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(54) **E-LIQUID FOR VAPING COMPRISING AN AEROSOL-FORMING AGENT AND A METHOD OF PRODUCING THEREOF**

(57) Present invention relates an e-liquid for vaping, comprising an aerosol-forming agent as a base solution of the e-liquid, wherein the e-liquid comprises one or more extracts (10) from tobacco-containing material (4)

such as vaporized extracts (8) comprising tobacco-derived components, having a specific boiling point, wherein the boiling point of the extract (10) is not higher than the boiling point of the base solution.

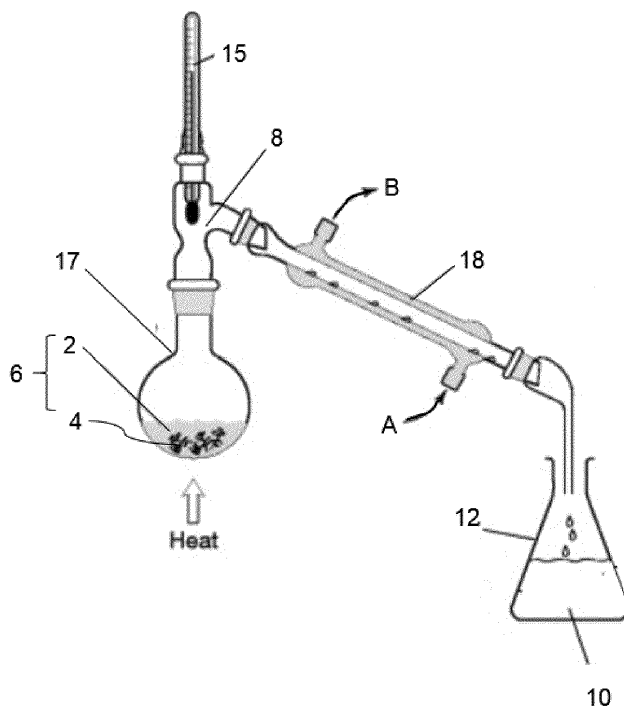


FIGURE 1

Description

Technical field of the invention

[0001] Present invention relates to the field of electronic cigarette, in particular relates to an e-liquid for vaping and a method of producing thereof.

Background of the invention

[0002] E-cigarettes, also known as e-cigs, vapes, vape pens, mods and tanks are devices that operate by heating a liquid solution to a certain temperature so that it produces an aerosol that is inhaled. Typically, e-cigarette devices have a heating element that atomizes a liquid solution called e-liquid. They are activated by taking a puff or pressing a button.

[0003] While using an e-cigarette is often called "vaping," the devices produce an aerosol, sometimes referred as vapour though both aerosol and vapour are slightly different in nature. Vapour is cloudy diffused matter such as mist, steam or fumes suspended in the air while aerosol is a liquid or solid composed of finely divided particles suspended in a gaseous medium.

[0004] E-liquid solution or liquid solution, sometimes called solvent, typically include tobacco-containing material, flavourings (flavourant) and a humectant, such as propylene glycol, to retain moisture and create an aerosol when heated.

[0005] E-cigarette users often search for a tobacco flavour e-liquid that does not taste artificial. This is due to the fact that concentrated nicotine such as nicotine shot which is often added into the e-liquid solution does not contain flavour. For this reason, chemical mimicking tobacco flavour is usually mixed with the e-liquid solution in order to mimic the real tobacco taste and flavour. Nevertheless, experienced users could still recognise the distinctive difference between a real tobacco flavour from a mimicked tobacco flavour.

[0006] For this reason, some e-liquid companies proposed e-liquid products which is provided with real tobacco material such as tobacco leaves or other tobacco parts that have been ground into powder form. However, a common problem of adding the tobacco material into the e-liquid solution is that upon repeated use, the heating element of the device quickly becomes fouled, causing an unpleasant smell to the user, and the vaporisation efficiency is reduced. Moreover, such e-liquids usually clog the device and needs to be cleaned very often. In addition, replacement of the heating element such as heating coil is not economical as it is more costly than a pack of traditional cigarettes, leading some users to revert back to their old habits.

[0007] In order to avoid these problems, improved e-liquids which do not adversely affect the e-cigarette device, yet at the same time provide natural tobacco flavour and taste, are needed.

Summary of the invention

[0008] The inventors of the present invention have found solutions to the above-discussed problems through an improved e-liquid and a method of producing the e-liquid as defined in the claims.

[0009] A first aspect of the invention is accordingly to provide an e-liquid for vaping, comprising an aerosol-forming agent as a base solution of the e-liquid, wherein the e-liquid comprises one or more extracts from tobacco-containing material such as vaporized extracts comprising tobacco-derived components, having a specific boiling point, wherein the boiling point of the extract is not higher than the boiling point of the base solution.

[0010] A second aspect of the invention is to provide a method of producing e-liquid for vaping, comprising the steps of:

a. Providing tobacco-containing material into fine particles, preferably through milling, pulverization, granulation, filtration and combinations thereof;

b. Providing the fine particles of tobacco-containing material in a solvent, thereby producing a tobacco-containing solvent mixture; optionally mixing the tobacco-containing solvent mixture;

c. Extracting the tobacco-containing solvent mixture with a distillation at a temperature not higher than the boiling point of the base solution to provide a first solution which comprises distillate including tobacco-derived components.

d. Collecting the first solution.

[0011] A third aspect of the invention is to provide an e-liquid obtainable from one of the methods according to the present invention.

[0012] The inventors found out that the e-liquids of the present invention not only give real tobacco taste and flavour but also do not clog the vaping device due to the fact that the extracts have a boiling point less than the boiling point of the base solution. In other words, the tobacco-derived components of the extract in the e-liquid when being heated, are evaporated as vapour, leaving no residues in the vaping device. Thus, the clogging of the device will be avoided and the heating element does not become fouled and causes unpleasant smell. Moreover, the heating element does not need to be cleaned frequently nor be replaced often.

[0013] According to some preferred embodiments, the extract is a distillate. This ensures that all content of the extract (which contains tobacco-derived components) to be evaporated along with the base solution such that no residues are left in the e-liquid or the vaping device when being heated. Thus, the heating element and the vaping device will not be clogged or causing foul taste or smell.

[0014] In another embodiment, the boiling point of the

extract and/or the base solution is less than about 300 °C, preferably less than 200 °C, more preferably about 100 °C. For instance, glycerol has a boiling point of about 290 °C whereas propylene glycol has a boiling point of about 188 °C. The mixture can further be subjected to a pressure while extracting/distilling such as at a standard atmospheric pressure. Of course, other pressure can also be provided, ranging from 0 (vacuum) to 5 atmospheric pressure.

[0015] In the event that the e-liquid comprises both glycerol and propylene glycol as base solution and being heated at around 300 °C, the base solution as well as the entire extract will be vaporised. No impurity is left in the e-liquid. In the event that propylene glycol is used as a solvent to extract tobacco-derived components, when the solvent is subject to a distillation process (heating at its boiling point at about 188 °C), the distillate containing tobacco-derived components is therefore "pure" in the sense that the extract and/or base solution will be evaporated completely, leaving no trace of residues in the vaping device.

[0016] In another embodiment, the boiling point of the extract and/or the base solution is between about 75 °C and 300 °C, preferably between 160 °C and 300 °C, more preferably between 271 °C and 300 °C. For instance, ethanol has a boiling point of about 78 °C, pure water has a boiling point of about 100 °C, propylene glycol has a boiling point of about 188 °C and glycerol has a boiling point of about 290 °C. Suitable solvent can be chosen to extract tobacco-derived components based on their physical and chemical properties (e.g. polarity) and/or the boiling point of the base solution of the e-liquid.

[0017] According to some embodiments, the e-liquid further comprises one or more components selected from the list consisting of water, flavourant, humectant, additives and enhancer.

[0018] According to the most preferred embodiment, the e-liquid comprises two or more solvents as a base solution, wherein one, two or more of the solvents are aerosol-forming agent.

[0019] According to some embodiments, the base solution comprises at least two solvents, wherein a first solvent has an aqueous character and a second solvent being immiscible with the first solvent. Both solvents can for example be provided to the tobacco material simultaneously in order to extract both water-soluble compounds and water-insoluble compounds into their solvents respectively. The two immiscible solvents can be collected subsequently as a distillate. This distillate can be provided to a base solution of an e-liquid or serves directly as a base solution of an e-liquid. This has the advantage that the distillate comprises a rich tobacco flavour and taste that is close to the natural tobacco character compared to artificial chemical mimicking tobacco flavour. Furthermore, as the extract has a boiling point less than the boiling point of the base solution, it ensures that the no residues are being left accumulated in the vaping device upon use of the e-liquid.

[0020] According to a further embodiment, the e-liquid may comprise of two solvents. The first solvent having a higher boiling point can be first used to extract the tobacco-derived components and collected as a distillate, and subsequently the distillate is provided to a second solvent having a lower boiling point, and may further be subjected to a second distillation. The distillate collected is hence provided in a purer form. Furthermore, the distillate is found to be of higher quality, as the extract/distillate undergo a double distillation process, thus increasing the quality of the e-liquid.

[0021] According to a further embodiment, the tobacco-containing material are fine particles, preferably processed through milling, pulverization, granulation, filtration and combinations thereof. The fine particles has higher surface area, allowing the tobacco-containing material to contact more easily with the solvent to enhance the extraction process.

[0022] In one particularly preferred embodiment, the tobacco-containing material has an average particle size of about less than about 5 mm, preferably less than about 3 mm or less than about 2 mm, or more preferably between about 0.01 mm and about 1 mm. Particle size of between about 0.01 mm and about 1 mm is most preferred as it allows most tobacco-derived components to be extracted by the one or more solvents.

[0023] According to yet another embodiment, the tobacco-containing material are selected from a list consisting of tobacco lamina, tobacco leaf, tobacco stem, reconstituted tobacco, tobacco dust and tobacco waste.

[0024] In another embodiment, the extracts are extracted from tobacco-containing material with one or more solvents selected from a list consisting of propylene glycol, glycerine, 1, 3-propane-diol (vegetol), water and ethanol.

[0025] According to some preferred embodiments, the method further comprises a step in between the step (a) and the step (b) of claim 1 by filtering out fine particles having particle sizes larger than 5 mm, preferably larger than about 3 mm or larger than about 2 mm, or more preferably larger than about 1 mm to provide filtered fine particles.

[0026] According to yet some preferred embodiments, the method further comprises a step of providing the distillate or the vaporized extract comprising tobacco-derived components to a further solvent, forming a second solution as a base solution of the e-liquid, and followed subsequently by collecting the second solution.

[0027] According to another embodiment, the step further comprising a step of purifying the distillate including tobacco-derived components obtained from the tobacco-containing solvent mixture such as to provide a purified distillate including tobacco-derived components.

[0028] According to one preferred embodiment, the method further comprises a step of double distillation.

[0029] According to one further embodiment, the distillate is obtained through simple distillation, steam distillation, dry distillation, vacuum distillation, fractional dis-

tillation and/or short path distillation.

[0030] A tobacco-containing material can be any compound, mixture, particle matter, and/or solution that contains and/or carries a constituent of tobacco, either artificially included or naturally contained in tobacco, e.g. tobacco, tobacco particles, tobacco flavor and/or nicotine. In contrast, an example for an artificially added non-tobacco-specific flavor would be menthol.

[0031] As used herein, the term "aerosol-forming agent" and "aerosol-generating material" are used interchangeably, and referred to a material capable of releasing upon heating volatile compounds (tobacco-derived components), which can form an aerosol. The aerosol generated from aerosol-generating material described herein may be visible or invisible and may include vapours (for example, fine particles of substances, which are in a gaseous state, that are ordinarily liquid or solid at room temperature) as well as gases and liquid droplets of condensed vapours. An aerosol-forming agent can be any compound, mixture and/or solution that is capable of forming an aerosol, e.g. when heated and/or in mixture with a tobacco-derived components. Well known examples include humectants such as glycerin and propylene glycol, other alcohols, such as ethanol, and etc.

[0032] As used herein, wt.-% is to be understood as weight percent, based on the total weight of the substance, unless explicitly otherwise specified. In the present disclosure, all amounts are given in wt.-%, unless clearly stated otherwise or obvious from context. In the present disclosure, furthermore all amounts given in wt.-% add up to 100 wt.-%. The weight percent are thereby calculated by dividing the mass of each component by the total mass e.g. of the foam, unless indicated otherwise or clear from context.

[0033] The term "distillate" is an extract (or vaporized extract which has been cooled and condensed) in which the final product has been systematically stripped off of most impure materials and compounds from tobacco-containing material except those volatile compounds having boiling points lower or similar to the boiling point of the solvent itself. In some instances, the term "first solution" is referred to the distillate.

[0034] The terms "aerosol" and "vapour" are used interchangeably in the present case.

[0035] By "about" or "approximately" in relation to a given numerical value, it is meant to include numerical values within 10 % of the specified value. In a more restrictive instance, it is meant to be within 5 % of the specified value. All values given in the present disclosure are to be understood to be complemented by the word "about", unless it is clear to the contrary from the context.

[0036] The term "comprise" is used interchangeably with the term "is" or "are". For instance the expression "the first solution comprises a distillate" may be understood as "the first solution is a distillate".

[0037] The indefinite article "a" or "an" does not exclude a plurality, thus should be treated broadly.

[0038] Unless defined otherwise, technical and scien-

tific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs.

5 Brief description of drawings

[0039] Figure 1 shows a first embodiment of the present invention.

10 Detailed description of the invention

[0040] Conventional tobacco extraction is a slow, time-consuming process, which usually involves the use of solvents at room temperature to extract compound of interest. For this reason, distillation process may be used to not only expedite the process but the distillate (vaporised extract subsequently cooled and condensed) obtained also has a higher purity quality.

[0041] Figure 1 is one embodiment of the present invention where an extract comprising tobacco-derived components is extracted through a distillation process. Fine particles of tobacco-containing material 4 is provided to a solvent 2 (liquid solution), forming a tobacco-containing solvent mixture 6. Due to the larger surface area of the tobacco-containing material 4 that is in contact with the solvent 2, higher amount of tobacco-derived components can be extracted effectively into the solvent 2.

[0042] Figure 1 shows a typical distillation set up. The distillation apparatus consists basically of a distillation flask 17, usually fitted with a vertical fractionating column (which may be empty, or packed with suitable materials such as glass helices or stainless-steel wool) to which is attached a condenser 18 leading to a receiving flask 12. The bulb of a thermometer 15 projects into the vapour phase 8 just below the region where the condenser joins the column. The distilling flask is heated so that its contents are steadily vaporised by boiling. The vapour 8 passes up into the column where, initially, it condenses and runs back into the flask. The resulting heat transfer gradually warms the column so that there is a progressive movement of the vapour phase-liquid boundary up the column, with increasing enrichment of the more volatile components. Because of this fractionation, the vapour extract 8 finally passing into the condenser 18 (where it condenses and flows into the receiver 12) is commonly that of the lowest-boiling components in the system. The conditions apply until all of the low-boiling material has been distilled, whereupon distillation ceases until the column temperature is high enough to permit the next component to distil. This usually results in a temporary fall in the temperature indicated by the thermometer.

[0043] In the present set up, the tobacco-containing solvent mixture 6 was heated slowly to reach a pre-determined temperature. The pre-determined temperature was set according to the boiling point of the solvent 2 such that the solvent 2 was boiled when reaching its boiling point. At this stage vapour gases 8 was produced. The flask (or pot) 17 was continuously heated, so that a

vapour 8, rich in the volatile components, was cooled and condensed, and subsequently collected in the external receiver 12 as a distillate 10.

[0044] The process was performed through a simple extractive distillation process. However, it can be foreseen that other suitable distillation can also be used to obtain a distillate 10 such as vacuum distillation, fractional distillation or even azeotropic distillation.

[0045] To this end, it is disclosed that as the extract (distillate) may contain very low amount of tobacco-derived components which are volatile compounds that give real tobacco taste and flavour, the distillate may be heated at a temperature (e.g. 10 to 20 °C) slightly lower than the boiling point of said base solution such as to condensate the distillate. Alternatively, higher amount of tobacco-containing material (e.g. 1:5 of tobacco powder in dry weight: solvent) can be provided to a solvent such that the extract contains higher amount of tobacco-derived components.

[0046] The extract containing the volatile compounds does not need to contain very high amount or percentage of tobacco-derived components, for instance an amount/percentage of 0.1 % to 1.5 %, preferably between 0.1 % and 0.5 % of volatile compounds (tobacco-derived components) containing in the extract/distillate would be sufficient to render the e-liquid a real tobacco flavour and taste.

[0047] The distillate 10 collected is an extract comprising tobacco-derived components. In one embodiment, this extract can be provided to a base solution of an e-liquid for vaping. For instance, the tobacco-derived components may comprise of nicotine, nitrosamine and acetaldehyde when using suitable solvent to extract these volatile compounds. For example, the boiling points of nicotine is 246 °C, nitrosamine is 175 °C and acetaldehyde is 20 °C. Suitable solvents can be used to extract interested volatile compounds within the common knowledge of skilled persons.

[0048] The exact identity of the tobacco-derived compounds can be determined by using commonly available methods. For instance the tobacco-derived compounds in E-liquid can be measured using GC (Gas chromatography) with suitable detector such as MS (Mass spectrometer) or FID (Flame Ionisation Detector) or HPLC (High Performance Liquid Chromatography with suitable detector such as MS or RID (Reflective Index Detector) or UVD (Ultra Violet Detector). In all cases MS is the most preferred detector due to the nature of the e-liquid mixture (as it contains many unknown compounds). For determining volatile (moisture) in base tobacco material the moisture meter (balance in IR oven) would be an option.

[0049] Alternatively, the extract 10 obtained through an extractive distillation process can serve directly as a base solution of an e-liquid. For example, the solvent 2 explained in Figure 1 can be glycerol and/or propylene glycol. When the tobacco-containing solvent mixture 6 is heated and reached its boiling point (e.g. glycerol has a boiling point of 290 °C; propylene glycol has a boiling

point of about 188 °C), the solvent (glycerol and/or propylene glycol) vaporized. The vapour 8 is subsequently cooled and condensed, forming a distillate 10. During this distillation process, tobacco-derived components are extracted from the tobacco material 2. However, only those tobacco-derived components of the extract which has a boiling point less than the boiling point of the base solution (e.g. glycerol and/or propylene glycol) are evaporated along with the solvent 2. For this reason, the distillate 10 is particularly pure, without any impurity. When the extract is used as an e-liquid for vaping, no residues will be left in the vaping device. Volatile compounds which have higher boiling points than the boiling point of the base solution is remained as concentrate (from the tobacco-containing solvent mixture 6).

[0050] In another embodiment, the vaporized extract 8 (obtained from heating of the tobacco-containing solvent mixture 6) can be channelled directly to an aerosol-forming agent (of a base solution) such that the vapour can be captured by the aerosol-forming agent of an e-liquid. By doing so, the e-liquid comprises both the aerosol-forming agent as a base solution as well as one or more extracts containing the tobacco-derived components.

[0051] In another example, fine particles of tobacco-containing material can be provided to flask of water, wherein the liquid solution is boiled at its boiling point. Vapour (steam) which contains tobacco-derived components is subsequently channelled to a base solution of an e-liquid (e.g. glycerol and/or propylene glycol) such that trace amount of steam/vapour is trapped in the base solution. The base solution obtained comprises volatile compounds of tobacco extract. As the boiling temperature of the extract is lower than the boiling temperature of the base solution (both glycerol and propylene glycol), therefore the e-liquid contains no impurities.

[0052] To this end, it is reiterated that although different types of volatile tobacco compounds are extracted from the tobacco material to the solvent, only those compounds having a boiling point lower than the solvent are evaporated along with the vaporized solvent. Tobacco compounds which are extracted by the solvent but have boiling points higher than the base solution will hence remained in the tobacco-containing solvent solution of the flask as a concentrate. It is disclosed herein that although the concentrate is sometimes added into e-liquid due to the fact that concentrates are extracts that have been made more potent, it poses problem to the vaping device as residues usually accumulate at the vaping device, causing fouled smell and requires often cleaning of the device or even replacement of the heating element.

[0053] It is also foreseeable that two different types of solvents may be provided to the flask to extract different compounds of the tobacco material. For example, a first solvent may have an aqueous character and a second solvent may not immiscible with the first solvent. By doing this, hydrophobic and hydrophilic volatile compounds and/or flavouring organic compounds can be extracted

by their respective solvents and subsequently a higher purity extract (distillate) can be collected. This method would ensure richer tobacco compounds can be extracted. The e-liquid which comprises one or more of such extracts are certainly preferred by most users due to its rich and natural tobacco flavour and smell.

[0054] In some preferred embodiments of the invention, tobacco leaves are macerated in one or more solvents. In some embodiments, the solvents may comprise a polar and/or a non-polar solvent (e.g., ethyl alcohol, hexane, etc.). In certain preferred embodiments, the first solution and/or the second solvent comprises ethanol. In some embodiments, the first solution and/or the second solution comprises water and/or water-miscible liquid(s). In some embodiments, the second solution comprises propylene glycol (PG), vegetable glycerin (VG), or a combination of both. In some embodiments, the first solution comprises pure grain alcohol. In some embodiments, the first solution comprises about 76% ethanol and about 24% water. The percentage (v/v) of first solvent to second solvent in the first solution and/or the second solution may vary. The percentage (w/v) of tobacco leaves to solution may also vary. Various types of tobacco leaves may be used, according to preference. In some embodiments of the invention, the types of cured tobacco are chosen for properties which would closely represent a real cigarette.

[0055] The tobacco-containing solvent mixture (solvent comprising tobacco-containing material) are preferably mixed vigorously (shaken, vortexed, etc.) to extract the desired compounds that are in the tobacco leaf. In some embodiments, the mixture may be gently heated to assist the maceration. In some embodiments, the mixture may be left for a period of time (e.g., days, weeks, months). The mixture may be agitated (constantly, at random, or at predetermined intervals), during the soaking time.

[0056] The macerated solution is then strained, removing the rough tobacco matter. In some embodiments, the tobacco parts may be pressed to remove as much liquid as possible. The macerated solution is preferably strained through a filter suitable for removing any of the larger particles. In some embodiments, the resulting strained liquid is approximately 70 to 95 percent of the volume of the macerated solution.

[0057] The tobacco-containing solvent mixture (where the first solution (distillate) is obtained from) may be removed by various means known to those of ordinary skill in the art. In some embodiments, the first solution is collected by heating the strained solution in a distillation unit until the first vaporized extract is collected (e.g., as shown in the FIG. 1). The temperature and time required for the distillation may be determined by those of ordinary skill in the art depending on the type of the solvent that is used. For example, for a solution comprising about 76% ethanol and about 24% water, the liquid may be heated to about 78 °C to collect the first solvent as a distillate, or to about 100 °C if it is water. The distillate is thus pure

and can be used directly as a base solution of an e-liquid, or can instead be provided to a base solution of an e-liquid. In another embodiment, the first solution may comprise of up to 95 wt. % glycerine and propylene glycol and the remaining is made up of ethanol and/or water. This embodiment has the advantage that richer tobacco flavour is obtained as different tobacco-derived components are extracted by different composition of the first solution. In a further embodiment, less than 3 % by weight of ethanol is provided in the first solution. The ethanol may not be only pure ethanol but may also be 75 % ethanol. The vaporized extract may then be channelled to a second solution comprise of only propylene glycol and glycerine, serving to condense the vapour.

[0058] The tobacco material can vary. Examples of suitable tobaccos include flue-cured, Burley, and Oriental tobaccos, as well as the rare or specialty tobaccos. The tobacco material can be in the form of laminae and/or stem, or can be in a processed form. Tobacco waste materials and processing by-products such as fines, dust, scrap, stems and stalks can be employed. The aforementioned materials can be processed separately, or as blends thereof.

[0059] The tobacco material can have a variety of sizes for the first extraction. For example, the tobacco can be in strip form or cut filler form. Alternatively, the tobacco can be ground to a powder of fine size. Small particle size tobacco materials are desirable in order to provide for increased extraction efficiency as well as decrease the time period over which extraction may occur.

[0060] To this end, it is reiterated that the tobacco material may be contacted with a solvent having an aqueous character. Such a solvent consists primarily of water, and can be essentially pure water in certain circumstances, or ionic water. However, the solvent can include water having substances such as pH buffers or the like dissolved therein. The solvent also can be a co-solvent mixture of water and minor amounts of one or more solvents which are miscible therewith. An example of such a co-solvent mixture is a solvent consisting of 95 parts water and 5 parts ethanol. Of course, another ratios are also possible.

[0061] The amount of tobacco material which is contacted with the solvent can vary. Typically, the weight of first solvent relative to the (dried) tobacco material is greater than 5:1, oftentimes greater than 10:1 and in certain instances greater than 20:1. The amount of solvent relative to tobacco material depends upon factors such as the type of solvent, the temperature at which the extraction is performed, the type or form of tobacco which is extracted, the manner in which contact of the tobacco material and solvent is conducted, and other such factors. The manner of contacting the tobacco material and first solvent is not particularly critical.

Example 1

[0062] A starting material of 10 % of tobacco-contain-

ing material by dry weight and 90 % by weight of a mixture of solvent comprising 50 % propylene glycol and 50 % glycerol was placed in a flask. The solvent mixture 6 was left in a room temperature for at least an hour.

[0063] Distillation was commenced and carried out by heating the flask slowly to a maximum temperature of 300 °C. Distillation was stopped when about 60% by weight of the starting material was collected as a distillate. In this manner the desired volatile compounds (tobacco-derived components) were obtained to the exclusion of bad tasting impurities. To this end, it was observed that a top quality of distillate can be obtained from the first 10 % to about 40 % distillate as most of the tobacco volatile compounds were constantly being released at that distillation phase.

[0064] Analysis of the resulting PG/VG-tobacco distillate product revealed a dissolved matter concentration of 600 parts per million or 0.06 % by weight. This dissolved matter consisted of a complicated chemical mixture which may be formed largely by the desired tobacco-derived components.

[0065] Weaker distillate concentrations of 0.02 % and 0.01 % by weight of dissolved matters were prepared from the above by adding two parts of PG/VG solvent and five parts of PG/VG solvent to one part of the 0.04% distillate above.

[0066] Subsequent experiment showed that the most preferred results for rich and real tobacco taste and flavour of e-liquid were attained when the e-liquid contained approximately 0.03 % of dissolved matter by weight. It was noticed that e-liquid containing below 0.015 %, the natural tobacco flavour and taste were difficult to notice and that above 0.10 % the e-liquid was not preferred by users as the tobacco taste was too strong.

Claims

1. An e-liquid for vaping, comprising an aerosol-forming agent as a base solution of the e-liquid, wherein the e-liquid comprises one or more extracts (10) from tobacco-containing material (4) such as vaporized extracts comprising tobacco-derived components, having a specific boiling point, wherein the boiling point of the extract (10) is not higher than the boiling point of the base solution.
2. The e-liquid according to claim 1, wherein the extract (10) is a distillate.
3. The e-liquid according to claim 1 or 2, wherein the boiling point of the extract (10) and/or the base solution is less than about 300 °C, preferably less than 200 °C, preferably about 100 °C, preferably between 150 °C and 300 °C.
4. The e-liquid according to any one of the preceding claims, wherein the boiling point of the extract (10)

and/or the base solution is between about 75 °C and 300 °C, preferably between 160°C and 290 °C, more preferably between 271 °C and 300 °C or most preferably between 240 °C and 290 °C.

5. The e-liquid according to any one of the preceding claims, wherein the e-liquid comprises two or more solvents as a base solution, wherein one, two or more of the solvents are aerosol-forming agents.
6. The e-liquid according to any one of the preceding claims, wherein the tobacco-containing material has an average particle size of about less than about 5 mm, preferably less than about 3 mm or less than about 2 mm, or more preferably between about 0.01 mm and about 1 mm.
7. The e-liquid according to any one of the preceding claims, wherein the extracts are extracted from tobacco-containing material with one or more solvents selected from a list consisting of propanol glycol, glycerine, 1,3-propane-diol, water and ethanol.
8. A method of producing e-liquid for vaping, comprising the steps of:
 - a. Providing tobacco-containing material into fine particles, preferably through milling, pulverization, granulation, filtration and combinations thereof;
 - b. Providing the fine particles of tobacco-containing material in a solvent, thereby producing a tobacco-containing solvent mixture; optional mixing the tobacco-containing solvent mixture;
 - c. Extracting the tobacco-containing solvent mixture with a distillation at a temperature not higher than the boiling point of the base solution to provide a first solution which comprises distillate including tobacco-derived components.
 - d. Collecting the first solution.
9. The method according to claim 8, further comprising a step in between step (a) and step (b) by filtering out fine particles having particle sizes larger than 5 mm, preferably larger than about 3 mm or larger than about 2 mm, or more preferably larger than about 1 mm to provide filtered fine particles.
10. The method according to claim 8 or 9, further comprising a step of providing the distillate or the vaporized extract including tobacco-derived components to a further solvent, forming a second solution as a base solution of the e-liquid, and followed subsequently by collecting the second solution.
11. The method according to any one of the claims 8-10, further comprising a step of purifying the distillate including tobacco-derived components obtained

from the tobacco-containing solvent mixture such as to provide a purified distillate including tobacco-derived components.

12. The method according to any one of the claims 8-11, further comprising a step of double distillation. 5
13. The method according to any one of the claims 8-12, wherein the distillate is obtained through simple distillation, steam distillation, dry distillation, vacuum distillation, fractional distillation and/or short path distillation. 10
14. An e-liquid obtainable from one of the methods of claim 8 to claim 13. 15

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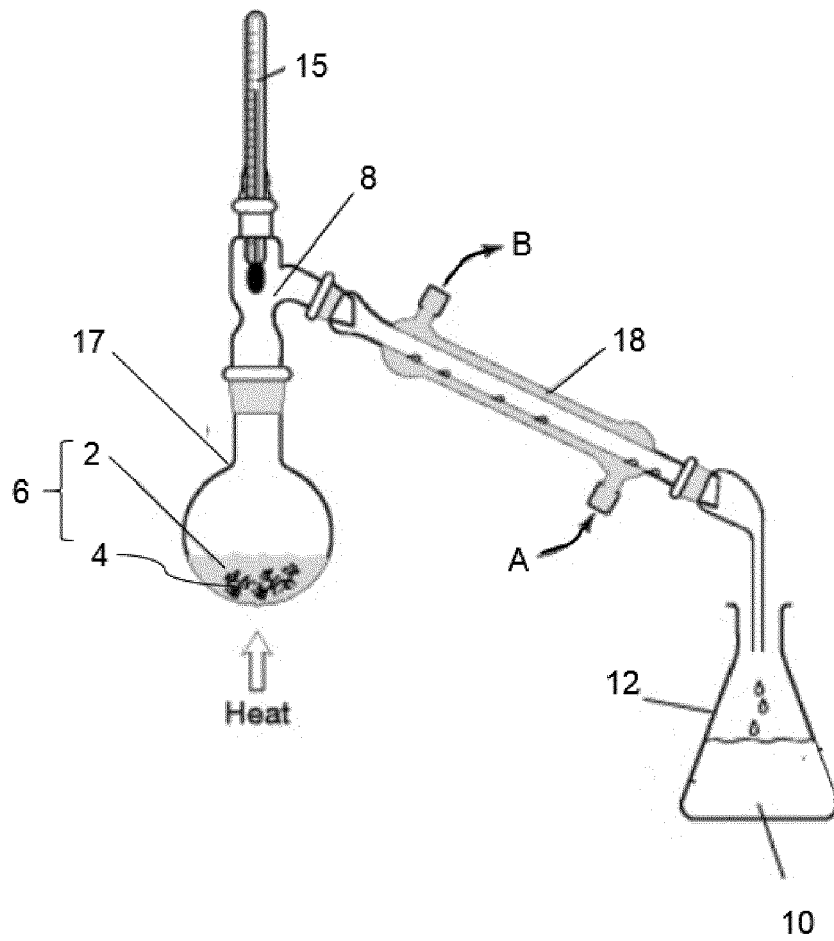


FIGURE 1



EUROPEAN SEARCH REPORT

Application Number
EP 20 17 8518

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2016/360780 A1 (FUJISAWA YOSHINORI [JP] ET AL) 15 December 2016 (2016-12-15) * paragraphs [0068], [0069], [0074] * -----	1-14	INV. A24B15/167 A24B15/24 A24F47/00
X	US 2017/245543 A1 (KARLES GEORGIOS D [US] ET AL) 31 August 2017 (2017-08-31) * paragraph [0090] * -----	1-14	
A	WO 2016/051334 A1 (PHILIP MORRIS PRODUCTS SA [CH]) 7 April 2016 (2016-04-07) * page 5, line 30 - page 6, line 7 * -----	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			A24B A24F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 November 2020	Examiner Villányi Kelemen, K
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 17 8518

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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30-11-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2016360780 A1	15-12-2016	CA 2940680 A1	03-09-2015
		CN 106028844 A	12-10-2016
		EP 3111784 A1	04-01-2017
		ES 2693227 T3	10-12-2018
		JP 6101859 B2	22-03-2017
		JP WO2015129679 A1	30-03-2017
		KR 20160110997 A	23-09-2016
		PL 3111784 T3	30-04-2019
		RU 2639111 C1	19-12-2017
		TW 201538089 A	16-10-2015
		US 2016360780 A1	15-12-2016
		WO 2015129679 A1	03-09-2015
US 2017245543 A1	31-08-2017	CA 3010875 A1	31-08-2017
		CN 108601390 A	28-09-2018
		EP 3419442 A1	02-01-2019
		EP 3725169 A1	21-10-2020
		JP 2019507592 A	22-03-2019
		KR 20180115688 A	23-10-2018
		RU 2018133584 A	25-03-2020
		RU 2020124145 A	04-08-2020
		US 2017245543 A1	31-08-2017
		WO 2017144705 A1	31-08-2017
WO 2016051334 A1	07-04-2016	CN 107105755 A	29-08-2017
		EP 3200624 A1	09-08-2017
		JP 2017530705 A	19-10-2017
		KR 20170066333 A	14-06-2017
		RU 2017114632 A	02-11-2018
		SG 11201701934V A	27-04-2017
		US 2017273351 A1	28-09-2017
		WO 2016051334 A1	07-04-2016