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(54) **REGULATOR FOR SMOKING FLAVOR OF TOBACCO**

(57) Herbs or citrus are added to a tobacco flavoring agent containing ascorbic acid, a salt or isomer thereof, and a chlorophyll-containing material, thereby lowering the tar or nicotine content of tobacco smoke, softening the nicotine smell and unpleasant or irritating odors produced during smoking, and endowing the tobacco with an original flavor. This tobacco flavoring agent may be used by being deposited on the tips of cigarettes or other tobacco products, or by being mixed with shredded tobacco leaves.

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Description

TECHNICAL FIELD

5 [0001] The present invention relates to a tobacco flavoring agent that softens the unpleasant or irritating odor during smoking and provides a mild flavor by being deposited on tobacco during smoking.

BACKGROUND ART

10 [0002] The tar and nicotine contained in tobacco smoke determine the flavor intensity of tobacco, its irritancy, and the degree to which it is harmful. As used herein, the term "tobacco smoke" refers to both primary and secondary smoke, and the term "flavor or the like" refers both to the flavor or taste of the primary smoke inhaled directly by the smoker and to the secondary smoke inhaled by the people nearby.

[0003] In view of this, tobacco flavoring agents are commercially available for lowering the tar or nicotine content of tobacco smoke, whereby the nicotine smell or other unpleasant or irritating odors generated during smoking are softened, the flavor enjoyed by the smoker is improved, and the impact on the people nearby is reduced.

[0004] Tobacco flavoring agents comprise powders that are deposited on the tips of tobacco products during smoking and are allowed to burn together with the tobacco. Components of such agents commonly include ascorbic acid, whose reducing action lowers the nicotine or tar content and softens the flavor, and comfrey powder for reducing the nicotine smell and softening the flavor through the action of chlorophyll. Further to improve the taste, the components used sometimes include menthol to afford a sensation of freshness, and vanillin to create a sweet aroma.

[0005] The flavor created by the conventional tobacco flavoring agents is limited, however, to merely softening the nicotine smell or irritating odor or additionally providing a refreshing sensation with menthol or creating a sweet aroma with vanillin, thus significantly narrowing the ranges of possible flavors and failing to adequately meet the diversified demands of contemporary smokers.

[0006] An object of the present invention, which is aimed at overcoming the shortcomings of prior art, is to provide a novel tobacco flavoring agent for reducing the tar or nicotine content of tobacco smoke, thereby reducing the nicotine smell and other unpleasant or irritating odors during smoking and improving the flavor, wherein this tobacco flavoring agent is capable of a heretofore unobtainable original flavor; and also to provide a tobacco in which this tobacco flavoring agent is used more efficiently.

DISCLOSURE OF THE INVENTION

[0007] As a result of extensive research into additives that can be blended with tobacco flavoring agents in such a way that the flavor afforded by the tobacco flavoring agents complements the inherent aroma of the tobacco and provides both the smokers themselves and the people nearby with an original aroma, the inventor perfected the tobacco flavoring agent of the present invention upon discovering that adding herbs or citrus is effective for this purpose. The inventor also developed a tobacco product containing the tobacco flavoring agent of the present invention upon discovering that, as a preferable embodiment of this tobacco flavoring agent, the effect of the tobacco flavoring agent can be further enhanced by mixing the tobacco flavoring agent with tobacco leaves and dispersing the components rather than depositing the flavoring agent on the tip of the tobacco product.

[0008] That is, the present invention provides, as a first tobacco flavoring agent, a tobacco flavoring agent containing ascorbic acid, a salt or isomer thereof, and a chlorophyll-containing material, wherein this tobacco flavoring agent further contains herbs.

[0009] The present invention also provides, as a second tobacco flavoring agent, a tobacco flavoring agent containing ascorbic acid, a salt or isomer thereof, and a chlorophyll-containing material, wherein this tobacco flavoring agent further contains citrus.

[0010] Also provided is a flavored tobacco obtained by admixing the tobacco flavoring agent of the present invention into shredded tobacco leaves.

BEST MODE FOR CARRYING OUT THE INVENTION

[0011] The present invention will now be described in detail.

[0012] The first tobacco flavoring agent of the present invention contains ascorbic acid, a salt or isomer thereof, and a chlorophyll-containing material, as well as herbs.

[0013] Here, the ascorbic acid and the salts or isomers thereof are used to reduce the content of tar, nicotine, and carbon monoxide in tobacco smoke in the same manner as in the case of conventional tobacco flavoring agents, thereby softening the nicotine smell and other unpleasant or irritating odors during smoking. Examples of ascorbic acid

and salts or isomers thereof include D- and L-ascorbic acids, sodium salts thereof, and other salts, of which L-ascorbic acid (Vitamin C) is preferable for use.

[0014] The chlorophyll-containing materials are used in order to soften the unpleasant odor of tobacco, and particularly to eliminate the nicotine smell and to soften the flavor, by the action of the chlorophyll. Various chlorophyll-containing powders or liquids can be used as such chlorophyll-containing materials. It is possible to use comfrey, chlorella, chlorophyll, and the like in the form of powders, pastes, or liquids. Of these, comfrey powder is preferred because it improves the adhesion of the tobacco flavoring agent to the tobacco in addition to providing excellent deodorization. In addition, chlorella powder is preferred from the standpoint of color coordination and stability.

[0015] Herbs are used characteristically in the first tobacco flavoring agent of the present invention, making it possible to produce an original mild flavor by blending the inherent tobacco aroma with the herbal fragrance.

[0016] Various aromatic plants can be used as such herbs, of which lavender and rosemary are preferred from because the resulting tobacco flavoring agent exudes durable fragrance during smoking or storage. In addition, a single herb may be used, or a plurality of them may be used together.

[0017] The properties of the herbs are not subject to any particular limitations, and powders, oils, extracts, or the like may be used. In particular, pulverized products are preferred because they allow the powder properties of the entire tobacco flavoring agent to be improved. In addition, when oils, extracts, or other liquid products are used, they should preferably be allowed to impregnate lecithin or another powdered substrate in advance.

[0018] Various components may be admixed as needed in addition to the aforementioned components into the first tobacco flavoring agent of the present invention. For example, menthol, vanillin, and the like can be admixed in order to afford a sensation of freshness or a sweet aroma to the flavor. Stevia or the like can be admixed in order to impart sweetness. Fatty acids (stearic acid, oleic acid, and the like), boric acid, and the like can be admixed in order to fix volatile nicotine and to facilitate tar decomposition at high temperatures. Malic acid, citric acid, or the like can be admixed in order to facilitate the formation of nicotine organic acid salts, to reduce the amount of volatile free nicotine, to promote the conversion of nicotine to nicotinic acid during burning, and to soften the irritating odor during smoking. Lecithin or the like can be admixed in order to improve powder properties. In addition, potassium nitrate or the like can be admixed as a combustion aid during tobacco lighting. It is also possible to admix lactose, maltose, vegetable oils and fats, Chinese matrimony vine, glycyrrhizin, *Sasa albo-marginata*, licorice, *Ganoderma lucidum karst*, arrowroot leaves, and various other components.

[0019] The ratios in which the components are admixed into the first tobacco flavoring agent can be appropriately set depending on the type, properties, and other parameters of the components being admixed. Under ordinary conditions, the ascorbic acid or salts or isomers thereof should be used preferably in an amount of 5-15 wt%, and more preferably 8-10 wt%. When in the form of powders, the chlorophyll-containing materials should be used preferably in an amount of 10-20 wt%, and more preferably 14-18 wt%. In addition, when the herbs are used as powders, their amount is preferably 3-8 wt%, and more preferably 5-8 wt%.

[0020] The first tobacco flavoring agent can also be obtained by grinding and mixing the components into a powder as needed.

[0021] Meanwhile, the second tobacco flavoring agent of the present invention involves the use of citrus instead of the herbs used in the first tobacco flavoring agent described above. This yields an original mild flavor in which the citrus fragrance is blended with the inherent aroma of tobacco.

[0022] The properties of citrus are not subject to any particular limitations, and powders, oils, extracts, or the like may be used. In particular, pulverized products are preferred because they allow the powder properties of the entire tobacco flavoring agent to be improved. In addition, when oils, extracts, or other liquid products are used, they should preferably be allowed to impregnate lecithin or another powdered substrate in advance.

[0023] Furthermore, the types of citrus are not subject to any particular limitations and include lemon, lime, citron, orange, *sudachi*, *kabosu*, tangerine, Japanese summer orange, *ponkan*, *iyokan*, *hassaku*, kumquat, bitter orange, and pomelo(shaddock). Lemon is particularly preferred. Of lemon parts, ground lemon rind is preferred.

[0024] The ratio in which citrus is admixed can be appropriately set depending on the type or properties of the citrus to be admixed. For example, 20-30 wt% should preferably be admixed when lemon powder is used.

[0025] Components other than citrus can be admixed into the second tobacco flavoring agent in the same manner (in terms of types and mixing ratios of the components) as in the case of the first tobacco flavoring agent.

[0026] The first and second tobacco flavoring agents of the present invention are characterized by containing solely herbs or citrus, respectively, but these agents also include embodiments in which each of them contains both herbs and citrus.

[0027] The first and second tobacco flavoring agents of the present invention are not subject to any particular limitations in terms of the manner in which these agents are used. Examples include cigarettes, shredded tobacco, and other tobacco products. In the specific example of a cigarette with one unit weight of about 1 g, the tobacco flavoring agent is deposited in an amount of 1-50 mg, and preferably 1-10 mg, on the lighting tip of the cigarette and burned together with the cigarette, or the tobacco flavoring agent is admixed in an amount of 0.01-5 wt% into shredded tobacco leaves,

a flavored tobacco product in which the agent is dispersed throughout the entire product is prepared, and the product is used as shredded tobacco for cigarettes, pipes, traditional Japanese pipes, hand-rolled cigarettes, and the like.

[0028] The latter method is preferable for the use of tobacco flavoring agents because of their more efficient utilization, and particularly because of the higher efficiency with which the nicotine content of tobacco smoke is reduced. Consequently, the present invention includes flavored tobacco obtained by admixing the tobacco flavoring agent of the present invention into shredded tobacco leaves. Of flavored tobacco products, those in the form of cigarettes are preferred because the end user can easily inhale tobacco smoke by performing operations identical to those performed when handling conventional cigarettes devoid of tobacco flavoring agents.

Examples

[0029] The present invention will now be described in detail on the basis of its examples.

Working Example 1, Working Example 2, Comparative Example 1, Comparative Example 2, and Comparative Example 3

[0030] Components were mixed in the mixing ratios shown in Table 1, yielding powdered tobacco flavoring agents.

Evaluation

(1) Organoleptic Test of Flavor

[0031] The tobacco flavoring agents of Working Examples 1 and 2 as well as Comparative Examples 1 and 2 were each deposited in an amount of 6 mg on the tip of a tobacco product ("Peace"), the tobacco product was lighted, and the flavor was organoleptically evaluated. In addition, a tobacco product on which no tobacco flavoring agent had been deposited was lighted as Comparative Example 3 (blank), and the flavor thereof was organoleptically evaluated. The evaluation results are shown in Table 1.

(2) Measurement of Nicotinic Acid in Primary Smoke

[0032] Tobacco products were suctioned at a suctioning rate of about 3 minutes per cigarette from the side opposite the lighted side, and the nicotinic acid in the suctioned gas (primary smoke) was absorbed by a nicotinic acid absorbent solution (1 N sodium hydroxide) in cases in which the tobacco flavoring agents of Working Examples 1 and 2 and Comparative Examples 1 and 2 were each deposited in an amount of 6 mg on the tips of tobacco products ("Peace"), and the tobacco products were lighted, and in a case in which a tobacco product on which no tobacco flavoring agent had been deposited was lighted as Comparative Example 3 (blank). Such nicotinic acid absorption was performed for 20 tobacco products, and the nicotinic acid content of the nicotinic acid absorption solution was determined by the bioassay method according to the guidelines for food and sanitation inspection under the supervision of the Environmental Health Bureau of the Welfare Ministry.

[0033] The results are shown in Table 1. These results indicate that in comparison with the case (Comparative Example 3) in which smoking was performed without the use of a tobacco flavoring agent, the use of the tobacco flavoring agents of Working Examples 1 and 2 had increased the content of nicotinic acid in primary smoke by a factor of about 1.6, and the biologically hazardous nicotine contained in the primary smoke had been efficiently converted to nicotinic acid. In addition, a comparison between the results of Working Examples 1 and 2 and the results of Comparative Examples 1 and 2 indicates that the lavender powder, rosemary powder, or lemon powder admixed in the Working Examples in order to obtain an original flavor did not impede the efficiency with which the tobacco flavoring agents converted nicotine to nicotinic acid.

(3) Measurement of Tar in Primary Smoke

[0034] Inhaled gas (primary smoke) was suctioned via a glass-fiber filter from the side opposite the lighted side and absorbed by an absorbent solution in cases in which the tobacco flavoring agents of Working Examples 1 and 2 and Comparative Examples 1 and 2 were each deposited in an amount of 6 mg on the tips of tobacco products ("Peace"), and the tobacco products were lighted, and in a case in which a tobacco product on which no tobacco flavoring agent had been deposited was lighted as Comparative Example 3 (blank). The glass-fiber filters were washed with the absorbent solution when a section of tobacco extending over a distance of 1 cm from the tip had been consumed, and when a section of tobacco extending over a distance of 1 to 4 cm from the tip had been consumed. The glass-fiber filters were dried, and the increase in the weight of these glass-fiber filters was termed the tar content.

[0035] The results are shown in Table 1. This table shows three tar contents; (i) the tar content resulting from the consumption of the section extending 1 cm from the tip, (ii) the tar content resulting from the consumption of the section extending 1 to 4 cm from the tip, and (iii) the combined tar content ((i)+(ii)).

[0036] The results indicate that using the tobacco flavoring agents of Working Examples 1 and 2 reduced the tar content of primary smoke by about 20% in comparison with smoking in which no tobacco flavoring agents were used (Comparative Example 3). In addition, a comparison between the results of Working Examples 1 and 2 and the results of Comparative Examples 1 and 2 indicates that the lavender powder, rosemary powder, or lemon powder admixed in the Working Examples in order to obtain an original flavor did not impede the efficiency with which the tobacco flavoring agents reduced the tar content of the primary smoke.

[Table 1]

(Unit: weight part)					
	Working Example 1	Working Example 2	Comparative Example 1	Comparative Example 2	Comparative Example 3
Ascorbic acid	0.5	0.5	0.5	0.5	
Comfrey powder ^{*1}	1.4	1.4	1.6	1.6	
Lavender powder ^{*2}	0.5	-	-	-	
Rosemary powder ^{*3}	0.3	-	-	-	
Lemon powder ^{*4}	-	3.0	-	-	
Menthol	0.1	0.6	0.3	0.5	
Vanillin ^{*5}	0.5	1.0	0.8	1.4	
Boric acid	0.4	0.6	0.6	0.6	
Stearic acid	1.0	1.0	1.4	1.4	
Malic acid	0.5	0.5	0.5	0.5	
Citric acid	0.5	0.5	1.0	0.5	
Lactose	1.0	1.0	1.2	1.2	
Stevia ^{*6}	0.4	0.5	0.5	0.4	
Lecithin ^{*7}	3.2	3.2	3.2	3.2	
Potassium nitrate ^{*8}	0.4	0.4	0.4	0.4	
Evaluation (1) Flavor	Original herb flavor with suppressed nicotine smell or irritating odor	Original lemon flavor with suppressed nicotine smell or irritating odor	Conventional mild sweet flavor with suppressed nicotine smell or irritating odor	Conventional strong sweet flavor with suppressed nicotine smell or irritating odor	Flavor with strong nicotine smell or irritating odor
(2) Nicotinic acid content (μg/20 cigs)	750	755	755	755	475
(3) Tar content (mg/cig) 1cm, 1-4cm, total	0.3, <0.1, 0.3	0.3, <0.1, 0.3	0.3, <0.1, 0.3	0.3, <0.1, 0.3	0.8, 0.6, 1.4

Notes to Table 1

[0037]

- 5 *1 Comfrey powder, manufactured by Takasago Yakuhin KK
- *2 Lavender powder, manufactured by Matsumoto Koryo KK
- *3 Rosemary powder, manufactured by Matsumoto Koryo KK
- *4 Lemon powder, manufactured by Matsumoto Koryo KK
- *5 Vanillin, manufactured by Matsumoto Koryo KK
- 10 *6 Stevia, manufactured by Dainippon Ink Co.,Ltd.
- *7 Lecithin, manufactured by Maruki Honpo KK
- *8 Potassium nitrate, manufactured by Otsuka Chemical Co., Ltd.

Working Example 3, Working Example 4

- 15 **[0038]** Tobacco flavoring agents were prepared in the same manner as in Working Examples 1 and 2 except that the comfrey powder (manufactured by Takasago Yakuhin KK) used in the amount of 1.4 weight parts during the preparation of the tobacco flavoring agents of Working Examples 1 and 2 was replaced with 1.2 weight parts of a chlorella powder (manufactured by Nihon Chlorella KK), yielding the tobacco flavoring agents of Working Examples 3 and 4.
- 20 **[0039]** The tobacco flavoring agents of Working Examples 3 and 4 were used in the same manner as in Working Examples 1 and 2 to organoleptically test the flavor, to measure the nicotinic acid content of primary smoke, and to measure the tar content of primary smoke. According to the results, the flavor was an original herb flavor (Working Example 3) or lemon flavor (Working Example 4) in which the nicotine smell or irritating odor was suppressed in the same manner as in Working Examples 1 and 2, respectively; the tar content was much lower than when smoking was performed without the use of a tobacco flavoring agent (Comparative Example 3); and the content of nicotinic acid was higher.

INDUSTRIAL APPLICABILITY

- 30 **[0040]** The tobacco flavoring agent of the present invention lowers the content of tar or nicotine in tobacco smoke, making it possible to obtain a tobacco flavoring agent that yields an original flavor and softens the nicotine smell and other unpleasant or irritating odors during smoking. In addition, the flavored tobacco of the present invention makes it easier to smoke a tobacco in which the tobacco flavoring agent of the present invention is utilized with higher efficiency.

Claims

1. A tobacco flavoring agent comprising:
 - ascorbic acid;
 - 40 a salt or isomer thereof; and
 - a chlorophyll-containing material, wherein said tobacco flavoring agent further contains a herb.
2. The tobacco flavoring agent according to Claim 1, wherein the agent comprises the herb in the form of a powder.
- 45 3. The tobacco flavoring agent according to Claim 1, wherein the agent comprises lavender or rosemary as the herb.
4. The tobacco flavoring agent according to Claim 1, wherein the agent comprises comfrey powder or chlorella powder as the chlorophyll-containing material.
- 50 5. The tobacco flavoring agent according to Claim 1, wherein the agent further comprises potassium nitrate.
6. The tobacco flavoring agent according to Claim 1, wherein the agent further comprises stearic acid or boric acid.
7. The tobacco flavoring agent according to Claim 1, wherein the agent further comprises citric acid or malic acid.
- 55 8. The tobacco flavoring agent according to any one of Claims 1-4, wherein the agent further comprises the following components (a), (b), and (c).

- (a) Potassium nitrate
- (b) Stearic acid or boric acid
- (c) Citric acid or malic acid

5 **9.** A tobacco flavoring agent comprising:

ascorbic acid;
a salt or isomer thereof; and
a chlorophyll-containing material, wherein said tobacco flavoring agent further contains citrus.

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10. The tobacco flavoring agent according to Claim 9, wherein the agent comprises the citrus in the form of a powder.

11. The tobacco flavoring agent according to Claim 9, wherein the agent comprises lemon as the citrus.

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12. The tobacco flavoring agent according to Claim 11, wherein the agent comprises ground lemon rind as the lemon.

13. The tobacco flavoring agent according to Claim 9, wherein the agent comprises comfrey powder or chlorella powder as the chlorophyll-containing material.

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14. The tobacco flavoring agent according to Claim 9, wherein the agent further comprises potassium nitrate.

15. The tobacco flavoring agent according to Claim 9, wherein the agent further comprises stearic acid or boric acid.

16. The tobacco flavoring agent according to Claim 9, wherein the agent further comprises citric acid or malic acid.

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17. The tobacco flavoring agent according to any one of Claims 9-13, wherein the agent further comprises following components (a), (b), and (c).

- (a) Potassium nitrate
- (b) Stearic acid or boric acid
- (c) Citric acid or malic acid

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18. A flavored tobacco, obtained by admixing a tobacco flavoring agent according to any one of Claims 1-17 into shredded tobacco leaves.

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19. The flavored tobacco according to Claim 18, wherein the tobacco is in cigarette form.

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INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER Int.Cl ¹ A24B15/30, 15/32, 15/38, 15/42, A24D1/18 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) Int.Cl ¹ A24B15/30, 15/32, 15/38, 15/42, A24D1/18 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1926-1996 Toroku Jitsuyo Shinan Koho 1994-1998 Kokai Jitsuyo Shinan Koho 1971-1997 Jitsuyo Shinan Toroku Koho 1996-1998 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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Y	JP, 8-332068, A (R.J. Reynolds Tobacco Co.), 17 December, 1996 (17. 12. 96), Par. No. [0022] (Particularly column 8, lines 15 to 21) & EP, 746987, A2	1-19
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
Date of the actual completion of the international search 30 November, 1998 (30. 11. 98)		Date of mailing of the international search report 8 December, 1998 (08. 12. 98)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

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International application No.

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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