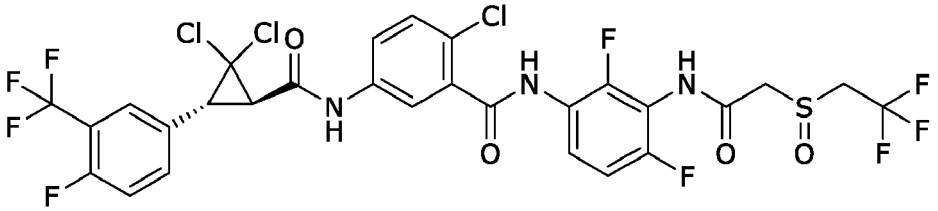
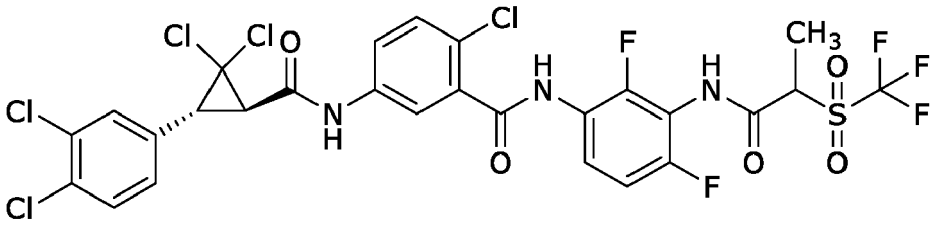
No.	Structure
F27	
F28	
F29	
F31	
F32	
F37	

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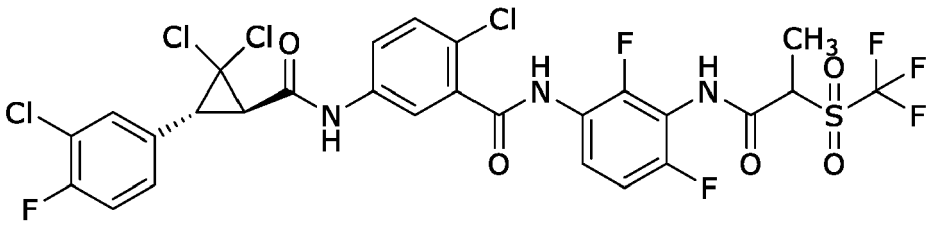
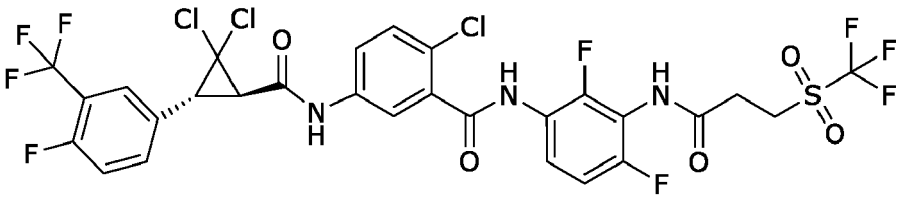
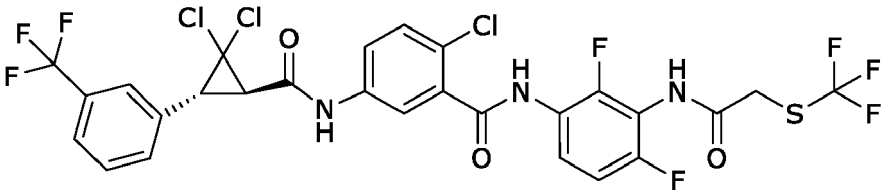
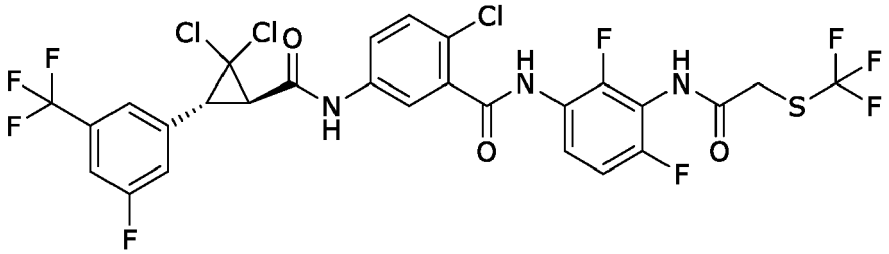
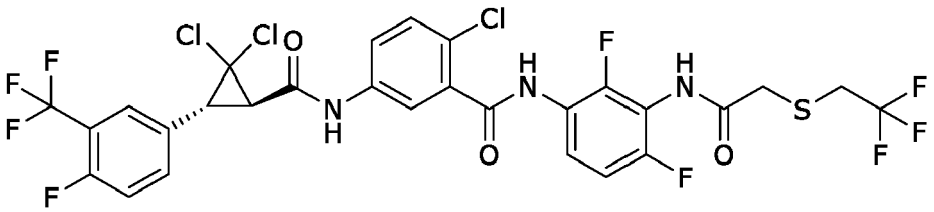
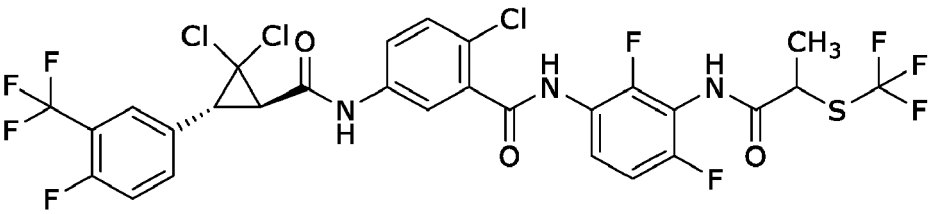
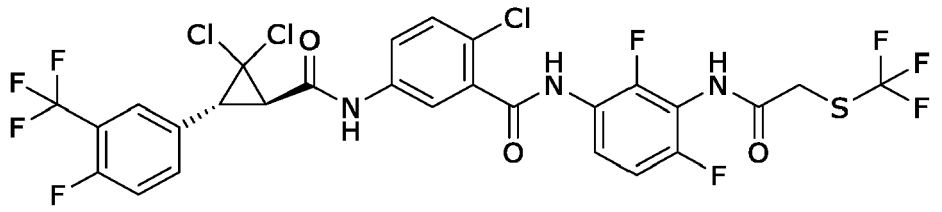
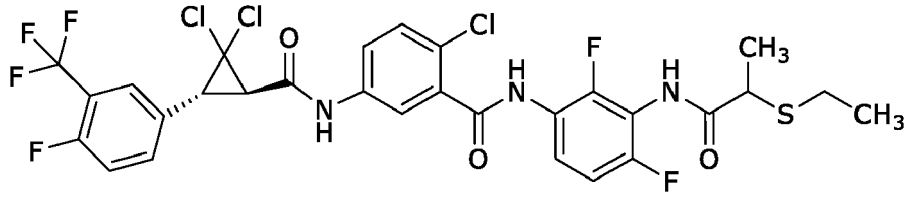
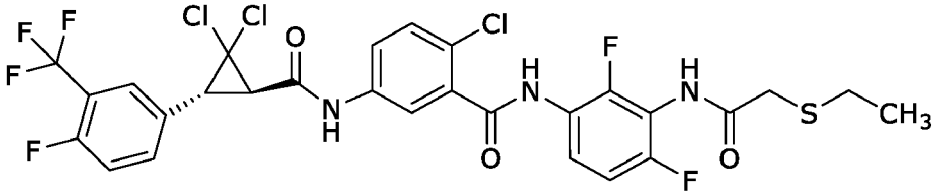
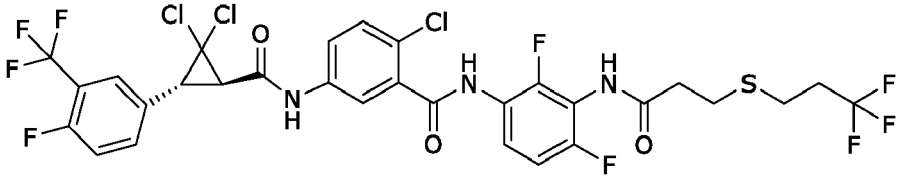
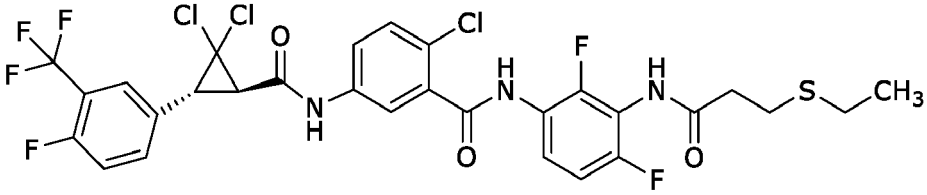
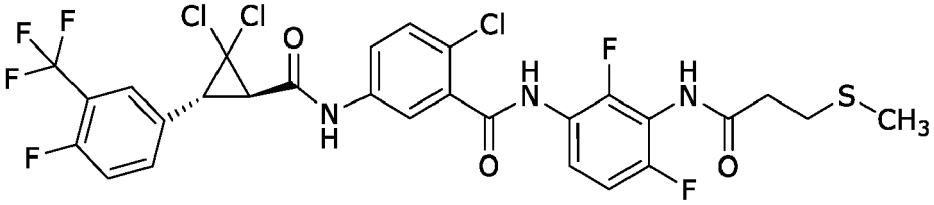
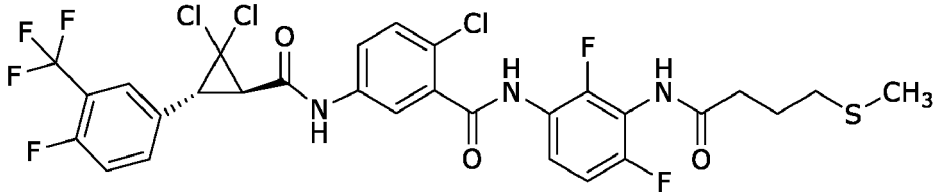
No.	Structure
F39	
F46	
F47	
F49	

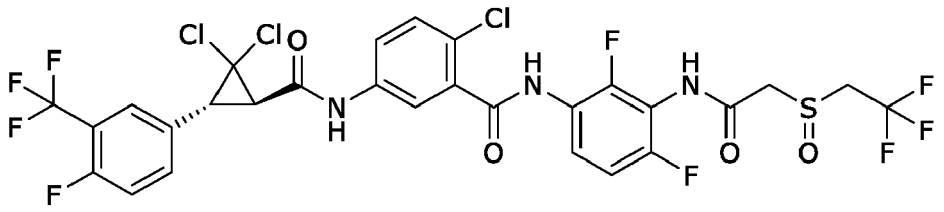
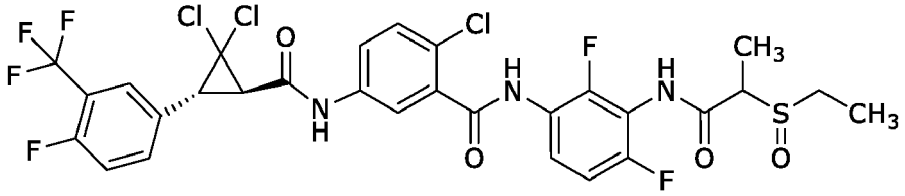
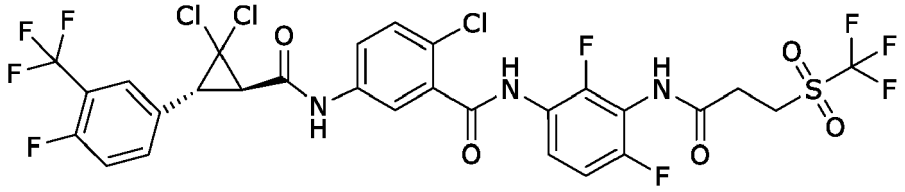
9. A molecule according to claim 1 wherein said molecule is selected from one of the molecules in the following table:.

No.	Structure
F15	
F16	

(continued)

No.	Structure
F17	
F18	
F19	
F21	
F23	
F24	
F25	

(continued)

No.	Structure
F32	
F34	
F46	

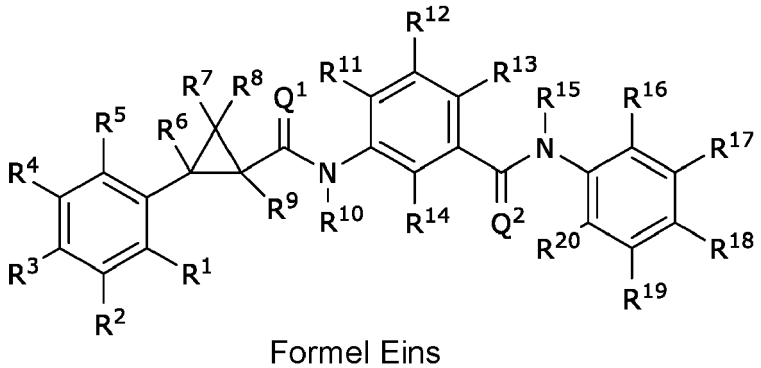
10. A composition comprising a molecule according to any of the previous claims further comprising a carrier.

11. A composition according to claim 10 further comprising an active ingredient.

12. A non-therapeutic process to control a pest said process comprising applying to a locus, a pesticidally effective amount of a composition according to any one of the claims 10-11.

Patentansprüche

1. Ein Molekül gemäß **Formel Eins**



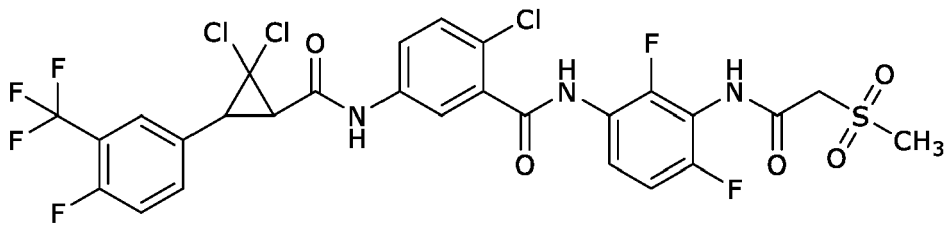
Formel Eins

wobei:

(A) R^1 aus der Gruppe bestehend aus H, F, Cl, Br, I, CN, NO_2, SF_5 und (C_1-C_3)-Halogenalkyl ausgewählt ist;
(B) R^2 aus der Gruppe bestehend aus H, F, Cl, Br, I, CN, NO_2, SF_5 und (C_1-C_3)-Halogenalkyl ausgewählt ist;
(C) R^3 aus der Gruppe bestehend aus H, F, Cl, Br, I, CN, NO_2, SF_5 und (C_1-C_3)-Halogenalkyl ausgewählt ist;
(D) R^4 aus der Gruppe bestehend aus H, F, Cl, Br, I, CN, NO_2, SF_5 und (C_1-C_3)-Halogenalkyl ausgewählt ist;

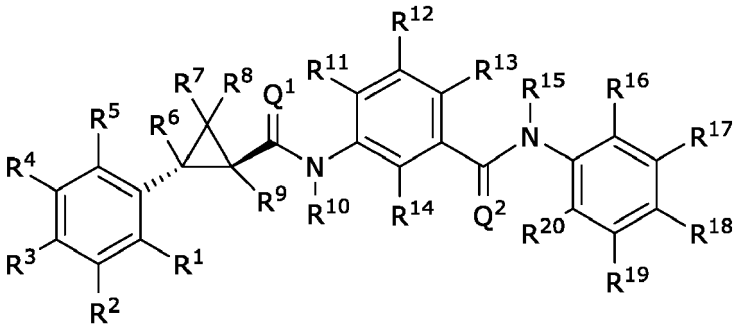
(E) R^5 aus der Gruppe bestehend aus H, F, Cl, Br, I, CN, NO_2, SF_5 und $(C_1\text{-}C_3)$-Halogenalkyl ausgewählt ist;
(F) R^6 H ist;
(G) R^7 aus der Gruppe bestehend aus F, Cl und Br ausgewählt ist;
(H) R^8 aus der Gruppe bestehend aus F, Cl und Br ausgewählt ist;
(I) R^9 H ist;
(J) Q^1 aus der Gruppe bestehend aus O und S ausgewählt ist;
(K) Q^2 aus der Gruppe bestehend aus O und S ausgewählt ist;
(L) R^{10} H ist;
(M) R^{11} aus der Gruppe bestehend aus H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$-Alkyl, $(C_1\text{-}C_3)$-Halogenalkyl und $(C_1\text{-}C_3)$-Alkoxy ausgewählt ist;
(N) R^{12} aus der Gruppe bestehend aus H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$-Alkyl, $(C_1\text{-}C_3)$-Halogenalkyl und $(C_1\text{-}C_3)$-Alkoxy ausgewählt ist;
(O) R^{13} aus der Gruppe bestehend aus H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$-Alkyl, $(C_1\text{-}C_3)$-Halogenalkyl und $(C_1\text{-}C_3)$-Alkoxy ausgewählt ist;
(P) R^{14} aus der Gruppe bestehend aus H, F, Cl, Br, I, CN, NO_2, $(C_1\text{-}C_3)$-Alkyl, $(C_1\text{-}C_3)$-Halogenalkyl und $(C_1\text{-}C_3)$-Alkoxy ausgewählt ist;
(Q) R^{15} H ist;
(R) R^{16}, R^{17}, R^{18}, R^{19} und R^{20} unabhängig aus der Gruppe bestehend aus H, F, Cl, Br, I, CN, NO_2, NH_2, OH, SF_5, $(C_1\text{-}C_3)$-Alkyl, $(C_1\text{-}C_3)$-Halogenalkyl, $(C_2\text{-}C_3)$-Alkenyl, $(C_2\text{-}C_3)$-Halogenalkenyl und $N(R^{21})C(=O)(R^{22})$ ausgewählt sind, wobei mindestens eines und nicht mehr als zwei von R^{16}, R^{17}, R^{18}, R^{19} und R^{20} $N(R^{21})C(=O)(R^{22})$ sind;
(S) R^{21} aus der Gruppe bestehend aus H, $(C_1\text{-}C_3)$-Alkyl, $(C_2\text{-}C_3)$-Alkenyl, $(C_2\text{-}C_3)$-Alkinyl, $(C_1\text{-}C_3)$-Halogenalkyl, $(C_2\text{-}C_3)$-Halogenalkenyl, $(C_1\text{-}C_3)$-Alkylphenyl, $(C_1\text{-}C_3)$-Alkyl-O$(C_1\text{-}C_3)$alkyl, $(C_1\text{-}C_3)$-Alkyl-OC(=O)$(C_1\text{-}C_3)$alkyl, C(=O)$(C_1\text{-}C_3)$-Alkyl und Phenyl ausgewählt ist;
(T) R^{22} aus der Gruppe bestehend aus $(C_1\text{-}C_6)$-Alkyl-S(=O)$_n$-$(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-Alkyl-S(=O)$_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$-Alkyl-S(=O)$_n$-aryl, $(C_1\text{-}C_6)$-Alkyl-S(=O)$_n$-heterocyclyl, $(C_2\text{-}C_6)$-Alkenyl-S(=O)$_n$-$(C_1\text{-}C_6)$-alkyl, $(C_2\text{-}C_6)$-Alkenyl-S(=O)$_n$-$(C_2\text{-}C_6)$alkenyl, $(C_2\text{-}C_6)$-Alkenyl-S(=O)$_n$-aryl, $(C_2\text{-}C_6)$-Alkenyl-S(=O)$_n$-heterocyclyl ausgewählt ist,

wobei n = 0, 1 oder 2 ist und
wobei jedes Alkyl und Alkenyl mit einem oder mehreren Substituenten substituiert sein kann, die aus der Gruppe bestehend aus F, Cl, Br, I, CN, OH, Oxo, NO_2, NH_2, NH$(C_1\text{-}C_3)$-Alkyl, N$((C_1\text{-}C_3)$-Alkyl$)_2$, O$(C_1\text{-}C_6)$-Alkyl, $(C_1\text{-}C_3)$-Alkyl-O$(C_1\text{-}C_3)$alkyl und $(C_3\text{-}C_6)$-Cycloalkyl ausgewählt sind und
wobei jedes Aryl und Heterocyclyl mit einem oder mehreren Substituenten substituiert sein kann, die aus der Gruppe bestehend aus $(C_1\text{-}C_3)$-Alkyl, F, Cl, Br, I, CN, OH, Oxo, NO_2, NH_2, NH$(C_1\text{-}C_3)$-Alkyl, N$((C_1\text{-}C_3)$-Alkyl$)_2$, O$(C_1\text{-}C_6)$-Alkyl, $(C_1\text{-}C_3)$-AlkylO$(C_1\text{-}C_3)$alkyl und $(C_3\text{-}C_6)$-Cycloalkyl ausgewählt sind; und
N-Oxide, Salze, Solvate, Ester, Kristallpolymorphe, Isotope, getrennte Stereoisomere und Tautomere der Moleküle der Formula Eins,
unter der Voraussetzung, dass das folgende Molekül ausgeschlossen ist



Molekül F1299.

2. Ein Molekül gemäß Anspruch 1, wobei das Molekül eine Struktur gemäß Formel Zwei aufweist



Formel Zwei

3. Ein Molekül gemäß irgendeinem der vorhergehenden Ansprüche, wobei R^1 aus der Gruppe bestehend aus H, F, Cl, Br, SF_5 und CF_3 ausgewählt ist; und/oder

wobei R^2 aus der Gruppe bestehend aus H, F, Cl, Br, SF_5 und CF_3 ausgewählt ist; und/oder
wobei R^3 aus der Gruppe bestehend aus H, F, Cl, Br, SF_5 und CF_3 ausgewählt ist; und/oder
wobei R^4 aus der Gruppe bestehend aus H, F, Cl, Br, SF_5 und CF_3 und/oder
wobei R^5 aus der Gruppe bestehend aus H, F, Cl, Br, SF_5 und CF_3 ausgewählt ist; und/oder
wobei R^7 Cl ist; und/oder
wobei R^8 Cl ist; und/oder
wobei Q^1 O ist; und/oder
wobei Q^2 O ist; und/oder
wobei R^{11} H ist; und/oder
wobei R^{12} aus der Gruppe bestehend aus H, F, Cl, CH_3 und CF_3 ausgewählt ist; und/oder
wobei R^{13} aus der Gruppe bestehend aus F, Cl, CH_3 und OCH_3 ausgewählt ist; und/oder
wobei R^{14} aus der Gruppe bestehend aus H, F und Cl ausgewählt ist; und/oder
wobei:

(a) R^{16}, R^{18}, R^{19} und R^{20} unabhängig aus der Gruppe bestehend aus H, F, Cl Br, I, CN, NO_2, NH_2, OH, SF_5, (C_1-C_3)-Alkyl, (C_1-C_3)-Halogenalkyl, (C_2-C_3)-Alkenyl und (C_2-C_3)-Halogenalkenyl ausgewählt sind und R^{17} $N(R^{21})C(=O)(R^{22})$ ist; oder
(b) R^{16}, R^{17}, R^{19} und R^{20} unabhängig voneinander aus der Gruppe bestehend aus H, F, Cl, Br, I, CN, NO_2, NH_2, OH, SF_5, (C_1-C_3)-Alkyl, (C_1-C_3)-Halogenalkyl, (C_2-C_3)-Alkenyl und (C_2-C_3)-Halogenalkenyl ausgewählt sind und R^{18} $N(R^{21})C(=O)(R^{22})$ ist;

und/oder wobei R^{21} H ist; und/oder
wobei R^{22} aus der Gruppe bestehend aus (C_1-C_6)-Alkyl-$S(=O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-Alkyl-$S(=O)_n$-(C_2-C_6)alkenyl, (C_1-C_6)-Alkyl-$S(=O)_n$-aryl, (C_1-C_6)-Alkyl-$S(=O)_n$-heterocyclyl ausgewählt ist, wobei n = 0, 1 oder 2 ist und wobei jedes Alkyl und Alkenyl mit einem oder mehreren Substituenten substituiert sein kann, die aus der Gruppe bestehend aus F, Cl, Br, I, CN, OH, Oxo, NO_2, NH_2, $NH(C_1$-$C_3)$-Alkyl, $N((C_1$-$C_3)$-$Alkyl)_2$, $O(C_1$-$C_6)$-Alkyl, (C_1-C_3)-Alkyl-$O(C_1$-$C_3)$alkyl und (C_3-C_6)-Cycloalkyl ausgewählt sind und wobei jedes Aryl und Heterocyclyl mit einem oder mehreren Substituenten substituiert sein kann, die aus der Gruppe bestehend aus (C_1-C_3)-Alkyl, F, Cl, Br, I, CN, OH, Oxo, NO_2, NH_2, $NH(C_1$-$C_3)$-Alkyl, $N((C_1$-$C_3)$-$Alkyl)_2$, $O(C_1$-$C_6)$-Alkyl, (C_1-C_3)-Alkyl-$O(C_1$-$C_3)$alkyl und (C_3-C_6)-Cycloalkyl ausgewählt sind.

4. Ein Molekül gemäß irgendeinem der vorhergehenden Ansprüche, wobei mindestens eines von R^2, R^3 und R^4 SF_5 ist; und/oder

wobei R^7 und R^8 nicht der gleiche Substituent sind; und/oder
wobei R^{22} aus der Gruppe bestehend aus (C_1-C_6)-Alkyl-$S(=O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-Alkyl-$S(=O)_n$-(C_2-C_6)alkenyl, (C_1-C_6)-Alkyl-$S(=O)_n$-phenyl, (C_1-C_6)-Alkyl-$S(=O)_n$-pyridyl ausgewählt ist, wobei n = 0, 1 oder 2 ist und wobei jedes Alkyl und Alkenyl mit einem oder mehreren Substituenten substituiert sein kann, die aus der Gruppe bestehend aus F, Cl, Br und I ausgewählt sind und wobei jedes Phenyl und Pyridyl mit einem oder mehreren Substituenten substituiert sein kann, die aus der Gruppe bestehend aus F, Cl, Br und I ausgewählt sind.

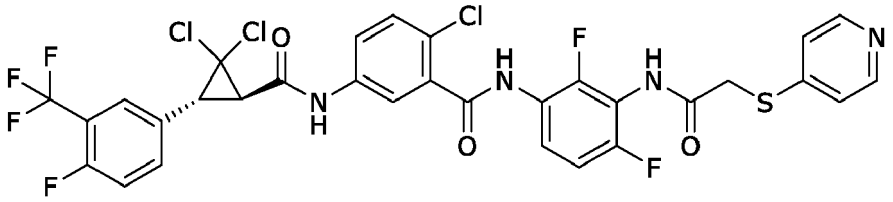
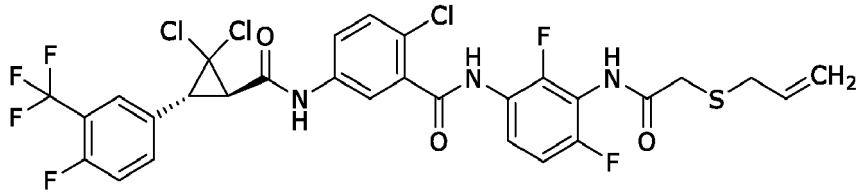
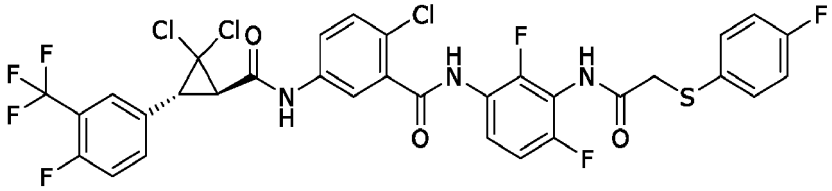
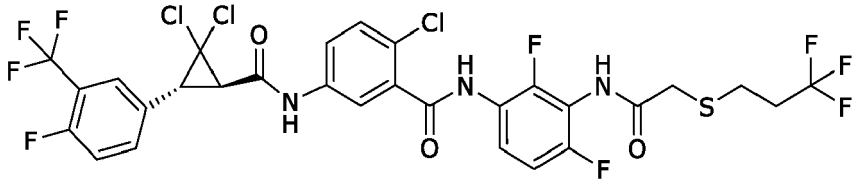
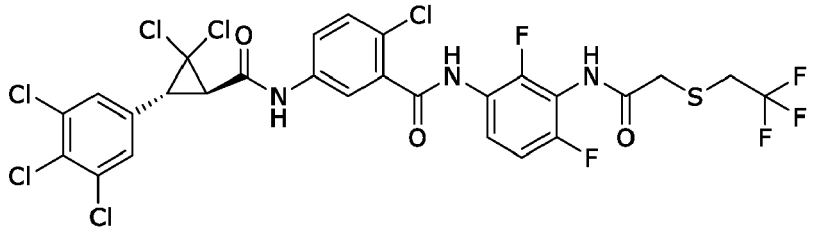
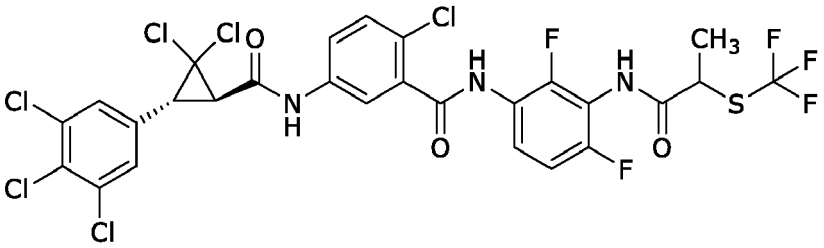
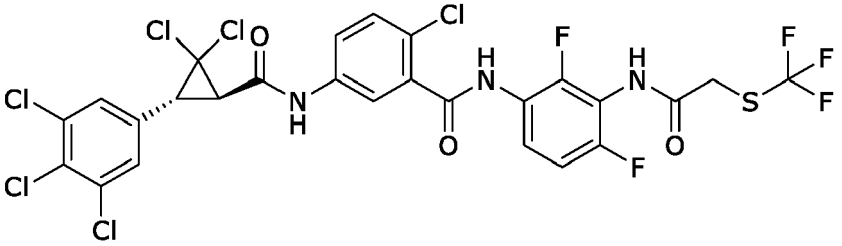
5. Ein Molekül gemäß irgendeinem der vorhergehenden Ansprüche, wobei:

R^1 H ist;
R^2 aus der Gruppe bestehend aus H, F, Cl und CF_3 ausgewählt ist;
R^3 aus der Gruppe bestehend aus H, F und Cl ausgewählt ist;
R^4 aus der Gruppe bestehend aus H, F, Cl und CF_3 ausgewählt ist;
R^5 H ist;
R^7 Cl ist;
R^8 Cl ist;
Q^1 O ist;
Q^2 O ist;
R^{11} H ist;
R^{12} H ist;
R^{13} Cl ist;
R^{14} H ist;
R^{16} F ist;
R^{17} $N(R^{21})C(=O)(R^{22})$ ist;
R^{18} F ist;
R^{19} H ist;
R^{20} H ist;
R^{21} H ist; und
R^{22} aus der Gruppe bestehend aus $(C_1\text{-}C_6)$-Alkyl-$S(=O)_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$-Alkyl-$S(=O)_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$-Alkyl-$S(=O)_n$-phenyl, $(C_1\text{-}C_6)$-Alkyl-$S(=O)_n$-pyridyl ausgewählt ist,
wobei n = 0, 1 oder 2 ist,
wobei jedes Alkyl, Alkenyl, Phenyl und Pyridyl mit einem oder mehreren Substituenten substituiert sein kann, die aus der Gruppe bestehend aus F und Cl ausgewählt sind.

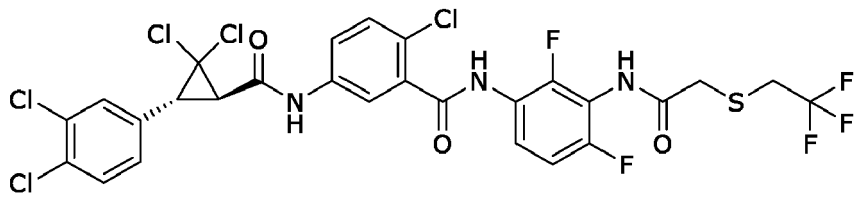
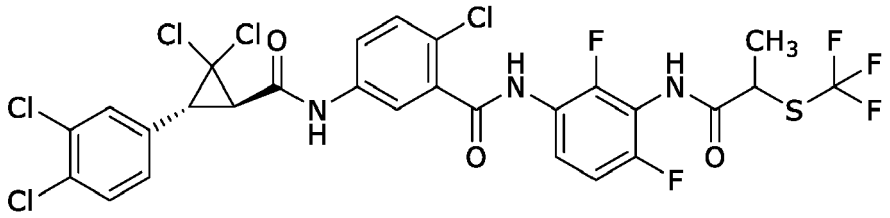
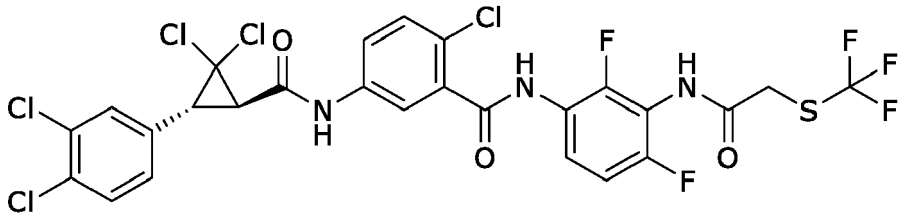
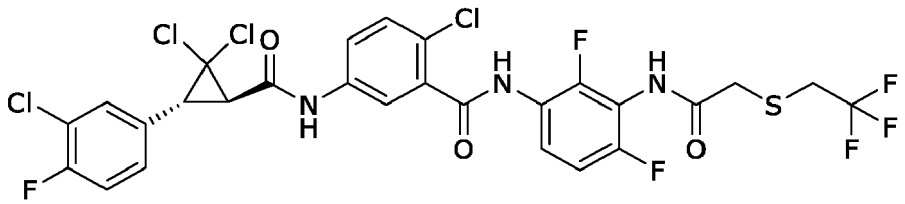
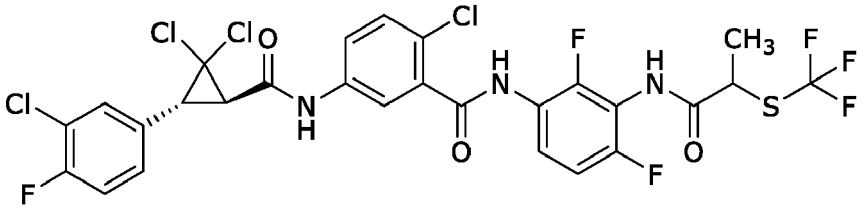
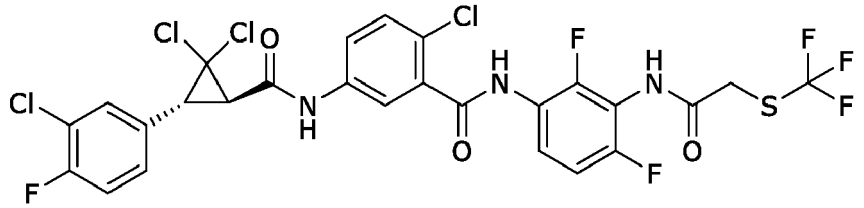
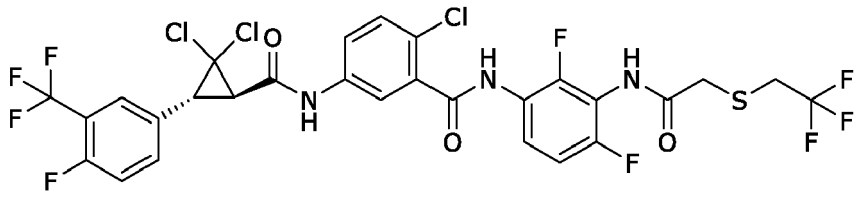
6. Ein Molekül gemäß irgendeinem der vorstehenden Ansprüche, wobei:

R^1 H ist;
R^2 aus der Gruppe bestehend aus H, F, Cl und CF_3 ausgewählt ist;
R^3 aus der Gruppe bestehend aus H, F und Cl ausgewählt ist;
R^4 aus der Gruppe bestehend aus H, F, Cl und CF_3 ausgewählt ist;
R^5 H ist;
R^7 Cl ist;
R^8 Cl ist;
Q^1 O ist;
Q^2 O ist;
R^{11} H ist;
R^{12} H ist;
R^{13} Cl ist;
R^{14} H ist;
R^{16} F ist;
R^{17} H ist;
R^{18} $N(R^{21})C(=O)(R^{22})$ ist;
R^{19} H ist;
R^{20} H ist;
R^{21} H ist; und
R^{22} aus der Gruppe bestehend aus $(C_1\text{-}C_6)$-Alkyl-$S(=O)_n$-$(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$-Alkyl-$S(=O)_n$-$(C_2\text{-}C_6)$alkenyl, $(C_1\text{-}C_6)$-Alkyl-$S(=O)_n$-phenyl, $(C_1\text{-}C_6)$-Alkyl-$S(=O)_n$-pyridyl ausgewählt ist,
wobei n = 0, 1 oder 2 ist,
wobei jedes Alkyl, Alkenyl, Phenyl und Pyridyl mit einem oder mehreren Substituenten substituiert sein kann, die aus der Gruppe bestehend aus F und Cl ausgewählt sind.

7. Ein Molekül gemäß Anspruch 1, wobei das Molekül aus einem der Moleküle in der folgenden Tabelle ausgewählt ist:

Nr.	Struktur
F2	
F3	
F4	
F5	
F6	
F7	
F8	

(fortgesetzt)

Nr.	Struktur
F9	
F10	
F11	
F12	
F13	
F14	
F15	

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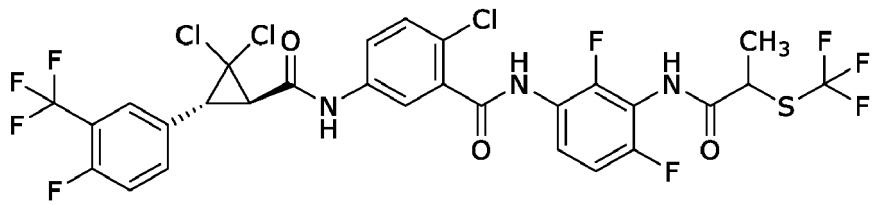
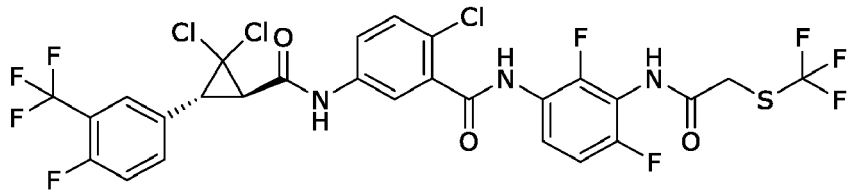
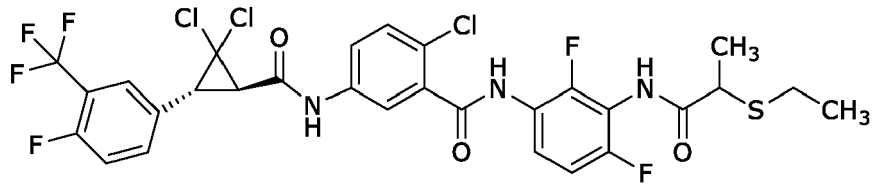
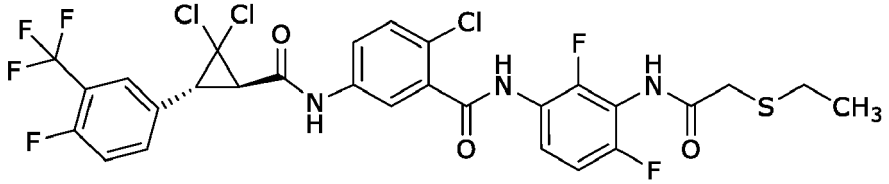
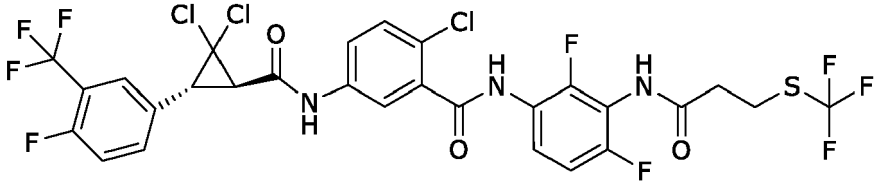
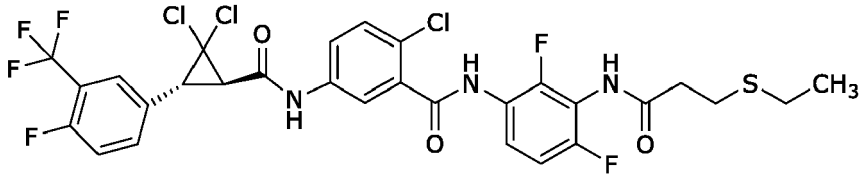
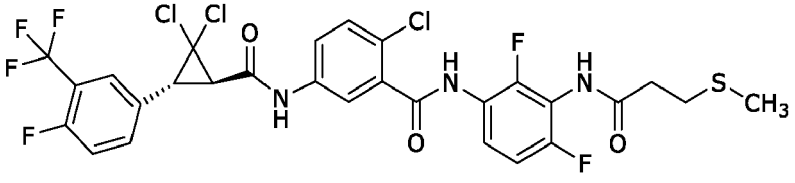
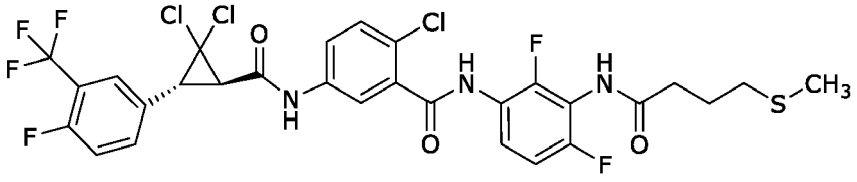
Nr.	Struktur
F16	
F17	
F18	
F19	
F22	
F23	
F24	
F25	

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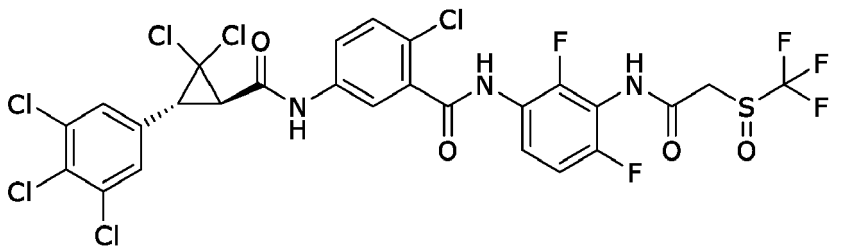
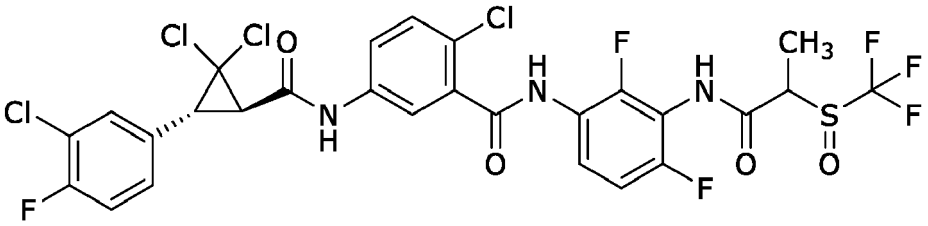
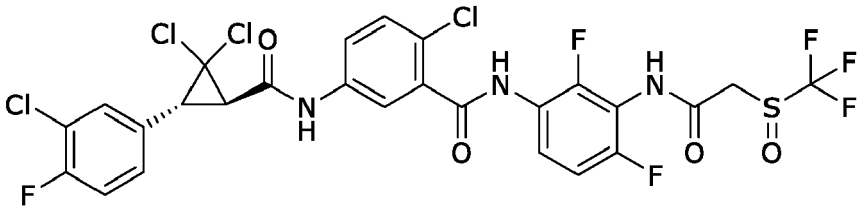
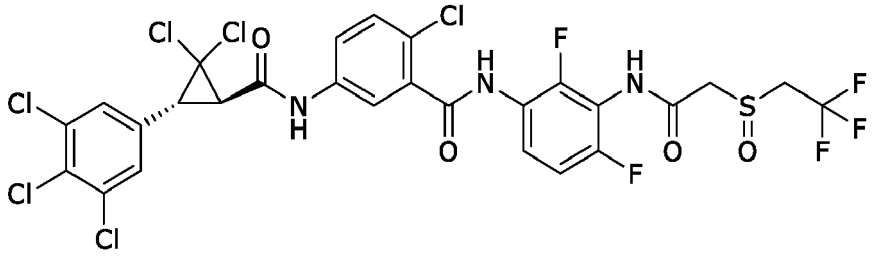
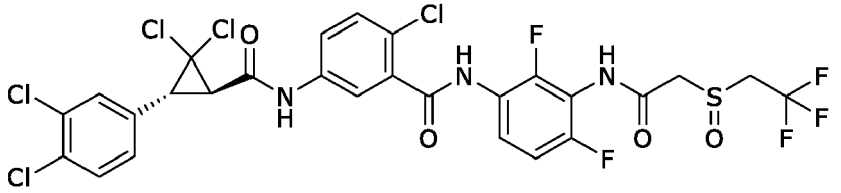
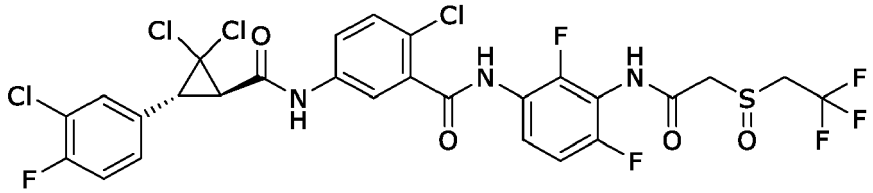
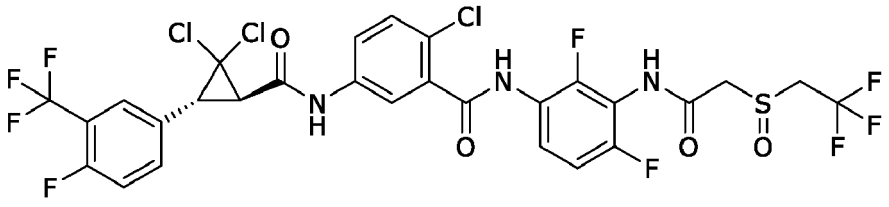
Nr.	Struktur
F26	
F27	
F28	
F29	
F30	
F31	
F32	

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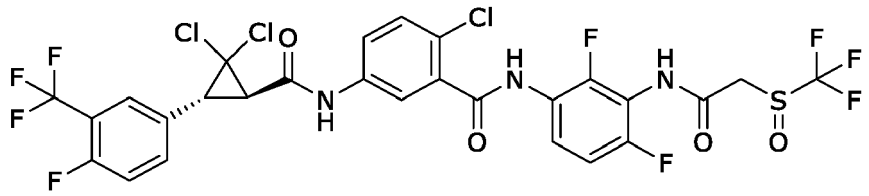
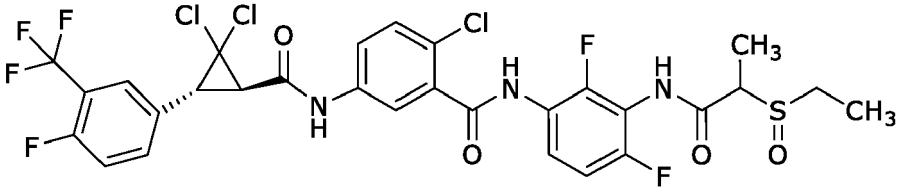
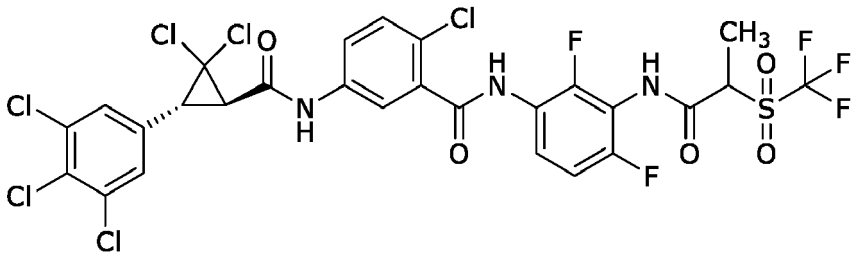
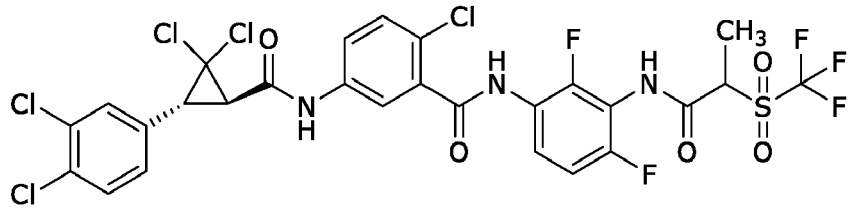
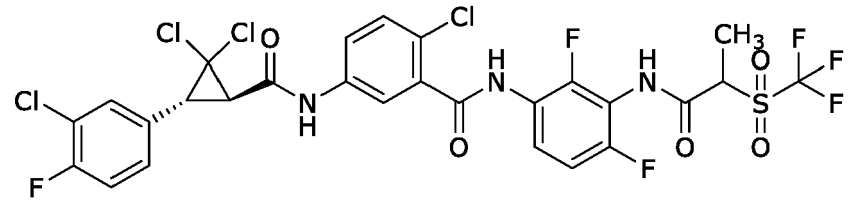
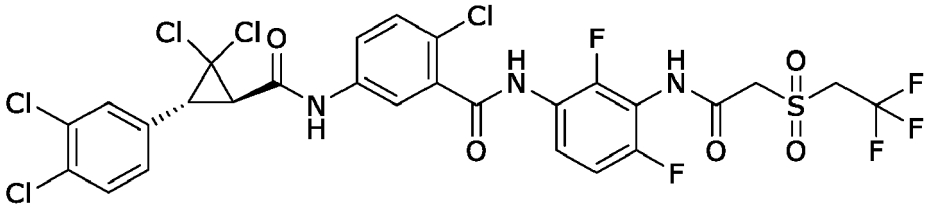
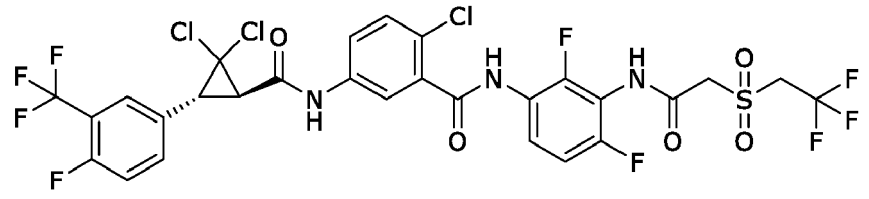
Nr.	Struktur
F33	
F34	
F35	
F37	
F39	
F42	
F44	

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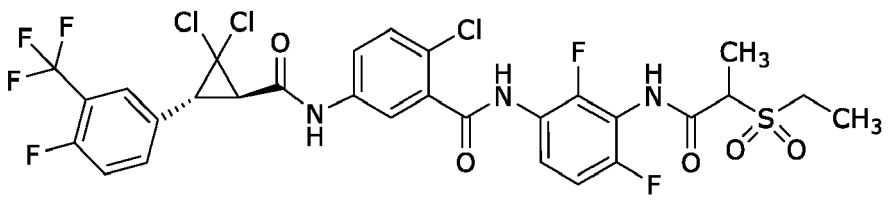
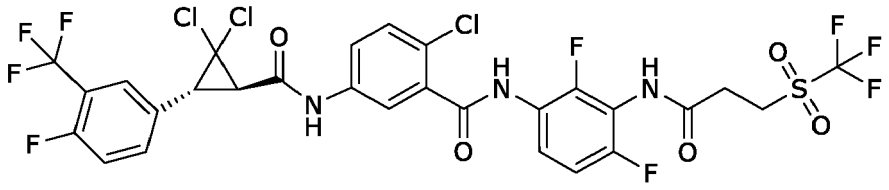
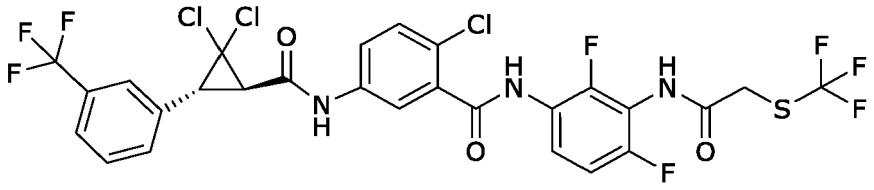
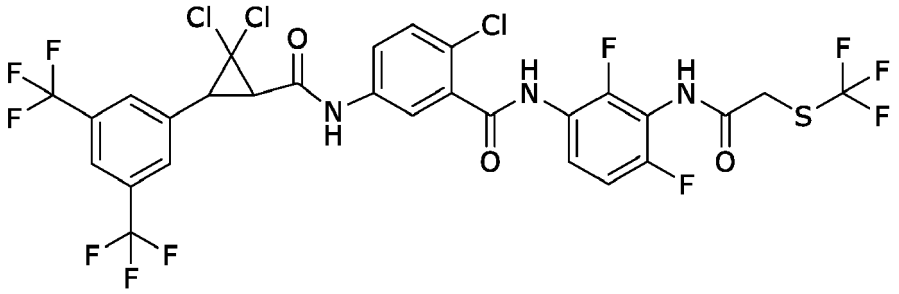
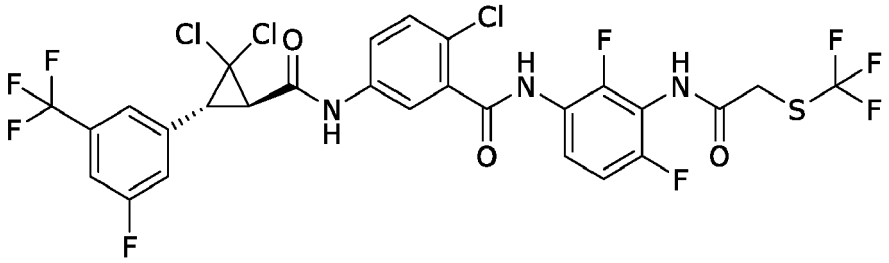
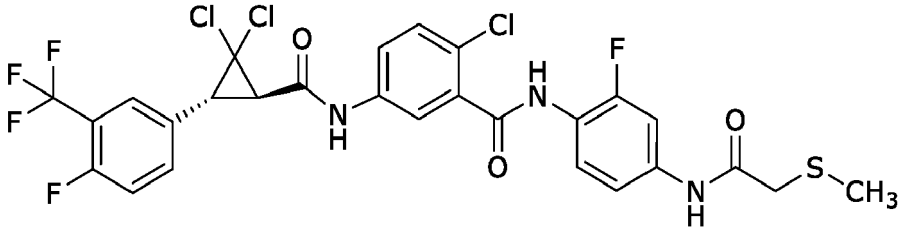
Nr.	Struktur
F45	
F46	
F47	
F48	
F49	
F50	

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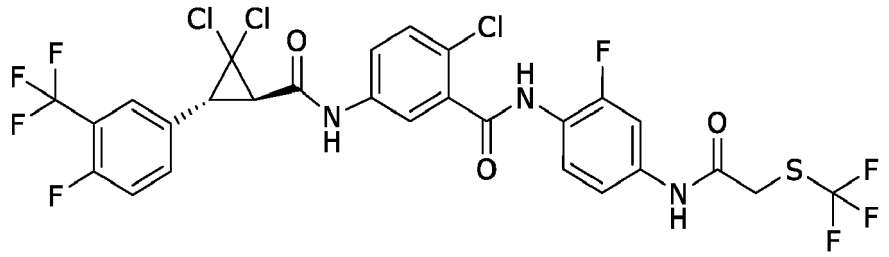
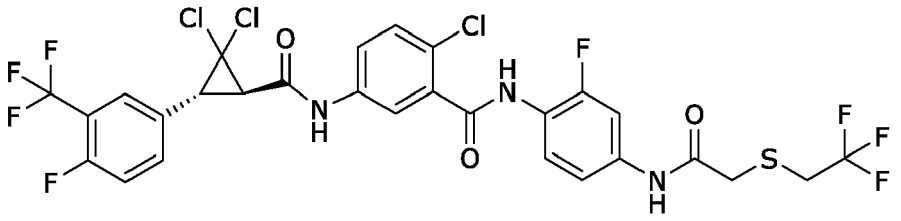
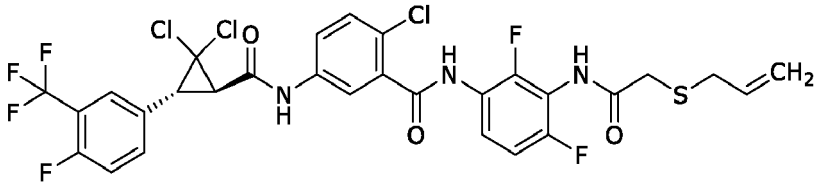
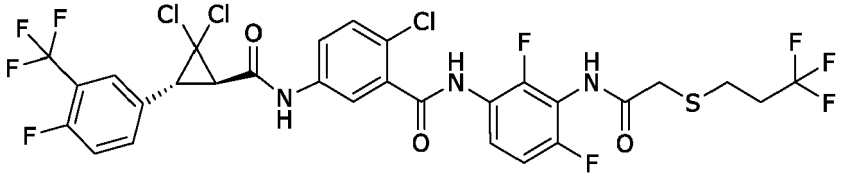
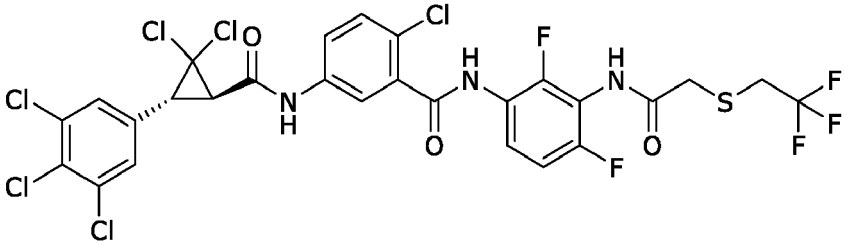
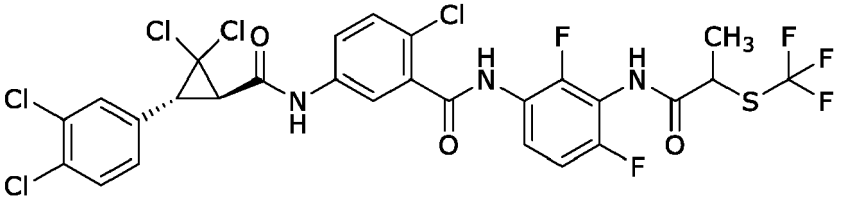
Nr.	Struktur
F51	
F52	

8. Ein Molekül gemäß Anspruch 1, wobei das Molekül aus einem der Moleküle in der folgenden Tabelle ausgewählt ist:

Nr.	Struktur
F3	
F5	
F6	
F10	

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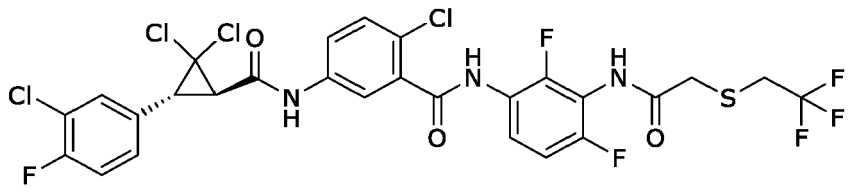
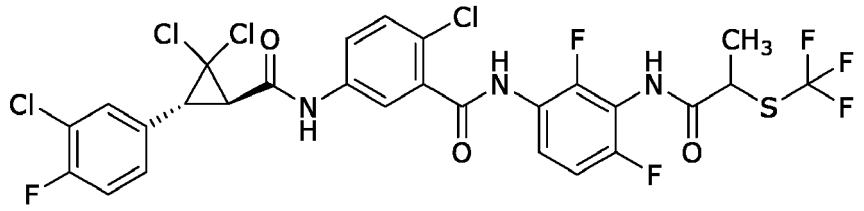
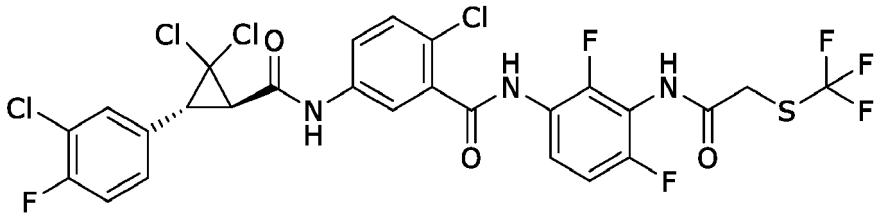
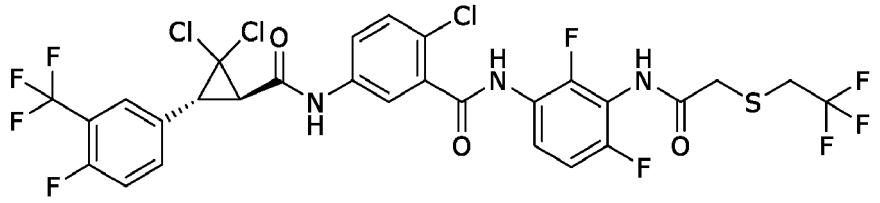
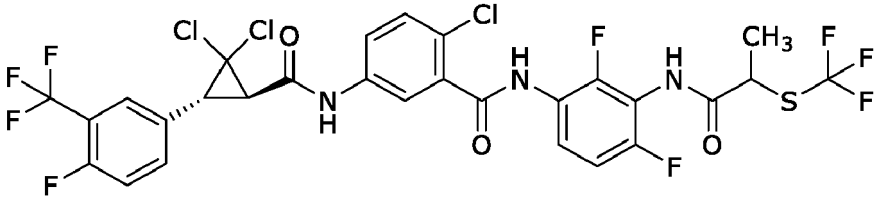
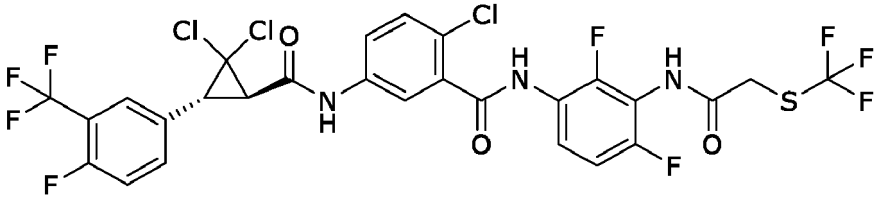
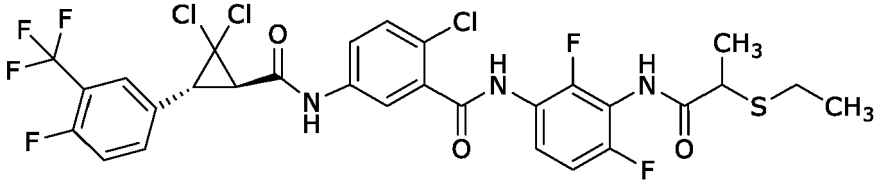
Nr.	Struktur
F12	
F13	
F14	
F15	
F16	
F17	
F18	

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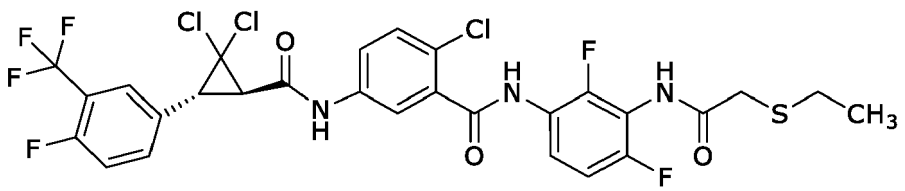
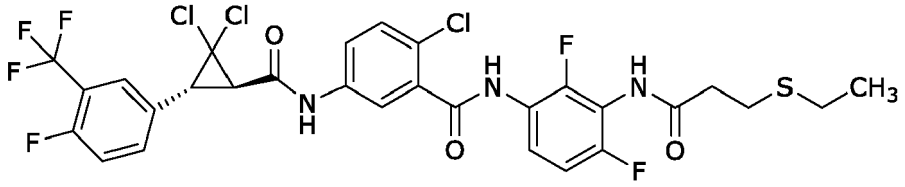
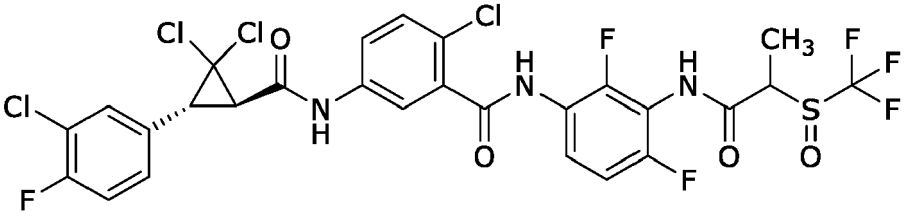
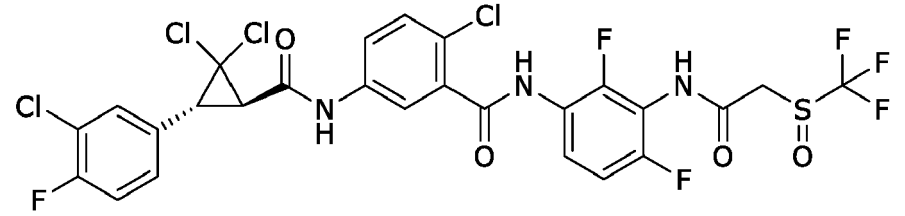
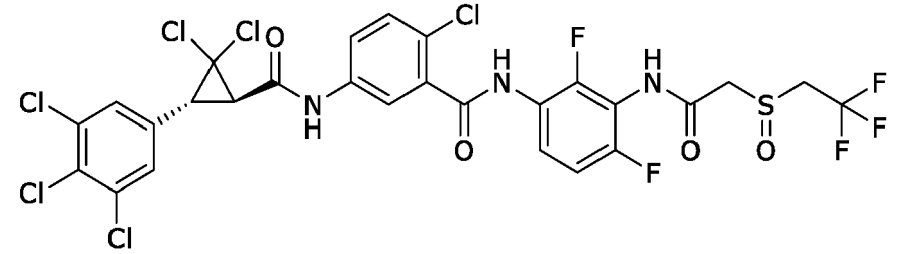
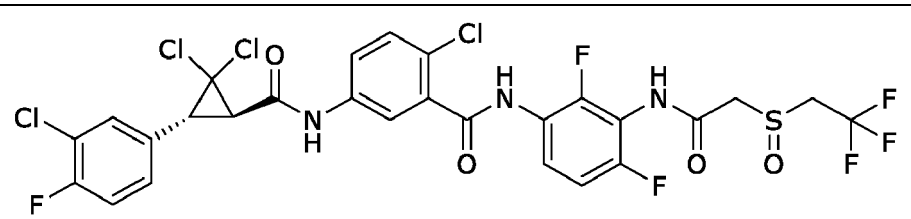
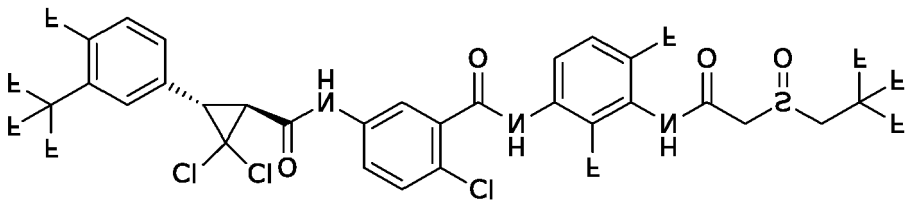
Nr.	Struktur
F19	
F23	
F27	
F28	
F29	
F31	
F32	

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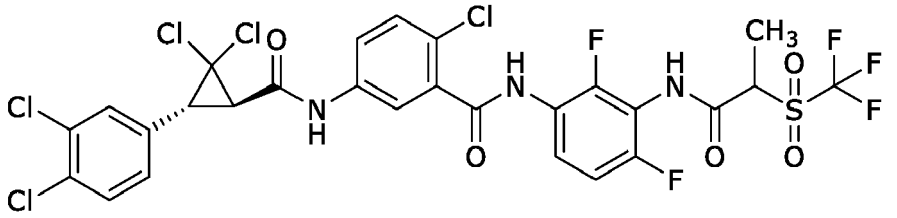
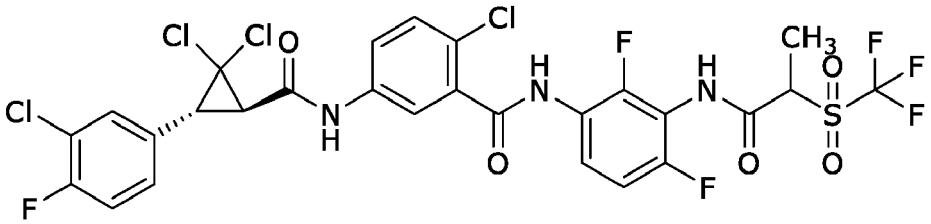
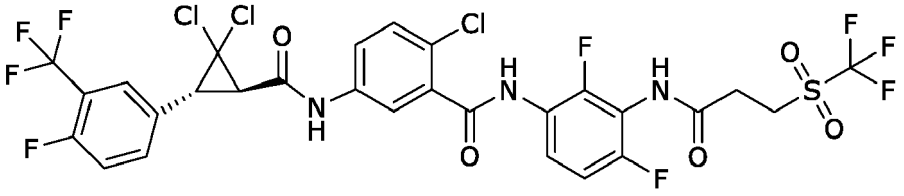
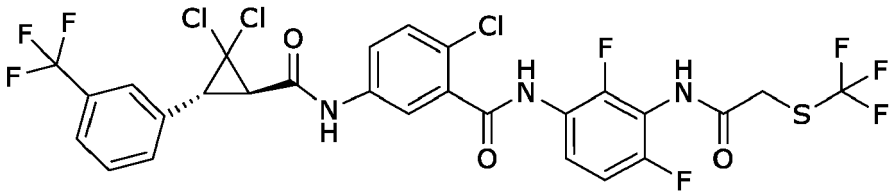
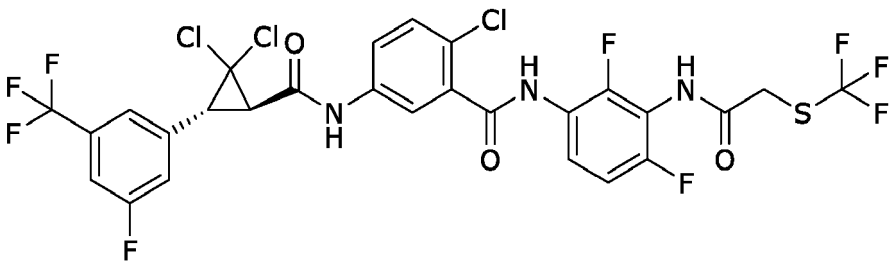
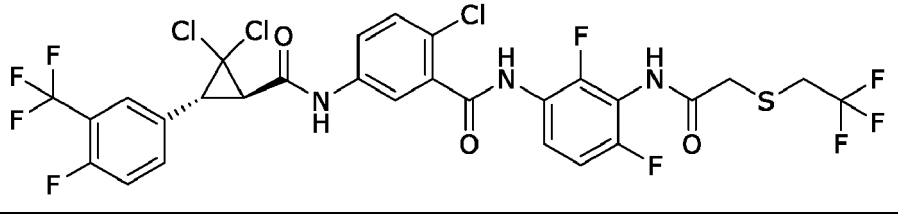
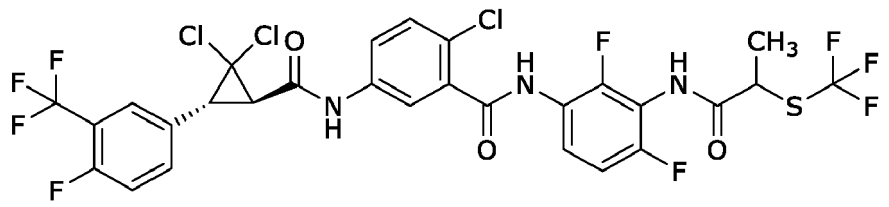
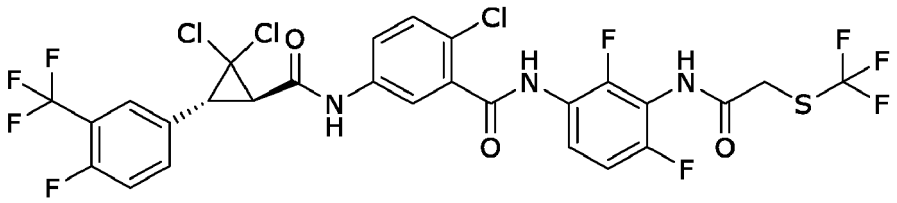
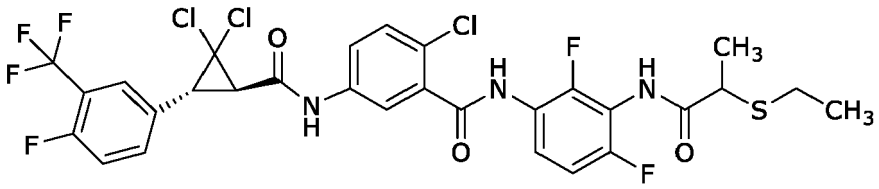
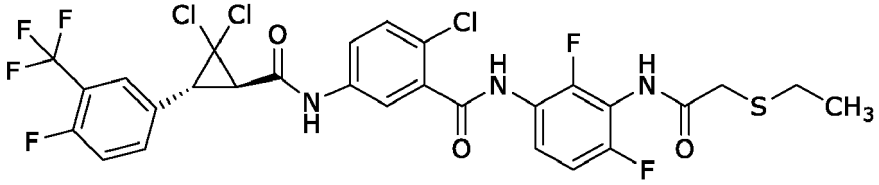
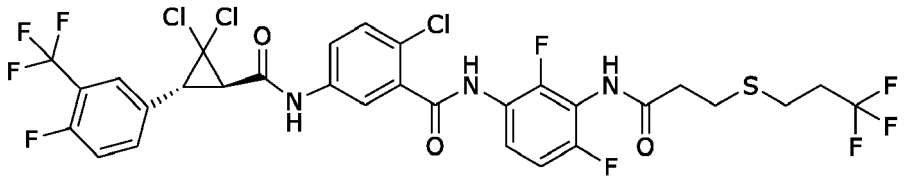
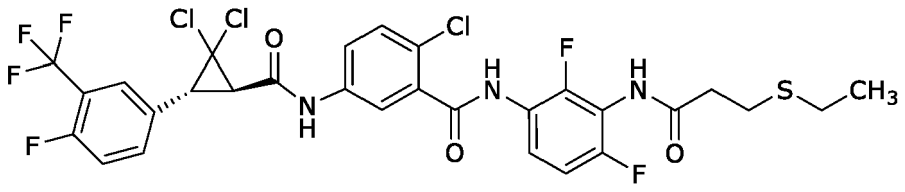
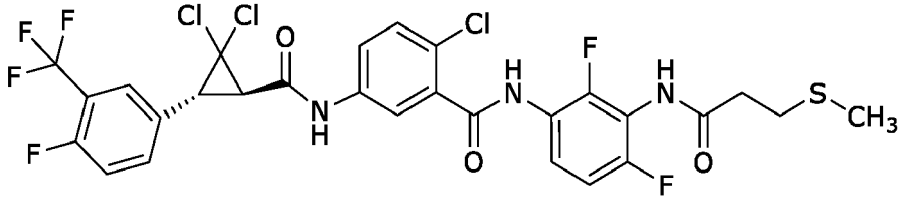
Nr.	Struktur
F37	
F39	
F46	
F47	
F49	

9. Ein Molekül gemäß Anspruch 1, wobei das Molekül aus einem der Moleküle in der folgenden Tabelle ausgewählt ist.

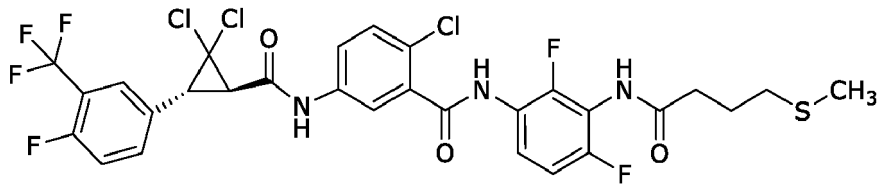
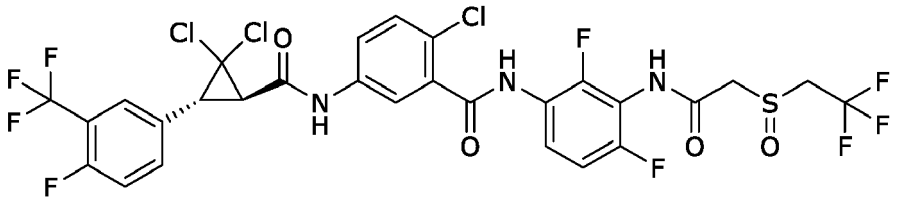
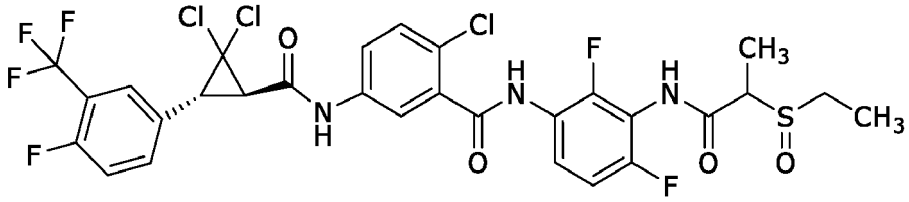
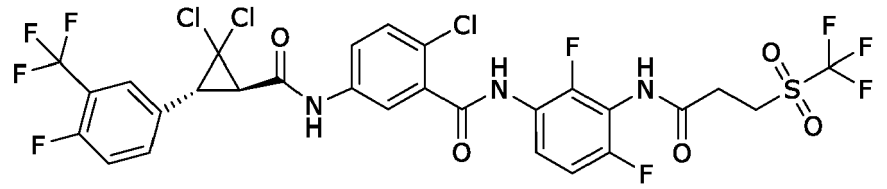
Nr.	Struktur
F15	

(fortgesetzt)

Nr.	Struktur
F16	
F17	
F18	
F19	
F21	

F23	
F24	

(fortgesetzt)

F25	
F32	
F34	
F46	

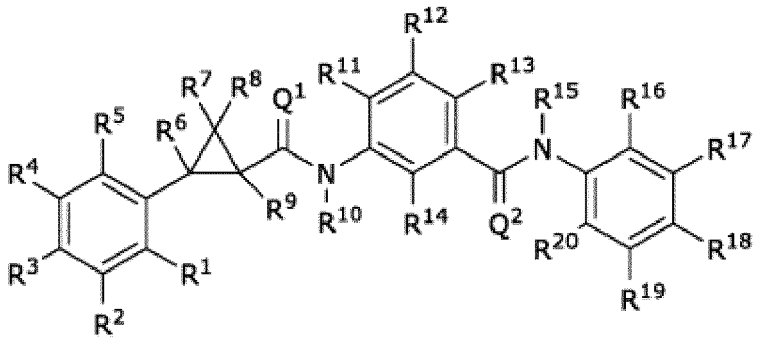
10. Eine Zusammensetzung umfassend ein Molekül gemäß irgendeinem der vorhergehenden Ansprüche, des Weiteren umfassend einen Trägerstoff.

11. Eine Zusammensetzung gemäß Anspruch 10, des Weiteren umfassend einen Wirkstoff.

12. Ein nicht-therapeutisches Verfahren zur Bekämpfung eines Schädlings, das Verfahren umfassend das Anwenden einer pestizid wirksamen Menge einer Zusammensetzung gemäß irgendeinem der Ansprüche 10 bis 11 auf einen Ort.

Revendications

1. Molécule correspondant à la Formule Un :



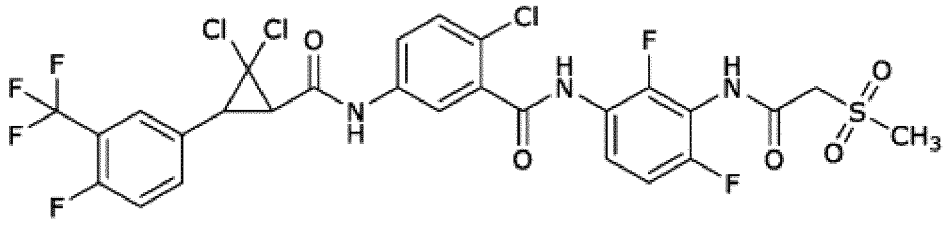
Formule Un

dans laquelle

A) R^1 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN, NO_2 et SF_5 et les groupes halogéno-alkyle en C_1-C_3,
B) R^2 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN, NO_2 et SF_5 et les groupes halogéno-alkyle en C_1-C_3,
C) R^3 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN, NO_2 et SF_5 et les groupes halogéno-alkyle en C_1-C_3,
D) R^4 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN, NO_2 et SF_5 et les groupes halogéno-alkyle en C_1-C_3,
E) R^5 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN, NO_2 et SF_5 et les groupes halogéno-alkyle en C_1-C_3,
F) R^6 représente un atome d'hydrogène,
G) R^7 représente une entité choisie dans l'ensemble constitué par un atome de fluor, un atome de chlore et un atome de brome,
H) R^8 représente une entité choisie dans l'ensemble constitué par un atome de fluor, un atome de chlore et un atome de brome,
I) R^9 représente un atome d'hydrogène,
J) Q^1 représente une entité choisie dans l'ensemble constitué par un atome d'oxygène et un atome de soufre,
K) Q^2 représente une entité choisie dans l'ensemble constitué par un atome d'oxygène et un atome de soufre,
L) R^{10} représente un atome d'hydrogène,
M) R^{11} représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN et NO_2 et les groupes alkyle en C_1-C_3, halogéno-alkyle en C_1-C_3 et alcoxy en C_1-C_3,
N) R^{12} représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN et NO_2 et les groupes alkyle en C_1-C_3, halogéno-alkyle en C_1-C_3 et alcoxy en C_1-C_3,
O) R^{13} représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN et NO_2 et les groupes alkyle en C_1-C_3, halogéno-alkyle en C_1-C_3 et alcoxy en C_1-C_3,
P) R^{14} représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN et NO_2 et les groupes alkyle en C_1-C_3, halogéno-alkyle en C_1-C_3 et alcoxy en C_1-C_3,
Q) R^{15} représente un atome d'hydrogène,
R) R^{16}, R^{17}, R^{18}, R^{19} et R^{20} représentent des entités choisies, indépendamment, dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN, NO_2, NH_2, OH et SF_5, les groupes alkyle en C_1-C_3, halogéno-alkyle en C_1-C_3, alcényle en C_2-C_3 et halogéno-alcényle en C_2-C_3, et les groupes symbolisés par $N(R^{21})C(=O)(R^{22})$, étant entendu qu'au moins l'un, mais au plus deux, des symboles R^{16}, R^{17}, R^{18}, R^{19} et R^{20} représente(nt) un groupe symbolisé par $N(R^{21})C(=O)(R^{22})$,
S) R^{21} représente une entité choisie dans l'ensemble constitué par un atome d'hydrogène et les groupes alkyle en C_1-C_3, alcényle en C_2-C_3, alcynyle en C_2-C_3, halogéno-alkyle en C_1-C_3, halogéno-alcényle en C_2-C_3, (alkyle en C_1-C_3)-phényle, (alkyle en C_1-C_3)-O-(alkyle en C_1-C_3), (alkyle en C_1-C_3)-OC(=O)-(alkyle en C_1-C_3), C(=O)-(alkyle en C_1-C_3) et phényle,
T) R^{22} représente une entité choisie dans l'ensemble constitué par les groupes (alkyle en C_1-C_6)-$S(=O)_n$-(alkyle en C_1-C_6), (alkyle en C_1-C_6)-$S(=O)_n$-(alcényle en C_2-C_6), (alkyle en C_1-C_6)-$S(=O)_n$-aryle, (alkyle en C_1-C_6)-$S(=O)_n$-hétérocyclyle, (alcényle en C_2-C_6)-$S(=O)_n$-(alkyle en C_1-C_6), (alcényle en C_2-C_6)-$S(=O)_n$-(alcényle en C_2-C_6), (alcényle en C_2-C_6)-$S(=O)_n$-aryle, et (alcényle en C_2-C_6)-$S(=O)_n$-hétérocyclyle,

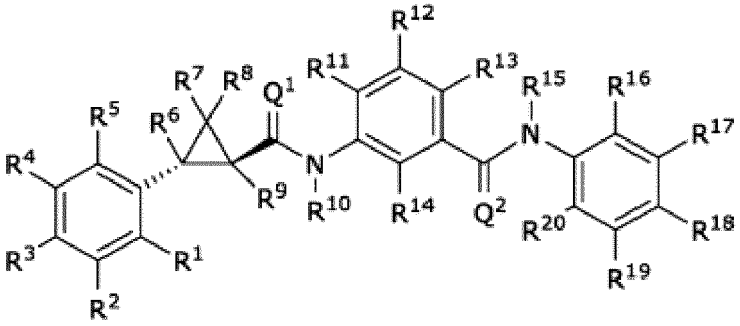
étant entendu que l'indice n vaut 0, 1 ou 2,
étant entendu que chacun desdits groupes alkyle et alcényle peut porter un ou plusieurs substituant(s) choisi(s) dans l'ensemble constitué par ceux symbolisés par F, Cl, Br, I, CN, OH, NO_2 et NH_2, le substituant oxo et les groupes NH-(alkyle en C_1-C_3), N(alkyle en C_1-C_3)$_2$, O-(alkyle en C_1-C_6), (alkyle en C_1-C_3)-O-(alkyle en C_1-C_3) et cycloalkyle en C_3-C_6,
et étant entendu que chacun desdits groupes aryle et hétérocyclyle peut porter un ou plusieurs substituant(s) choisi(s) dans l'ensemble constitué par les groupes alkyle en C_1-C_3, les substituants symbolisés par F, Cl, Br, I, CN, OH, NO_2 et NH_2, le substituant oxo et les groupes NH-(alkyle en C_1-C_3), N(alkyle en C_1-C_3)$_2$, O-(alkyle en C_1-C_6), (alkyle en C_1-C_3)-O-(alkyle en C_1-C_3) et cycloalkyle en C_3-C_6 ;

et N-oxydes, sels, solvats, esters, formes cristallines polymorphes, dérivés isotopiques, stéréoisomères résolus et formes tautomères des molécules correspondant à la Formule Un,
sous réserve que soit exclue la molécule de formule suivante :



Molécule F1299

2. Molécule conforme à la revendication 1, laquelle molécule possède une structure correspondant à la Formule Deux :



Formule Deux

3. Molécule conforme à l'une des revendications précédentes, dans laquelle

- R^1 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, SF_5 et CF_3,
- et/ou R^2 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, SF_5 et CF_3,
- et/ou R^3 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, SF_5 et CF_3,
- et/ou R^4 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, SF_5 et CF_3,
- et/ou R^5 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, SF_5 et CF_3,
- et/ou R^7 représente un atome de chlore,
- et/ou R^8 représente un atome de chlore,
- et/ou Q^1 représente un atome d'oxygène,
- et/ou Q^2 représente un atome d'oxygène,
- et/ou R^{11} représente un atome d'hydrogène,
- et/ou R^{12} représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl, CH_3 et CF_3,
- et/ou R^{13} représente une entité choisie dans l'ensemble constitué par celles symbolisées par F, Cl, CH_3 et OCH_3,
- et/ou R^{14} représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F et Cl,
- et/ou

  a) R^{16}, R^{18}, R^{19} et R^{20} représentent des entités choisies, indépendamment, dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN, NO_2, NH_2, OH et SF_5, les groupes alkyle en C_1-C_3, halogéno-alkyle en C_1-C_3, alcényle en C_2-C_3 et halogéno-alcényle en C_2-C_3, et R^{17} représente un groupe $N(R^{21})C(=O)(R^{22})$,
  b) ou R^{16}, R^{17}, R^{19} et R^{20} représentent des entités choisies, indépendamment, dans l'ensemble constitué par celles symbolisées par H, F, Cl, Br, I, CN, NO_2, NH_2, OH et SF_5, les groupes alkyle en C_1-C_3, halogéno-alkyle en C_1-C_3, alcényle en C_2-C_3 et halogéno-alcényle en C_2-C_3, et R^{18} représente un groupe $N(R^{21})C(=O)(R^{22})$,

- et/ou R^{21} représente un atome d'hydrogène,

- et/ou R^{22} représente une entité choisie dans l'ensemble constitué par les groupes (alkyle en C_1-C_6)-S(=O)$_n$-(alkyle en C_1-C_6), (alkyle en C_1-C_6)-S(=O)$_n$-(alcényle en C_2-C_6), (alkyle en C_1-C_6)-S(=O)$_n$-aryle et (alkyle en C_1-C_6)-S(=O)$_n$-hétérocyclyle, étant entendu que l'indice n vaut 0, 1 ou 2, que chacun desdits groupes alkyle et alcényle peut porter un ou plusieurs substituant(s) choisi(s) dans l'ensemble constitué par ceux symbolisés par F, Cl, Br, I, CN, OH, NO_2 et NH_2, le substituant oxo et les groupes NH-(alkyle en C_1-C_3), N(alkyle en C_1-C_3)$_2$, O-(alkyle en C_1-C_6), (alkyle en C_1-C_3)-O-(alkyle en C_1-C_3) et cycloalkyle en C_3-C_6, et que chacun desdits groupes aryle et hétérocyclyle peut porter un ou plusieurs substituant(s) choisi(s) dans l'ensemble constitué par les groupes alkyle en C_1-C_3, les substituants symbolisés par F, Cl, Br, I, CN, OH, NO_2 et NH_2, le substituant oxo et les groupes NH-(alkyle en C_1-C_3), N(alkyle en C_1-C_3)$_2$, O-(alkyle en C_1-C_6), (alkyle en C_1-C_3)-O-(alkyle en C_1-C_3) et cycloalkyle en C_3-C_6.

4. Molécule conforme à l'une des revendications précédentes, dans laquelle

- au moins l'un des symboles R^2, R^3 et R^4 représente un groupe symbolisé par SF_5,
- et/ou les symboles R^7 et R^8 ne représentent pas le même substituant,
- et/ou R^{22} représente une entité choisie dans l'ensemble constitué par les groupes (alkyle en C_1-C_6)-S(=O)$_n$-(alkyle en C_1-C_6), (alkyle en C_1-C_6)-S(=O)$_n$-(alcényle en C_2-C_6), (alkyle en C_1-C_6)-S(=O)$_n$-phényle et (alkyle en C_1-C_6)-S(=O)$_n$-pyridinyle, étant entendu que l'indice n vaut 0, 1 ou 2, que chacun desdits groupes alkyle et alcényle peut porter un ou plusieurs substituant(s) choisi(s) dans l'ensemble constitué par ceux symbolisés par F, Cl, Br et I, et que chacun desdits groupes phényle et pyridinyle peut porter un ou plusieurs substituant(s) choisi(s) dans l'ensemble constitué par ceux symbolisés par F, Cl, Br et I.

5. Molécule conforme à l'une des revendications précédentes, dans laquelle

- R^1 représente un atome d'hydrogène,
- R^2 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl et CF_3,
- R^3 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F et Cl,
- R^4 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl et CF_3,
- R^5 représente un atome d'hydrogène,
- R^7 représente un atome de chlore,
- R^8 représente un atome de chlore,
- Q^1 représente un atome d'oxygène,
- Q^2 représente un atome d'oxygène,
- R^{11} représente un atome d'hydrogène,
- R^{12} représente un atome d'hydrogène,
- R^{13} représente un atome de chlore,
- R^{14} représente un atome d'hydrogène,
- R^{16} représente un atome de fluor,
- R^{17} représente un groupe N(R^{21})C(=O)(R^{22}),
- R^{18} représente un atome de fluor,
- R^{19} représente un atome d'hydrogène,
- R^{20} représente un atome d'hydrogène,
- R^{21} représente un atome d'hydrogène,
- et R^{22} représente une entité choisie dans l'ensemble constitué par les groupes (alkyle en C_1-C_6)-S(=O)$_n$-(alkyle en C_1-C_6), (alkyle en C_1-C_6)-S(=O)$_n$-(alcényle en C_2-C_6), (alkyle en C_1-C_6)-S(=O)$_n$-phényle et (alkyle en C_1-C_6)-S(=O)$_n$-pyridinyle,

étant entendu que l'indice n vaut 0, 1 ou 2, et que chacun desdits groupes alkyle, alcényle, phényle et pyridinyle peut porter un ou plusieurs substituant(s) choisi(s) dans l'ensemble constitué par les atomes de fluor et de chlore.

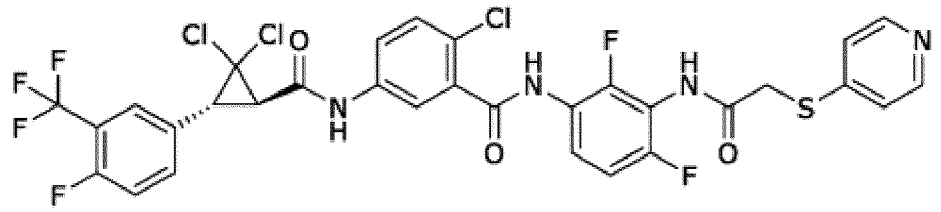
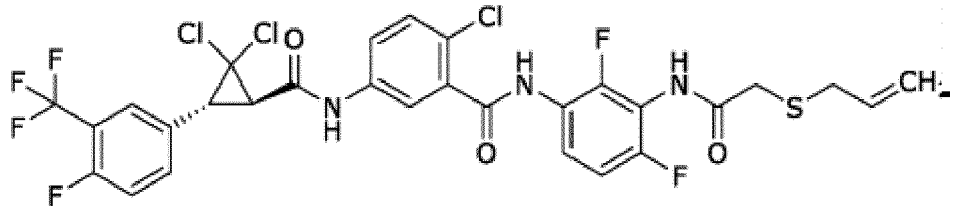
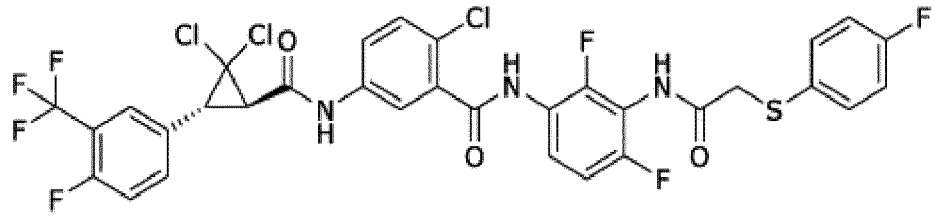
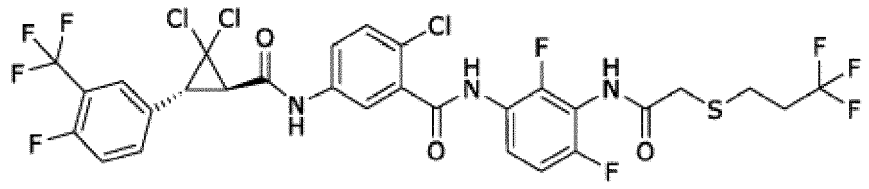
6. Molécule conforme à l'une des revendications précédentes, dans laquelle

- R^1 représente un atome d'hydrogène,
- R^2 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl et CF_3,
- R^3 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F et Cl,
- R^4 représente une entité choisie dans l'ensemble constitué par celles symbolisées par H, F, Cl et CF_3,
- R^5 représente un atome d'hydrogène,
- R^7 représente un atome de chlore,

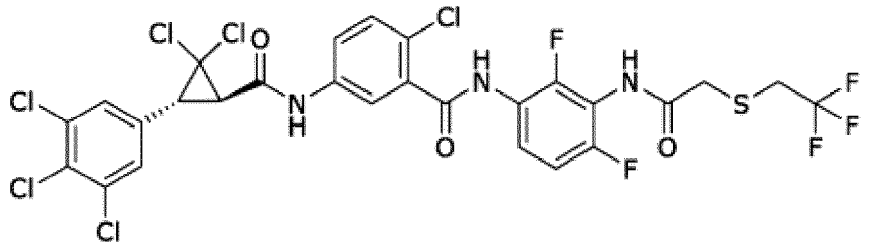
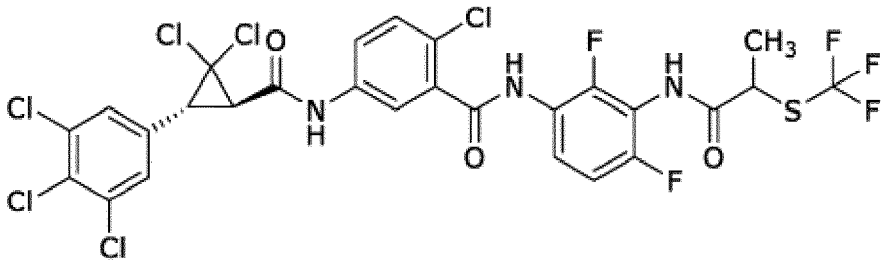
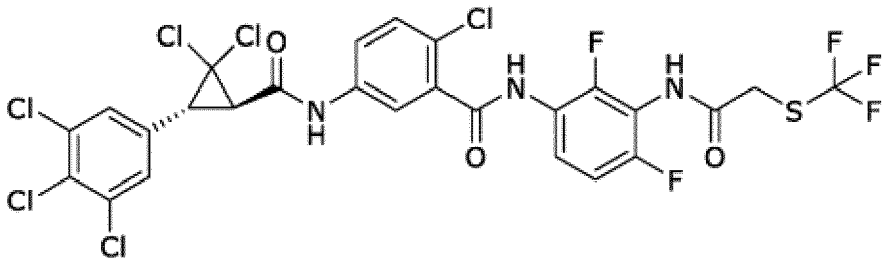
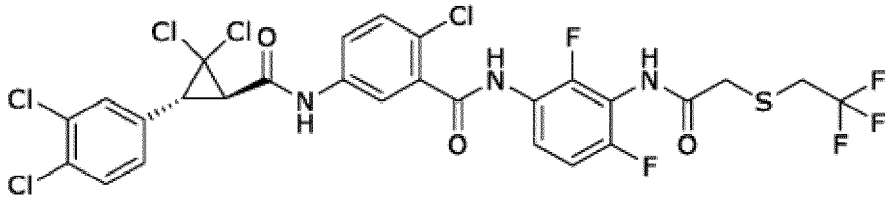
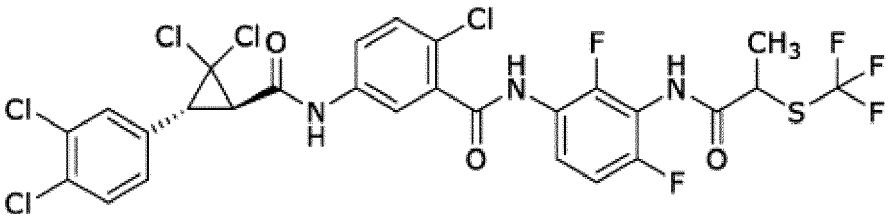
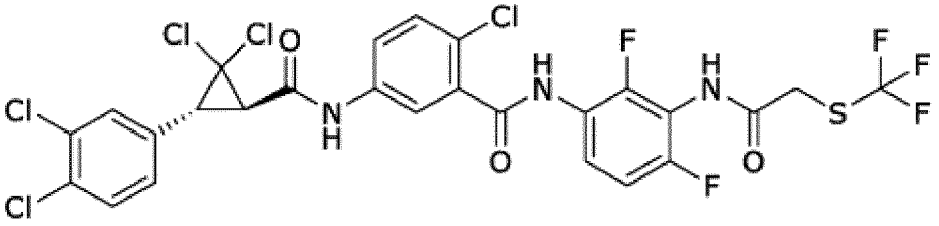
- R^8 représente un atome de chlore,
- Q^1 représente un atome d'oxygène,
- Q^2 représente un atome d'oxygène,
- R^{11} représente un atome d'hydrogène,
- R^{12} représente un atome d'hydrogène,
- R^{13} représente un atome de chlore,
- R^{14} représente un atome d'hydrogène,
- R^{16} représente un atome de fluor,
- R^{17} représente un atome d'hydrogène,
- R^{18} représente un groupe $N(R^{21})C(=O)(R^{22})$,
- R^{19} représente un atome d'hydrogène,
- R^{20} représente un atome d'hydrogène,
- R^{21} représente un atome d'hydrogène,
- et R^{22} représente une entité choisie dans l'ensemble constitué par les groupes (alkyle en C_1-C_6)-$S(=O)_n$-(alkyle en C_1-C_6), (alkyle en C_1-C_6)-$S(=O)_n$-(alcényle en C_2-C_6), (alkyle en C_1-C_6)-$S(=O)_n$-phényle et (alkyle en C_1-C_6)-$S(=O)_n$-pyridinyle,

étant entendu que l'indice n vaut 0, 1 ou 2, et que chacun desdits groupes alkyle, alcényle, phényle et pyridinyle peut porter un ou plusieurs substituant(s) choisi(s) dans l'ensemble constitué par les atomes de fluor et de chlore.

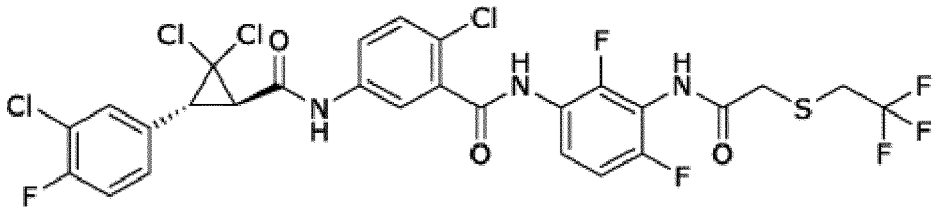
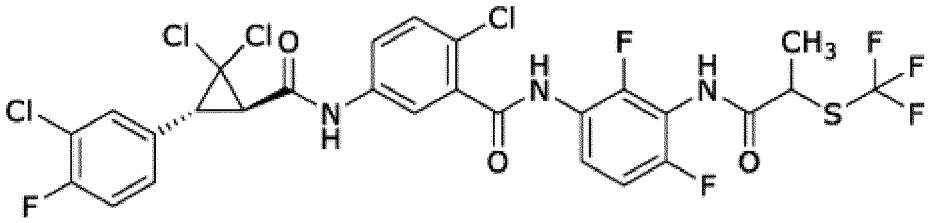
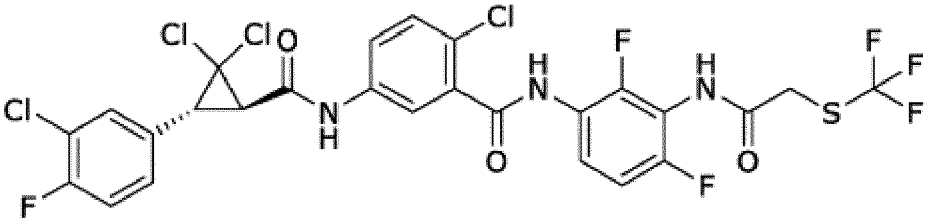
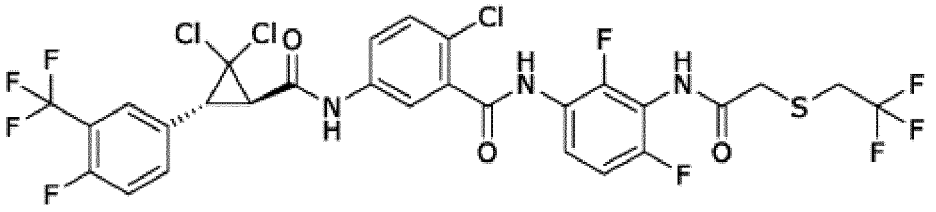
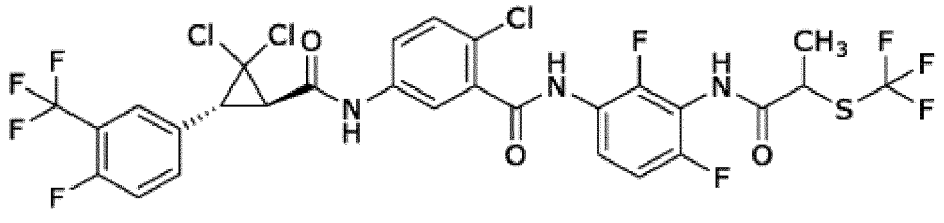
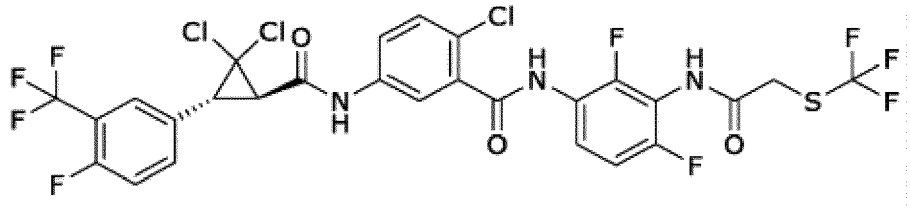
7. Molécule conforme à la revendication 1, laquelle molécule est choisie parmi les molécules figurant dans le tableau suivant :

No.	Structure
F2	
F3	
F4	
F5	

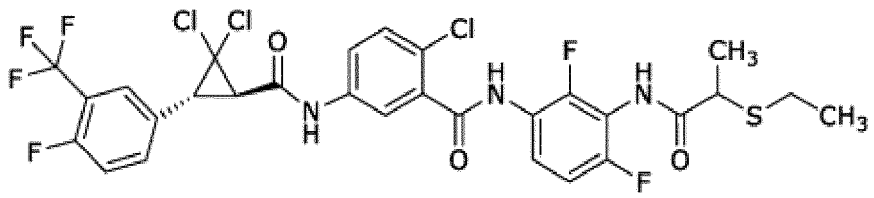
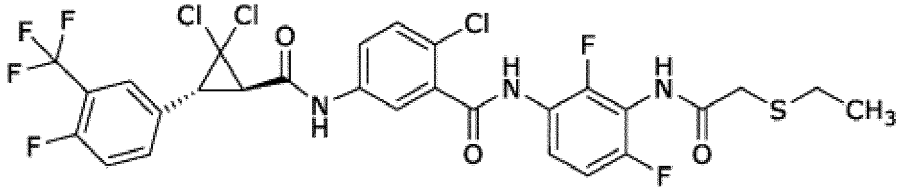
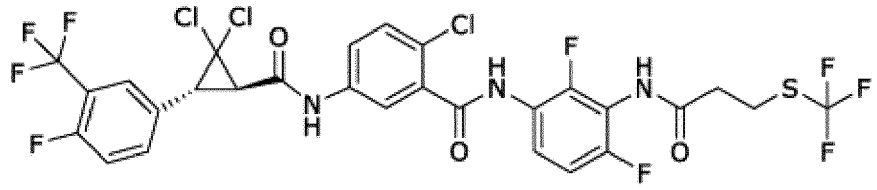
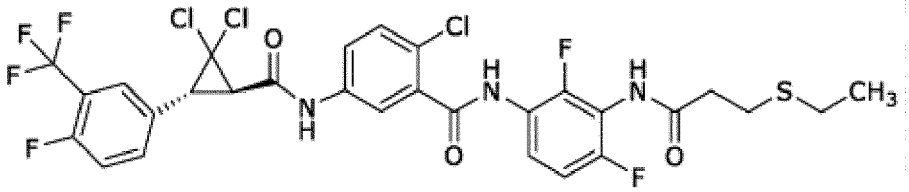
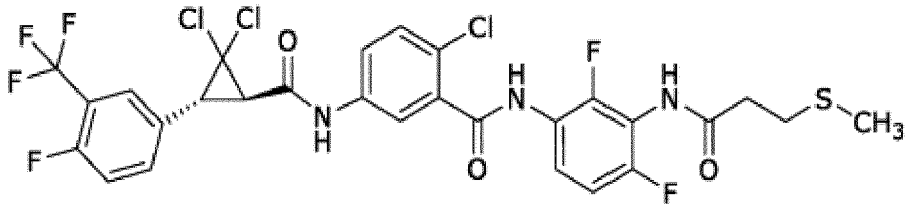
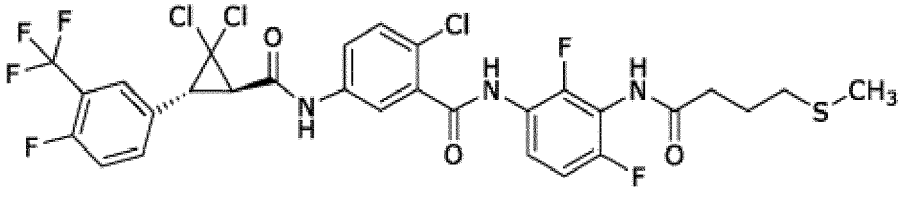
(suite)

No.	Structure
F6	
F7	
F8	
F9	
F10	
F11	

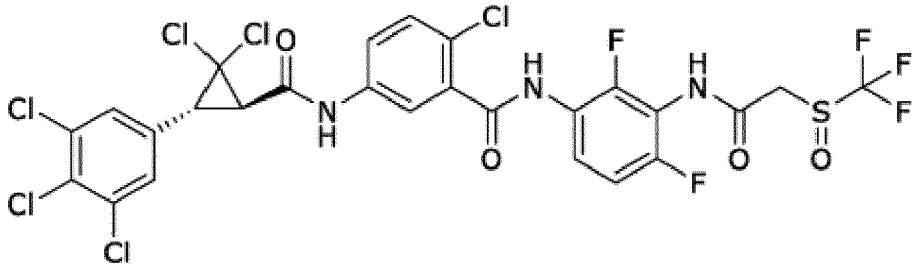
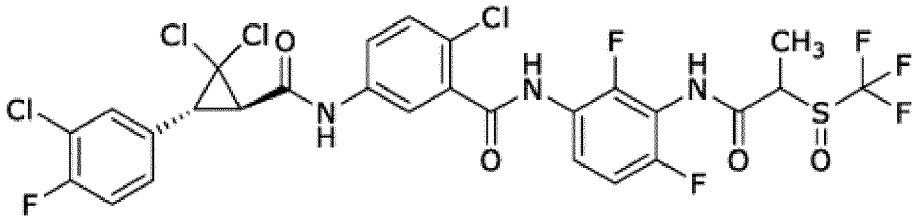
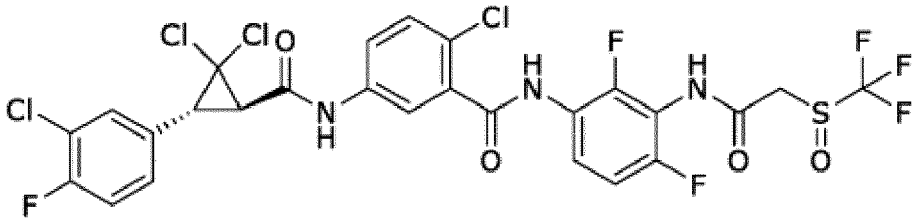
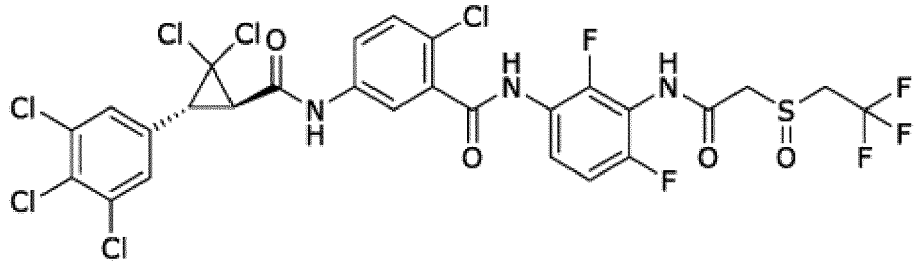
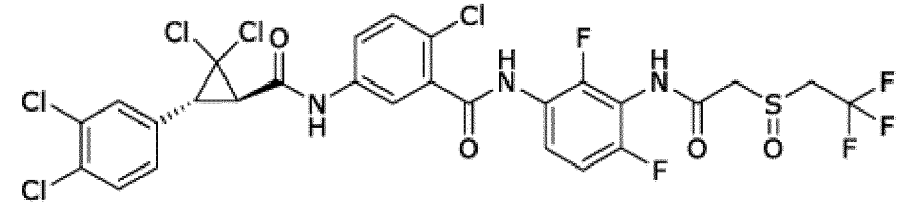
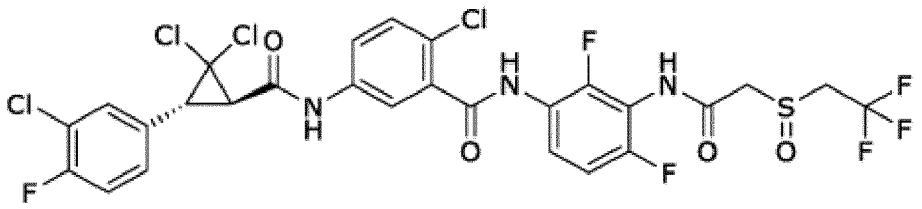
(suite)

No.	Structure
F12	
F13	
F14	
F15	
F16	
F17	

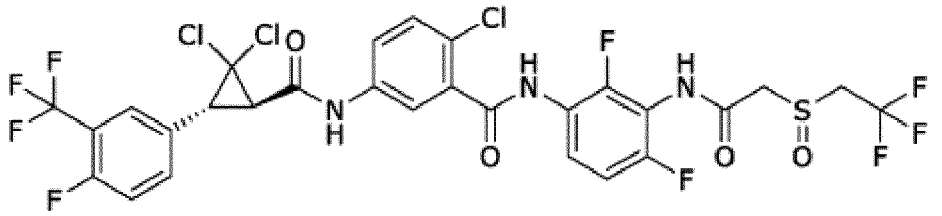
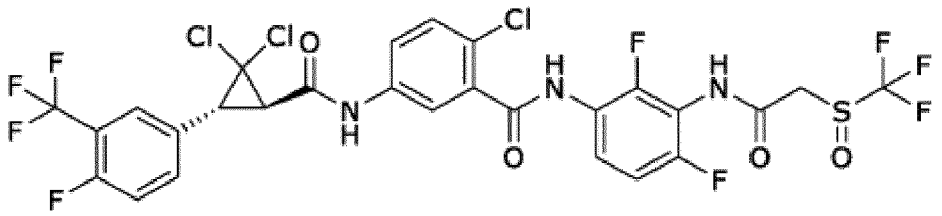
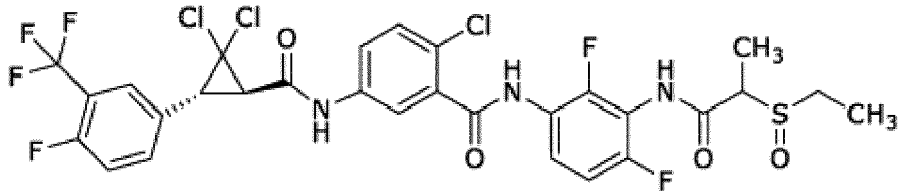
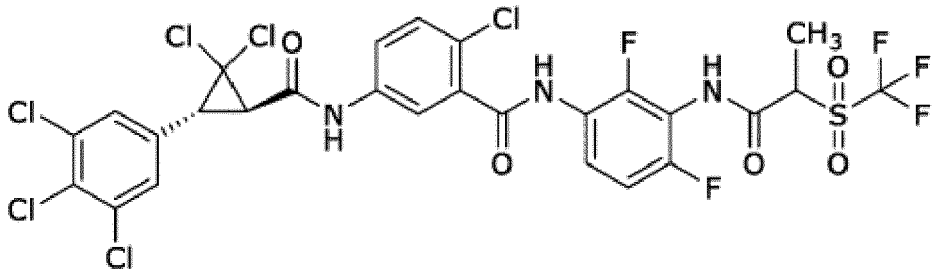
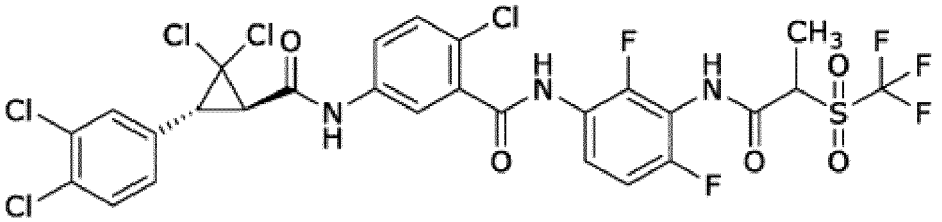
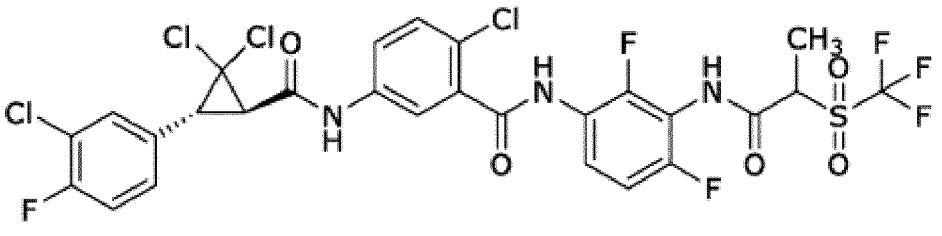
(suite)

No.	Structure
F18	
F19	
F22	
F23	
F24	
F25	

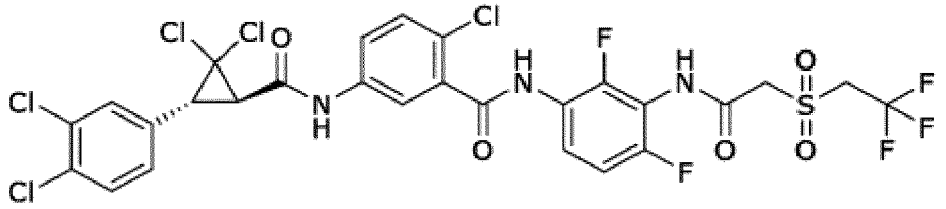
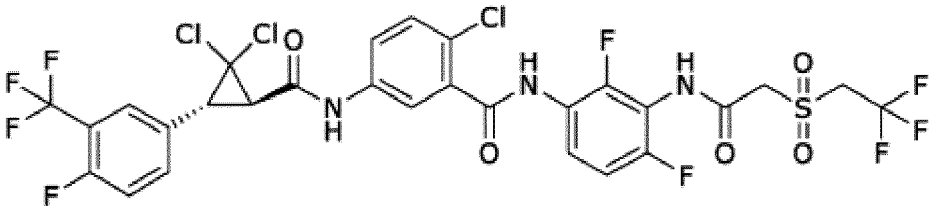
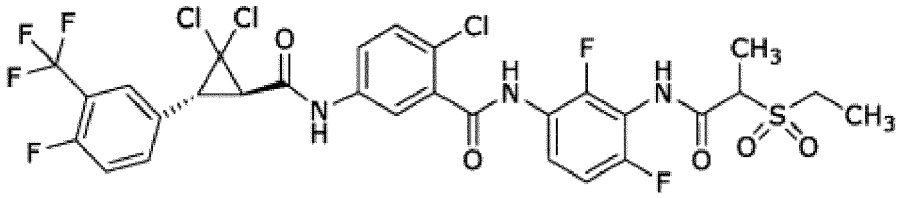
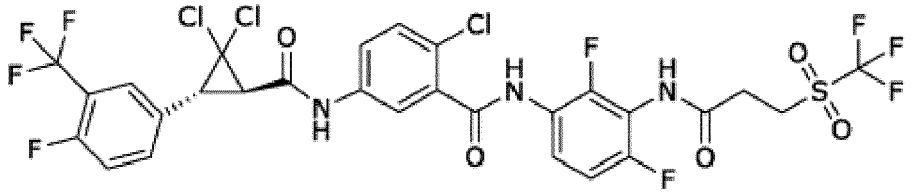
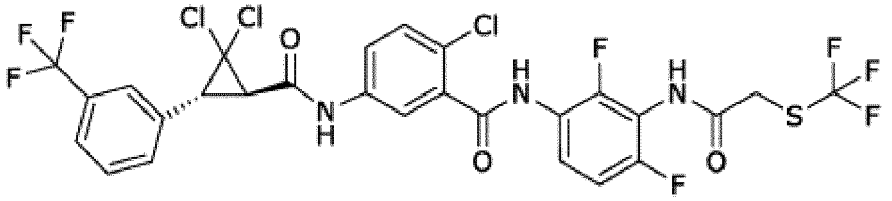
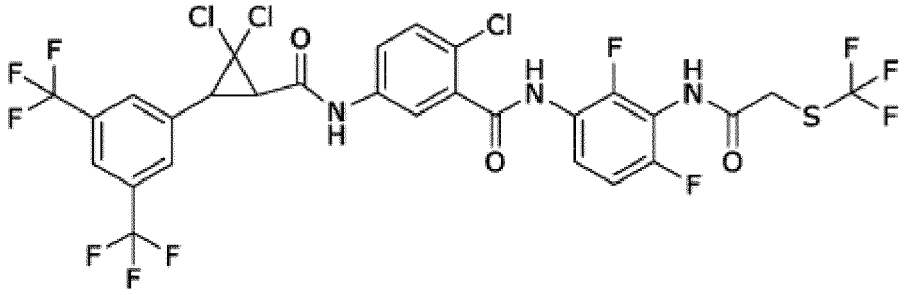
(suite)

No.	Structure
F26	
F27	
F28	
F29	
F30	
F31	

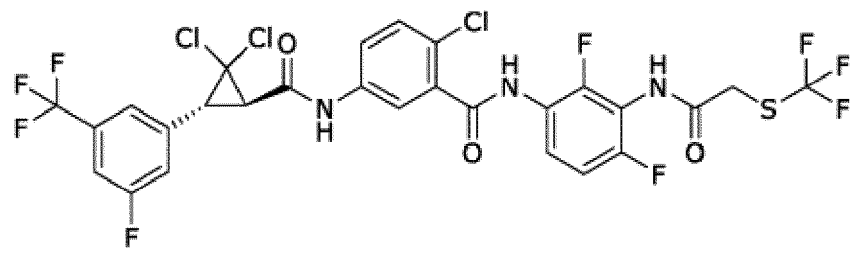
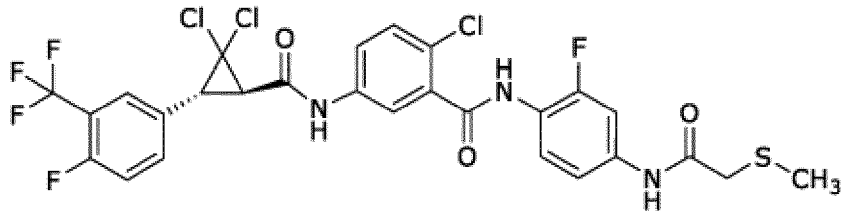
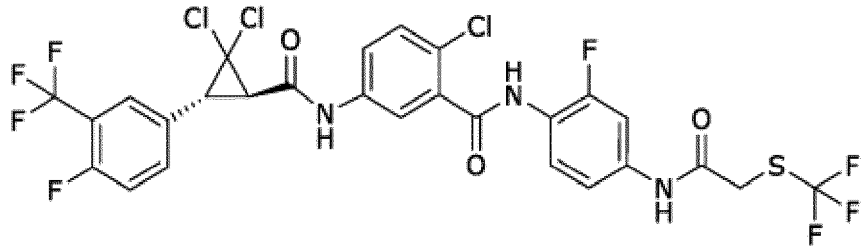
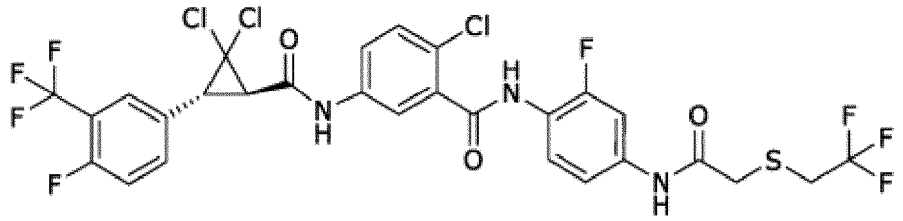
(suite)

No.	Structure
F32	
F33	
F34	
F35	
F37	
F39	

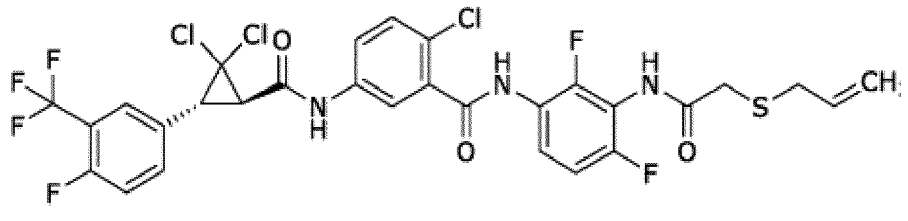
(suite)

No.	Structure
F42	
F44	
F45	
F46	
F47	
F48	

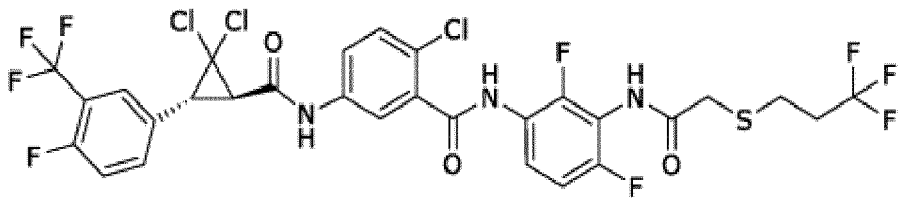
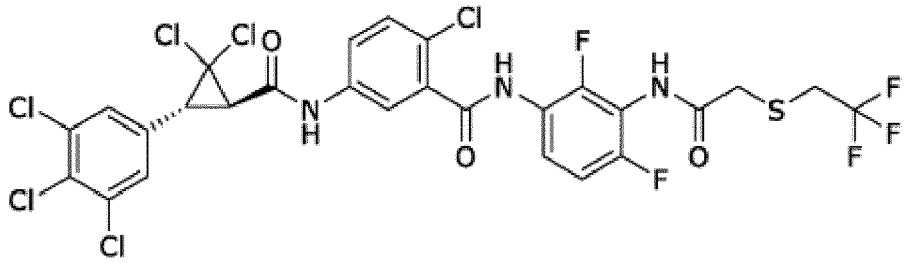
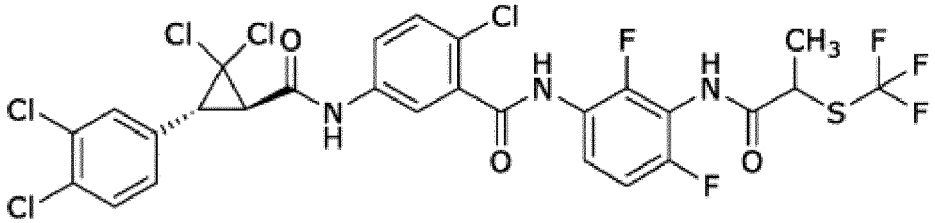
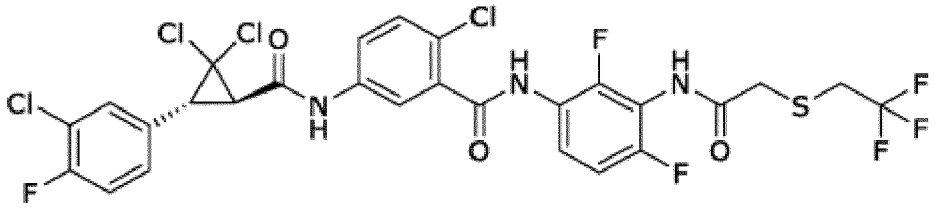
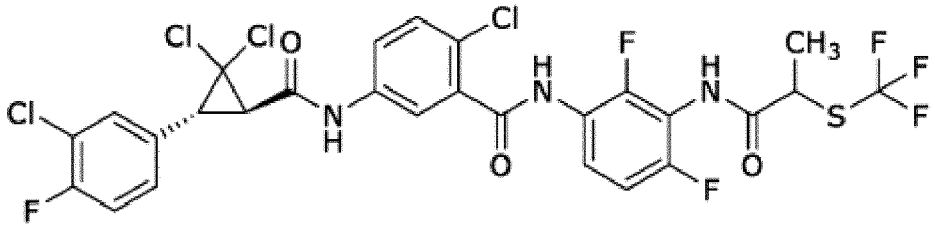
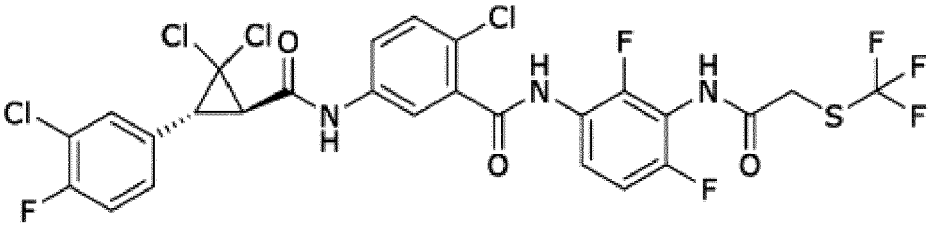
(suite)

No.	Structure
F49	
F50	
F51	
F52	

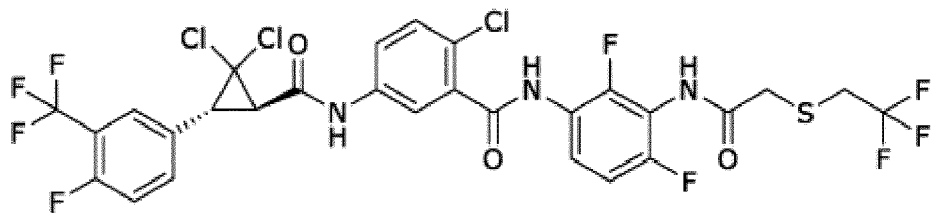
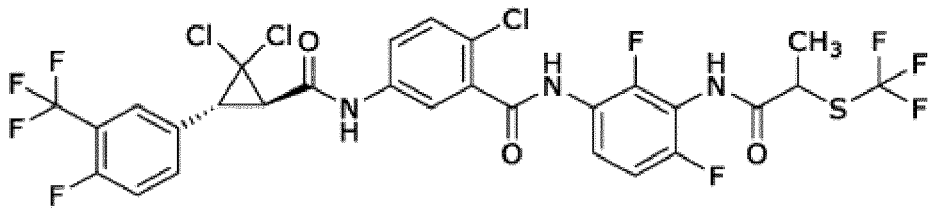
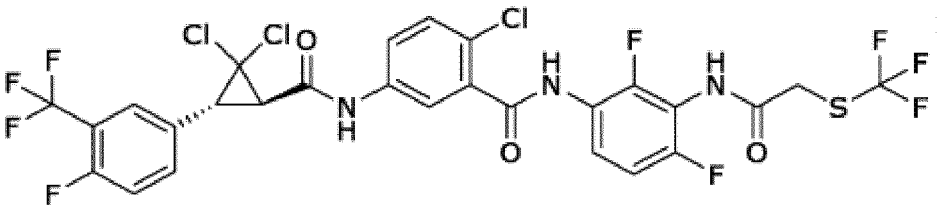
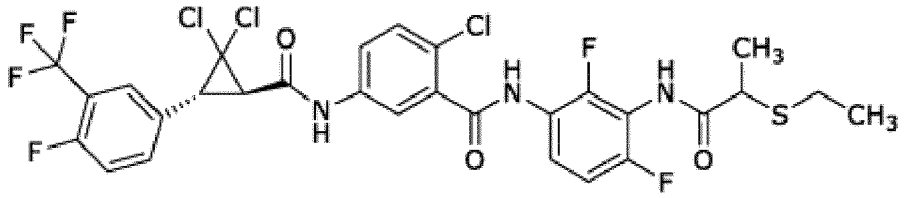
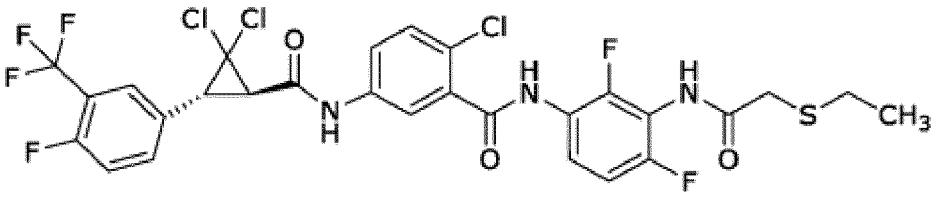
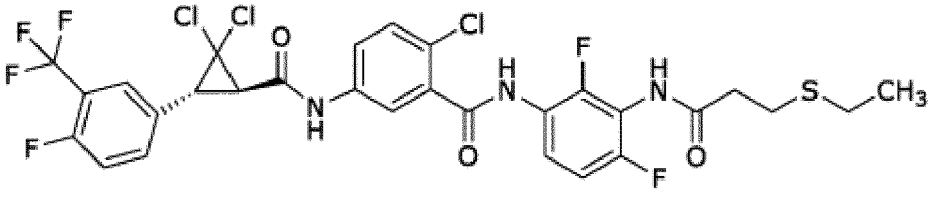
8. Molécule conforme à la revendication 1, laquelle molécule est choisie parmi les molécules figurant dans le tableau suivant :

No.	Structure
F3	

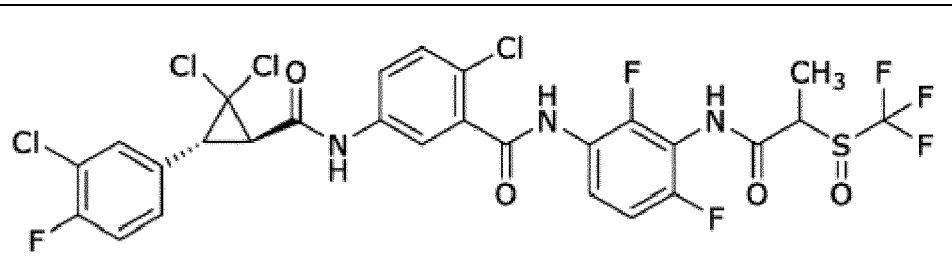
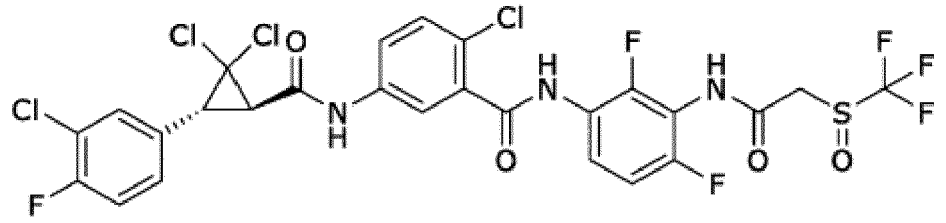
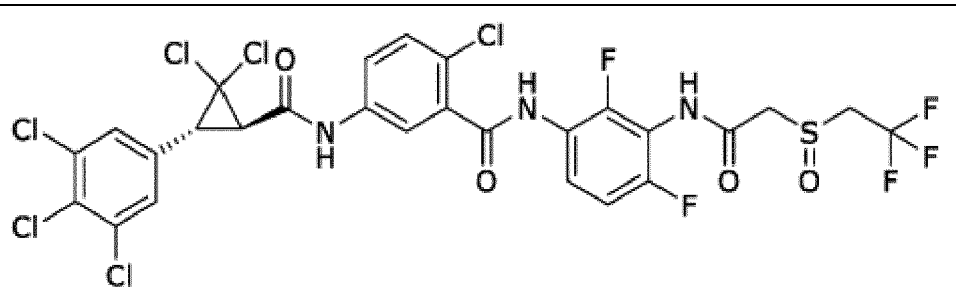
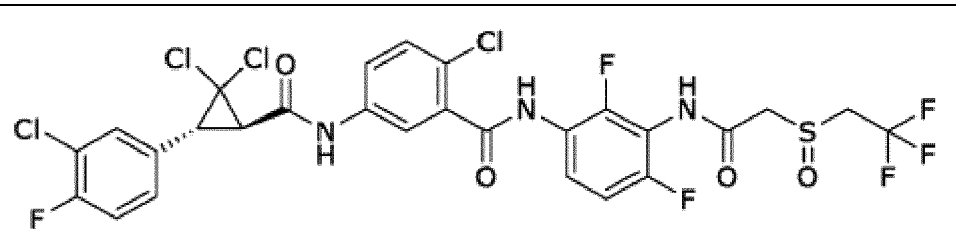
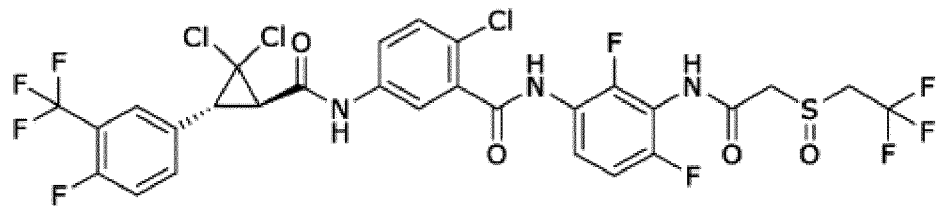
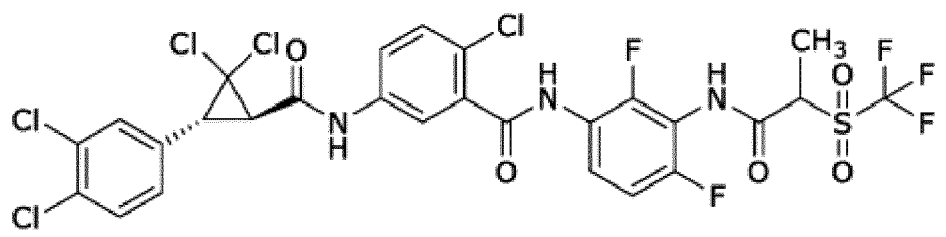
(suite)

No.	Structure
F5	
F6	
F10	
F12	
F13	
F14	

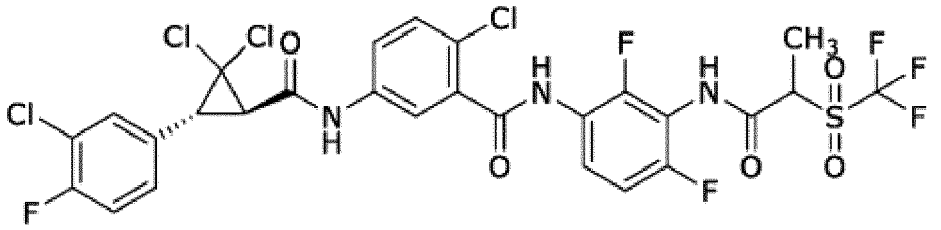
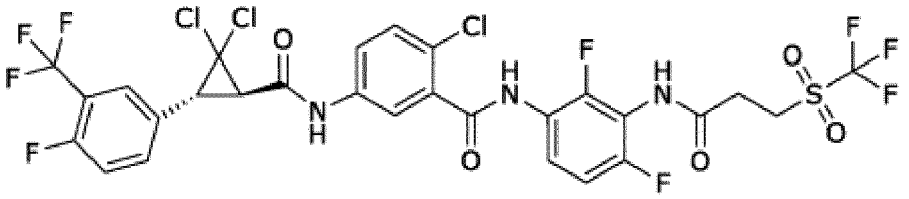
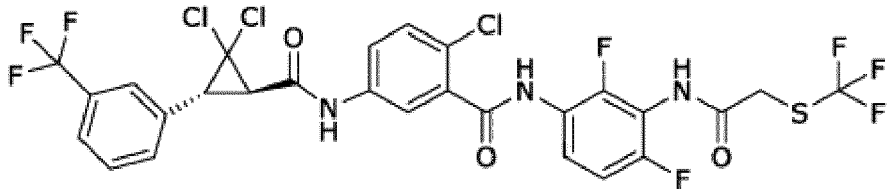
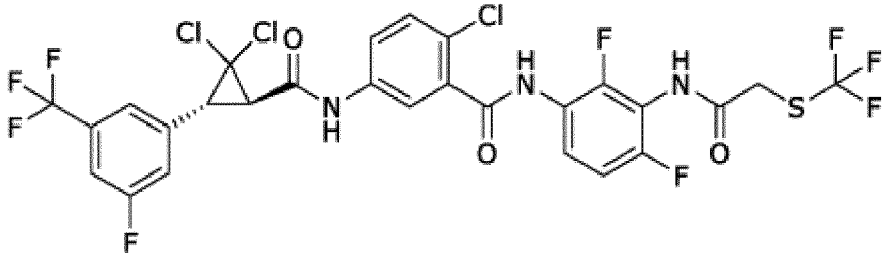
(suite)

No.	Structure
F15	
F16	
F17	
F18	
F19	
F23	

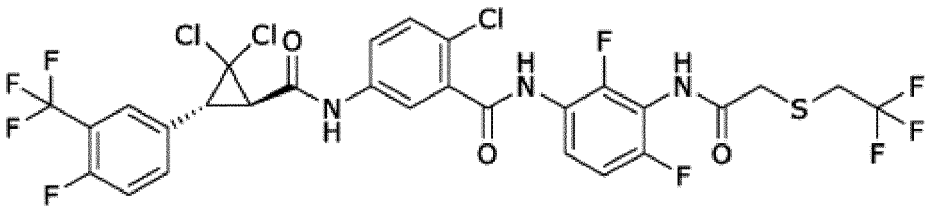
(suite)

No.	Structure
F27	
F28	
F29	
F31	
F32	
F37	

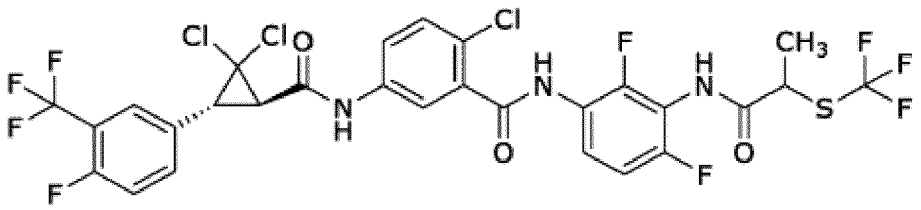
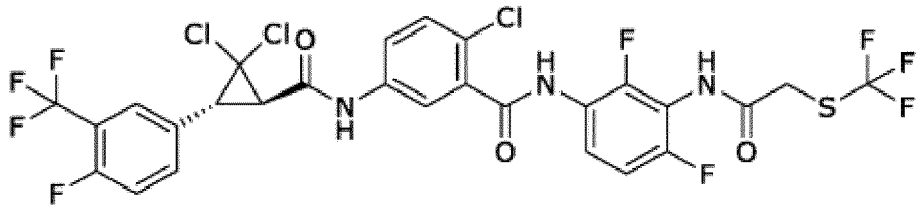
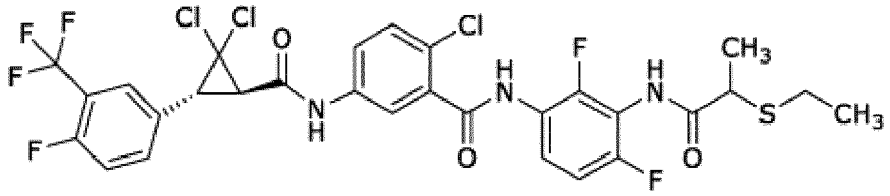
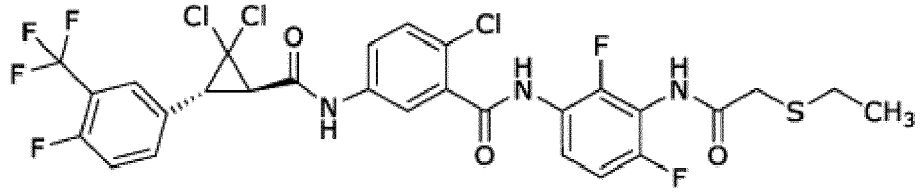
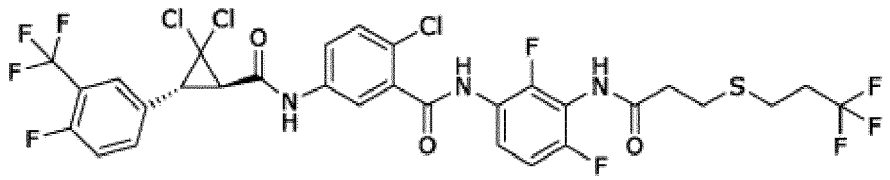
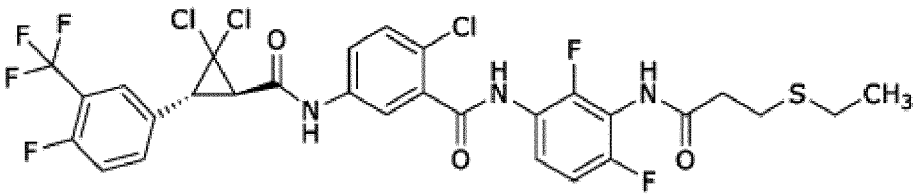
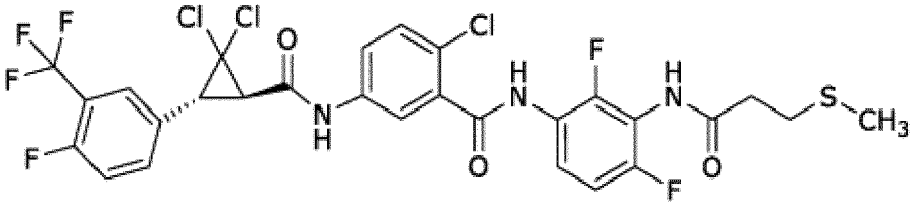
(suite)

No.	Structure
F39	
F46	
F47	
F49	

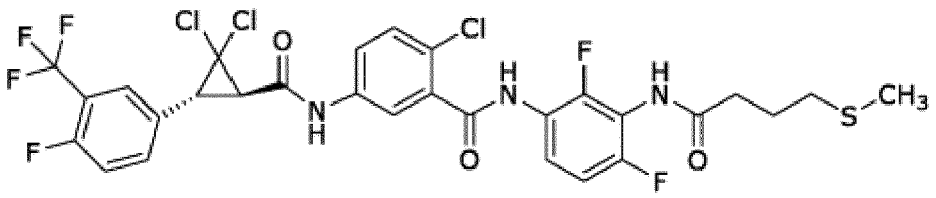
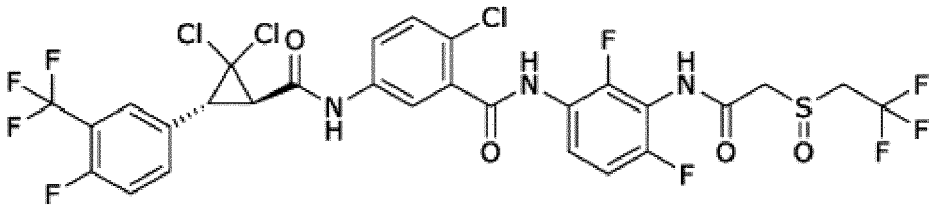
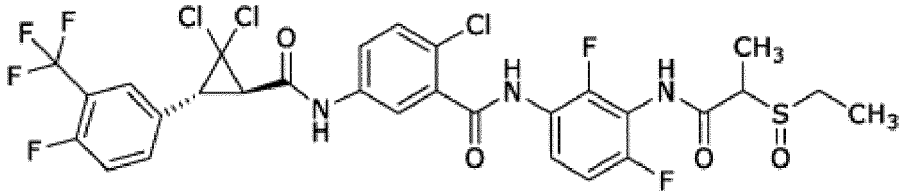
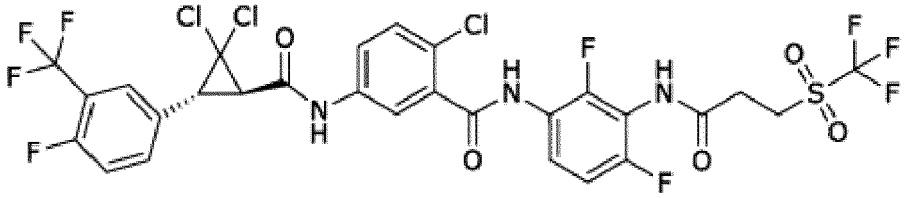
9. Molécule conforme à la revendication 1, laquelle molécule est choisie parmi les molécules figurant dans le tableau suivant :

No.	Structure
F15	

(suite)

No.	Structure
F16	
F17	
F18	
F19	
F21	
F23	
F24	

(suite)

No.	Structure
F25	
F32	
F34	
F46	

10. Composition comprenant une molécule conforme à l'une des revendications précédentes, et comprenant en outre un véhicule.

11. Composition conforme à la revendication 10, comprenant en outre un ingrédient actif.

12. Procédé non-thérapeutique de lutte contre un nuisible, lequel procédé comporte le fait d'appliquer en un lieu de fréquentation, en une quantité à effet pesticide, une composition conforme à l'une des revendications 10 et 11.

REFERENCES CITED IN THE DESCRIPTION

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