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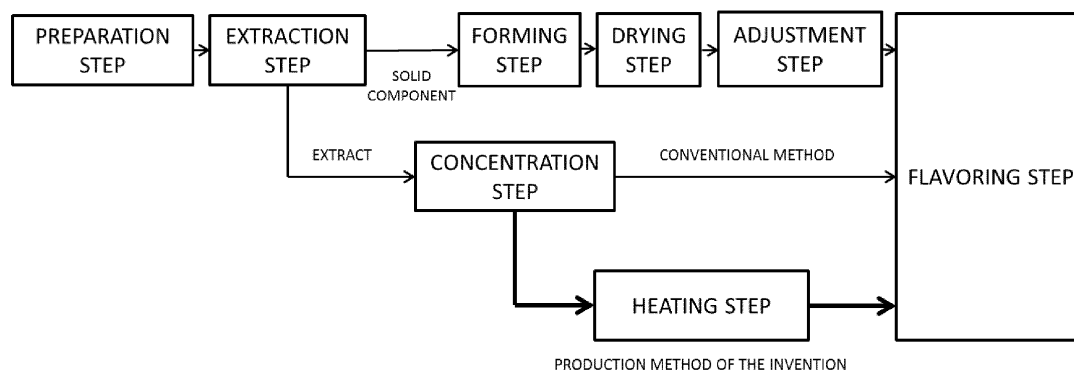
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(54) **METHOD FOR MANUFACTURING SHEET TOBACCO**

(57) The purpose of the present invention is to provide a method for manufacturing sheet tobacco with which it is possible to manufacture sheet tobacco having low formaldehyde emissions. Sheet tobacco having low formaldehyde emissions can be manufactured using a manufacturing method comprising: a preparation step for preparing a tobacco raw material that has a sugar content of at least 15,000 $\mu\text{g/g}$, and a sugar content to glutamine content ratio (sugar content/glutamine content) of 70 or

less; an extraction step for obtaining a liquid extract, using water, from the tobacco raw material prepared in the preparation step; a heating step for heating the liquid extract obtained in the extraction step at 75-100°C for 20-360 minutes; a forming step for forming a residue obtained in the extraction step into a sheet; and an aromatizing step for bringing the liquid extract heated in the heating step into contact with the sheet obtained in the forming step.



PRODUCTION METHOD OF THE INVENTION

Fig.1

Description

[Technical Field]

5 **[0001]** The present invention relates to a method for producing sheet tobacco, and more particularly to a method for producing sheet tobacco that allows producing sheet tobacco of low formaldehyde emissions.

[Background Art]

10 **[0002]** The term "(reconstituted) sheet tobacco" denotes a product obtained by processing, for instance, low-quality leaf tobacco and/or a fine powder of leaf veins, generated in tobacco production processes, and then forming the processed product into a sheet shape by rolling or papermaking technique. Sheet tobacco is used as a partial substitute of shredded tobacco contained in paper-rolled tobacco (cigarettes) or the like.

15 **[0003]** In order to secure taste quality, treatments are carried out, in the production process of such sheet tobacco, that involve for instance extracting beforehand flavor components (flavor extract) from a raw material, and then adding the extract to the formed sheet tobacco.

20 **[0004]** Meanwhile, as is known, combustion smoke of tobacco products contains formaldehyde. Lower aldehydes such as formaldehyde are difficult to remove through adsorption on ordinary smoking filters. It has thus been proposed to add, to the filters, for instance hydrotalcite (see PTL 1) or basic polypeptides (see PTL 2) for selective removal of formaldehyde.

[Citation List]

[Patent document]

25

[0005]

[Patent document 1] WO 2003/056947

[patent document 2] Japanese Patent Application Publication No. 2006-34127

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[Summary of Invention]

[Technical Problem]

35 **[0006]** An object of the present invention is to provide a method for producing sheet tobacco that allows producing sheet tobacco low in formaldehyde emissions themselves.

[Solution to Problem]

40 **[0007]** As a result of diligent research conducted with the aim of attaining the above goal, the inventors found that sheet tobacco of low formaldehyde emissions is obtained, in the production of sheet tobacco, by: (1) preparing a tobacco material that satisfies specific conditions pertaining to sugar content and glutamine content, and (2) performing a heating treatment on an extract obtained through extraction from the tobacco material using an extraction solvent, and adding the extract to the formed sheet, and perfected the present invention on the basis of that finding.

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<1> A method for producing sheet tobacco, including: a preparation step of preparing a tobacco material having a sugar content of 15,000 $\mu\text{g/g}$ or higher and a ratio of sugar content with respect to a glutamine content (sugar content/glutamine content) of 70 or lower; an extraction step of obtaining an extract from the tobacco material prepared in the preparation step by using an extraction solvent containing water; a heating step of heating the extract obtained in the extraction step; a forming step of forming, in the shape of a sheet, a residue obtained in the extraction step; and an flavoring step of bringing the extract having undergone the heating step into contact with the sheet obtained in the forming step.

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<2> The method for producing sheet tobacco according to <1>, wherein the heating temperature in the heating step is 75°C to 100°C.

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<3> The method for producing sheet tobacco according to <1> or <2>, wherein the heating time in the heating step is 20 to 360 minutes.

<4> The method for producing sheet tobacco according to any one of <1> to <3>, including a concentration step of concentrating the extract obtained in the extraction step.

<5> The method for producing sheet tobacco according to <4>, wherein the concentration step is a step of bringing the concentration of a soluble component of the extract to 37 to 39 mass%.

<6> The method for producing sheet tobacco according to any one of <1> to <5>, wherein the heating step is carried out under atmospheric pressure conditions.

<7> The method for producing sheet tobacco according to any one of <1> to <6>, which is a method for producing sheet tobacco in which a ratio of formaldehyde emissions with respect to total particulate matter (TPM) (mass of formaldehyde / mass of TPM) is lower than 0.002.

[Effects of Invention]

[0008] The present invention allows producing sheet tobacco of low formaldehyde emissions.

[Brief Description of Drawing]

[0009]

[Fig. 1]

Fig. 1 is a diagram illustrating a production flow example of the method for producing sheet tobacco of the present invention.

[Description of Embodiment]

[0010] Concrete examples will be described below for explaining in detail the method for producing sheet tobacco of the present invention. Provided that the scope of the invention is not departed from, however, the invention is not limited to the matter below and can be implemented in the form of various modifications, as appropriate.

<Method for producing a tobacco material>

[0011] The method for producing sheet tobacco being one aspect of the present invention (hereafter also referred to as "production method of the present invention") is characterized by having: a preparation step of preparing a tobacco material having a sugar content of 15,000 $\mu\text{g/g}$ or higher and a ratio of sugar content with respect to glutamine content (sugar content/glutamine content) of 70 or lower (hereafter also referred to as "preparation step"); an extraction step of obtaining an extract, using an extraction solvent containing water, out of the tobacco material having been prepared in the preparation step (the present step may also referred to as "extraction step" for short); a heating step of heating the extract obtained in the extraction step (the present step may also referred to as "heating step" for short); a forming step of forming, in the shape of a sheet, a residue obtained in the extraction step (the present step may also referred to as "forming step" for short); and an flavoring step of bringing the extract having undergone the heating step into contact with the sheet obtained in the forming step (the present step may also referred to as "flavoring step").

[0012] As a result of diligent research conducted with the aim of lowering formaldehyde emissions, in particular formaldehyde emissions from sheet tobacco, the inventors found that sheet tobacco of low formaldehyde emissions can be obtained, in the production of sheet tobacco, by: (1) preparing a tobacco material that satisfies specific conditions pertaining to sugar content and glutamine content; and (2) performing a heating treatment on an extract obtained through extraction from the tobacco material using an extraction solvent, and adding the extract to the formed sheet.

[0013] The underlying mechanism for the low formaldehyde emissions is not wholly clear, but it is deemed that sugars and amino acids in the extract undergo aminocarbonyl reactions as the extract is heated, becoming denatured into components that are not prone to generating formaldehyde (the heating temperature in this case lies preferably within a temperature range that does not exceed 100°C, from the viewpoint of preserving the flavor of tobacco in a preferred state). Sugars are deemed to be components that give rise to formaldehyde, and it is found that the sheet tobacco of low formaldehyde emissions is achieved by setting the content of amino acids, in particular the content of glutamine, to be a specific or higher content with respect to the content of sugars. The glutamine that contributes to the present invention is preferably included in the tobacco material, since in that case the original taste of the tobacco is not significantly lost.

[0014] The feature "sugar content of 15,000 $\mu\text{g/g}$ or higher" denotes the sugar content mass per mass of dry tobacco material, and indicates that a comparatively high sugar content in the tobacco material potentially entails large formaldehyde emissions. That is, the production method of the present invention is a method that allows producing superior sheet tobacco of low formaldehyde emissions, through the use of such a tobacco material.

[0015] The language "sugar" in "sugar content" denotes generically the pentasaccharides glucose, fructose, sucrose, maltose and inositol contained in leaf tobacco, and the language "sugar content" denotes the total content mass of the

foregoing.

[0016] Further, it suffices that the conditions "sugar content of 15,000 $\mu\text{g/g}$ or higher" and "ratio of sugar content with respect to glutamine content (sugar content/glutamine content) of 70 or less" be satisfied as average values of the tobacco material as a whole; thus where the tobacco material that is prepared is homogeneous there is no need for all materials to satisfy the above conditions.

[0017] The preparation step, extraction step, heating step, flavoring step and so forth will be explained in detail next.

(Preparation step)

[0018] The preparation step is a step of preparing a tobacco material having a sugar content of 15,000 $\mu\text{g/g}$ or higher and a ratio of sugar content with respect to glutamine content (sugar content/glutamine content) of 70 or lower, but the method for preparing the tobacco material is not particularly limited, and may involve for instance selecting a tobacco material that satisfies the above conditions, or blending tobacco materials so as to satisfy the above conditions.

[0019] As a concrete preparation method there may be blended tobacco materials having features pertaining to the sugar content and the content of amino acids (glutamine), of for instance the "flue-cured variety" and "Burley variety". The term "flue-cured variety" denotes generically tobacco dried in accordance with an iron pipe drying method or circulation drying method; the leaf tobacco in this case is yellow in color and, as is known, has a comparatively high sugar content. The "Burley variety", bred at the Tennessee Agricultural Experiment Station in the US in 1955, is a variety of comparatively high amino acid content. Specifically, by adjusting the blending ratio of the "flue-cured variety" of high sugar content and of the "Burley variety" of high content of amino acids (glutamine) it becomes possible to easily prepare a tobacco material that satisfies the conditions "sugar content of 15,000 $\mu\text{g/g}$ or higher" and "ratio of sugar content with respect to glutamine content (sugar content/glutamine content) of 70 or lower". Tobacco materials may be used other than the flue-cured variety and the Burley variety and may be from a part of the tobacco plant such as the leaves, stems, veins, roots, and flowers. The leaves may be dry leaves having undergone a drying treatment or may be raw leaves not having undergone a drying treatment. As such there is no special limitation on what leaves to be used.

[0020] The sugar content of the tobacco materials that is prepared is preferably 18,000 $\mu\text{g/g}$ or higher, more preferably 20,000 $\mu\text{g/g}$ or higher, and is ordinarily 200,000 $\mu\text{g/g}$ or lower.

[0021] The glutamine content in the tobacco material that is prepared is ordinarily 200 $\mu\text{g/g}$ or higher, preferably 260 $\mu\text{g/g}$ or higher, and ordinarily 3000 $\mu\text{g/g}$ or lower.

[0022] The sugar content with respect to the glutamine content (sugar content/glutamine content) of the tobacco material that is prepared is preferably 50 or lower, more preferably 40 or lower.

[0023] Sheet tobacco of low formaldehyde emissions is produced easily within the above ranges.

[0024] The sugar content can be quantified by extracting components, for instance from a powdered tobacco material, using an acetonitrile aqueous solution or the like, and analyzing the extract as-is by high performance liquid chromatography.

[0025] The glutamine content can be quantified by extracting components, for instance from a powdered tobacco material, using a methanol aqueous solution or the like, and analyzing the extract as-is by high performance liquid chromatography.

(Extraction step)

[0026] The extraction step is a step of obtaining an extract, using an extraction solvent containing water, from the tobacco material having been prepared in the preparation step. The extraction method and the extraction conditions are not particularly limited, and known methods and conditions can be selected as appropriate depending on the purpose.

[0027] Examples of the water-containing extraction solvent that is used for extraction include, as components other than water, for instance inorganic acids, organic acids, and alcohols such as ethanol.

[0028] The water content in the water-containing extraction solvent is ordinarily 5 mass% or higher, and ordinarily 100 mass% or lower, preferably 75 mass% or lower.

[0029] The set temperature during extraction is ordinarily 40°C or higher, preferably 50°C or higher, and ordinarily 70°C or lower. Sheet tobacco of superior taste quality is produced easily within the above ranges.

(Heating step)

[0030] The heating step is a step of heating the extract obtained in the extraction step, but the heating method and so forth are not particularly limited, and known methods can be selected as appropriate depending on the purpose.

[0031] The heating temperature of the extract is preferably 75°C to 100°C, more preferably 80°C or higher, and more preferably 90°C or lower. Sheet tobacco of low formaldehyde emissions is produced easily within the above ranges.

[0032] The heating time of the extract is preferably 20 to 360 minutes, but is more preferably 30 minutes or longer,

yet more preferably 40 minutes or longer, and more preferably 240 minutes or shorter, and yet more preferably 120 minutes or shorter. Sheet tobacco of low formaldehyde emissions is produced easily within the above ranges.

(Forming step)

[0033] The forming step is a step of forming, in the shape(form) of a sheet, a residue obtained in the extraction step, but the forming method and forming conditions are not particularly limited, and known methods and conditions can be selected as appropriate depending on the purpose.

[0034] The forming method is particularly preferably a papermaking method in which the residue having pulp or the like added thereto, as appropriate, is made into a sheet.

(Flavoring step)

[0035] The flavoring step is a step of bringing the extract having undergone the heating step into contact with the sheet obtained in the forming step, but the contact method and contact conditions are not particularly limited, and known methods and conditions can be selected as appropriate depending on the purpose.

[0036] Examples of the contact method that can be selected as appropriate include spray coating, roll coating, gravure coating and the like.

(Other steps)

[0037] So long as the production method of the present invention includes the preparation step, extraction step, heating step and flavoring step described above, there is no special limitation on a method to be employed, and the method may include other known processing steps that are used in order to produce sheet tobacco. Such steps include for instance a concentration step of concentrating the extract obtained in the extraction step, a drying step of drying the sheet obtained in the forming step, an adjustment step of adjusting the sheet to a target temperature and/or target water content, and a drying step of drying the sheet obtained in the flavoring step.

[0038] The concentration step involves bringing the concentration of the soluble component of the extract ordinarily to 30 to 45 mass%, preferably to 35 mass% or higher, more preferably 37 mass% or higher, and preferably 40 mass% or lower and more preferably 39 mass% or lower. Liquid viscosity increases, and handling becomes difficult, when the concentration is excessive, while reaction efficiency tends to worsen when concentration is excessively low.

[0039] The shape, physical properties and so forth of the sheet tobacco produced in accordance with the production method of the present invention are not particularly limited, and can be selected as appropriate depending on the purpose.

[0040] The basis weight of the sheet tobacco is ordinarily 80 g/m² or higher, preferably 90 g/m² or higher, and ordinarily 160 g/m² or lower, preferably 150 g/m² or lower.

[0041] The formaldehyde emissions of the sheet tobacco are ordinarily lower than 0.0020, and preferably no greater than 0.0015 as a ratio (mass of formaldehyde / mass of TPM) with respect to total particulate matter (TPM).

Examples

[0042] The present invention will be explained in more specific terms next using examples, but various modifications can be adopted without departing from the scope of the present invention. Accordingly, the scope of the present invention should not be interpreted as being limited by the concrete examples illustrated below.

(Examples)

[0043] Herein tobacco material A and tobacco material B given in Table 1 were prepared by collecting the lamina, midrib and so forth having dissimilar contents of sugar and of glutamine, and by adjusting as appropriate blending ratios. The sugar content and glutamine content in tobacco material A and tobacco material B were quantified in accordance with the methods below.

<Quantification of sugar content>

[0044] The sugar content of the tobacco materials was quantified as a result of the operation below.

[0045] A tobacco powder was produced from leaf tobacco, using Absolute Mill (ABS-W, by Osaka Chemical Co., Ltd.), then 40 mL of an extraction solvent (acetonitrile: ultrapure water (by MilliQ) = 1:1) were added to 1 g of the tobacco powder, and an ultrasonic treatment was performed for 30 minutes, to extract saccharides. The extract after filtering was quantified, as it was, through analysis by high performance liquid chromatography below.

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- Analysis instrument: high performance liquid chromatography RI detector (JASCO Corporation)

[0046]

5 Column: HPLC NH₂ column (Capcell PakNH₂ UG80, Shiseido Company, Limited)
Mobile phase: 75% acetonitrile (NeCN : distilled water = 75:25)

<Quantification of glutamine content>

10 [0047] The glutamine content of the tobacco material was quantified as a result of the following operation.

[0048] Tobacco powder was produced from leaf tobacco, using Absolute Mill (ABS-W, by Osaka Chemical Co., Ltd.), Amino acids were extracted by adding 20 mL of an extraction solvent (80% methanol (methanol : ultrapure water (by MiliQ) = 8:2)) to 1 g of tobacco powder, and an ultrasonic treatment was performed for 30 minutes, to extract amino acids. The extract after filtering was quantified, as it was, through analysis by high performance liquid chromatography below.

- Analysis instrument: high performance liquid chromatography with diode array (DAD) detector (Agilent 1290)

[0049]

20 Column: Agilent ZORBAX Eclipse AAA
Mobile phase A: 40 mM phosphoric acid buffer solution
Mobile phase B: 45% acetonitrile · 45% methanol aqueous solution
25 Gradient: Yes

[Table 1]

[0050]

30 Table 1

	Sugar content (μg/g-DB)	Glutamine content (μg/g-DB)	Sugar content/glutamine content
Tobacco material A	26,488	664	40
Tobacco material B	38,381	317	121

(1) The prepared tobacco material A, pulp (pulp proportion in the material: 8%), and water so as to yield a solid-liquid ratio of 1:10, were charged into an extractor (model MX-350, by Mitoyo Kakoki, Ltd.), the soluble components were extracted at 60°C, and thereafter solid-liquid separation was carried out using a screw press machine (by Marui Industrial Corporation., Ltd.).

(2) The obtained extract was concentrated using an evaporator (concentration condition: 50°C; concentration of the soluble component: 40%).

(3) The concentrated extract was heated for 40 minutes at 85°C.

(4) The residue obtained through extraction was beaten (freeness degree: 250 mL (CSF: Canadian Standard Freeness)), and the resulting product was formed to yield a sheet, using a forming machine.

(5) The obtained sheet was dried by being passed through a Yankee dryer (80°C).

(6) The heated solution was brought into contact with the adjusted sheet, by means of an flavoring machine (size press) (coating condition: extract component blending ratio 40%-DB, basis weight (final product sheet weight) 130 g/m²-DB).

(7) The obtained sheet was dried by being passed through a tunnel dryer (180°C), and was shredded in a shredding machine.

<Measurement of formaldehyde emissions and total particulate matter (TPM)>

55 [0051] Formaldehyde emissions and total particulate matter (TPM) of the obtained sheet tobacco were measured in accordance with the procedures below.

• Formaldehyde emissions

[0052] Internal air in a quartz tube that held shredded tobacco (200 mg) was replaced by nitrogen through nitrogen streaming (1000 mL/minute) for 30 seconds. Thereafter, the whole was heated for 1 minute (temperature rise conditions: 800°C/minute), inside an infrared lamp heating device; heating was terminated once 800°C were reached, and that state was held for 10 seconds.

[0053] Formaldehyde in the tobacco smoke components thus generated was trapped by being caused to pass through two impingers that held an acetonitrile solution of 2,4-dinitrophenylhydrazine (12 mmol/L, under acidic conditions through addition of phosphoric acid). The collected liquid was filtered using a syringe filter (pore diameter: 0.2 µm, by Merck Millipore), and thereafter was brought to a given volume (10 mL) through addition of 6 mL of a 1% Trizma solution. After adjustment to a given volume, quantification was performed by high performance liquid chromatography with diode array detector (HPLC-DAD).

• Analysis instrument: high performance liquid chromatography with diode array detector (by Agilent Technologies, Agilent 1290 Infinity LC system)

[0054]

High performance liquid chromatography conditions: see "CORESTA RECOMMENDED METHOD N° 74"
1% Trizma solution adjustment method: see "CORESTA RECOMMENDED METHOD N° 74"

• TPM (crude tar)

[0055] Internal air in a quartz tube that held shredded tobacco (200 mg) was replaced by nitrogen through nitrogen streaming (1000 mL/minute) for 30 seconds. Thereafter, the whole was heated for 1 minute until reaching 800°C (temperature rise conditions: 800°C/minute), inside an infrared lamp heating device. Heating was terminated once 800°C were reached, and that state was held for 10 seconds. Crude tar generated by thermal decomposition of the tobacco was trapped in a glass fiber filter, and the amount of tar was measured on the basis of the difference in filter weight before and after heating.

- Equipment: infrared lamp heating device (by ULVAC Technologies, Inc., model: SSA-E45P)
- Glass fiber filter (by Borgwaldt KC GmbH, model: Filer 44 mmφ)

[0056] The ratio of formaldehyde emissions with respect to total particulate matter is given in Table 2.

(Comparative example 1)

[0057] Sheet tobacco was produced in accordance with the same method as that of the example, but herein the concentrated extract was not heated. Formaldehyde emissions and total particulate matter were measured. The ratio of formaldehyde emissions with respect to total particulate matter is given in Table 2.

(Comparative example 2)

[0058] Sheet tobacco was produced in accordance with the same method as in the example, but herein tobacco material B was used instead of tobacco material A. Formaldehyde emissions and total particulate matter were measured. The ratio of formaldehyde emissions with respect to total particulate matter is given in Table 2.

(Comparative example 3)

[0059] Sheet tobacco was produced in accordance with the same method as in the example, but herein tobacco material B was used instead of tobacco material A, and the concentrated extract was not heated. Formaldehyde emissions and total particulate matter were measured. The ratio of formaldehyde emissions with respect to total particulate matter is given in Table 2.

[Table 2]

[0060]

Table 2

	Tobacco material	Heating step	Formaldehyde/TPM
Example	Tobacco material A (S/G=40<70)	Yes	0.0015
Comparative example 1		No	0.0020
Comparative example 2	Tobacco material B (S/G=121>70)	Yes	0.0034
Comparative example 3		No	0.0032

[Industrial Applicability]

[0061] The sheet tobacco obtained in accordance with the production method of the present invention can be used as a substitute product of various types of shredded tobacco of smoking tobacco, such as cigarettes, shag, cigars and the like.

Claims

1. A method for producing sheet tobacco, the method comprising: a preparation step of preparing a tobacco material having a sugar content of 15,000 $\mu\text{g/g}$ or higher and a ratio of sugar content with respect to a glutamine content (sugar content/glutamine content) of 70 or lower; an extraction step of obtaining an extract from the tobacco material prepared in the preparation step by using an extraction solvent containing water; a heating step of heating the extract obtained in the extraction step; a forming step of forming, in the shape of a sheet, a residue obtained in the extraction step; and an flavoring step of bringing the extract having undergone the heating step into contact with the sheet obtained in the forming step.
2. The method for producing sheet tobacco according to claim 1, wherein the heating temperature in the heating step is 75°C to 100°C.
3. The method for producing sheet tobacco according to claim 1 or 2, wherein the heating time in the heating step is 20 to 360 minutes.
4. The method for producing sheet tobacco according to any one of claims 1 to 3, comprising a concentration step of concentrating the extract obtained in the extraction step.
5. The method for producing sheet tobacco according to claim 4, wherein the concentration step is a step of bringing the concentration of a soluble component of the extract to 37 to 39 mass%.
6. The method for producing sheet tobacco according to any one of claims 1 to 5, wherein the heating step is carried out under atmospheric pressure conditions.
7. The method for producing sheet tobacco according to any one of claims 1 to 6, which is a method for producing sheet tobacco in which a ratio of formaldehyde emissions with respect to total particulate matter (TPM) (mass of formaldehyde / mass of TPM) is lower than 0.002.

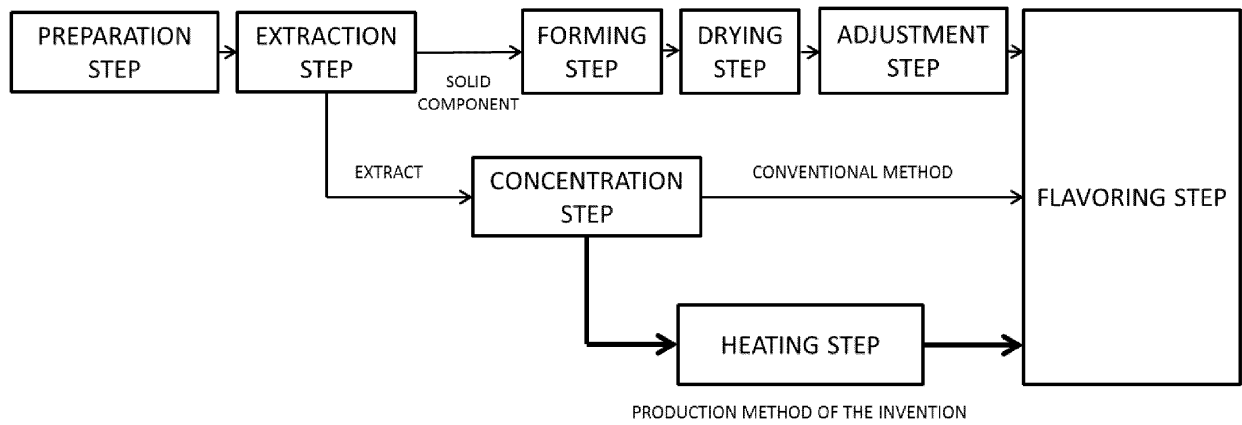


Fig.1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/067160

A. CLASSIFICATION OF SUBJECT MATTER

A24B3/14(2006.01)i, A24B15/24(2006.01)i

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)

A24B3/14, A24B15/24

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2015
Kokai Jitsuyo Shinan Koho	1971-2015	Toroku Jitsuyo Shinan Koho	1994-2015

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5143097 A (R. J. REYNOLDS TOBACCO CO.), 01 September 1992 (01.09.1992), column 2, line 10 to column 6, line 7; fig. 1 (Family: none)	1-7
A	JP 2001-525190 A (Brown & Williamson Tobacco Corp.), 11 December 2001 (11.12.2001), fig. 1 & US 5908034 A & WO 1999/029189 A1 & EP 1039810 A & BR 9813444 A & CA 2313188 A & CN 1281342 A	1-7
A	JP 2004-283107 A (Japan Tobacco Inc.), 14 October 2004 (14.10.2004), paragraphs [0034] to [0036] (Family: none)	1-7

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search
07 September 2015 (07.09.15)Date of mailing of the international search report
15 September 2015 (15.09.15)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

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REFERENCES CITED IN THE DESCRIPTION

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- JP 2006034127 A [0005]