(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 356 760 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
24.04.2024 Bulletin 2024/17

(21) Application number: **21946032.6**

(22) Date of filing: **17.06.2021**

(51) International Patent Classification (IPC):
A24B 15/28 *(2006.01)* ***A24B 13/00*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A24B 13/00; A24B 15/28

(86) International application number:
PCT/JP2021/023020

(87) International publication number:
WO 2022/264355 (22.12.2022 Gazette 2022/51)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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(54) **FLAVOR MOLDED ARTICLE AND PRODUCTION METHOD THEREFOR, TOBACCO MATERIAL PRODUCTION METHOD, AND TOBACCO PRODUCT PRODUCTION METHOD**

(57) Provided is a flavor molded article that is easy to store and transport, that prevents volatilization of flavor components during storage and transport, and that has a sufficient strength and a good flavor. This production method for a flavor molded article comprises: a step for forming a mixture by mixing a tobacco powder material having an average particle size of at most 100 μm with an alcohol having 2-7 carbon atoms; a step for compression-molding the mixture; and a step for removing at least a portion of the alcohol from the mixture.

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Description

TECHNICAL FIELD

[0001] The present invention relates to a flavoring molded body, a method for producing the flavoring molded body, a method for producing a tobacco material, and a method for producing a tobacco product.

BACKGROUND ART

[0002] Examples of methods for imparting a flavor to a tobacco product in a uniform manner include a method for adding a flavoring agent which is disclosed in PTL 1, which includes suspending particles of leaf tobacco in a dispersion medium and adding the resulting dispersion liquid to raw leaf tobacco by spraying or the like.

[0003] Examples of tobacco products include the tobacco tablets for oral use which are disclosed in PTLs 2 and 3. A binder is commonly used for molding tobacco tablets for oral use.

[0004] PTL 4 discloses a technique in which shredded tobacco having a shred width of 0.6 to 1 mm is caused to age in an air atmosphere under hermetically sealed conditions and a polyol is added to the aged shredded tobacco, in order to produce a tobacco material in which the compositions of an enhanced ester fragrance component and a component that contributes to inhaling flavor are unlikely to change with time.

CITATION LIST

PATENT LITERATURE

[0005]

PTL 1: International Publication No. 2014/185103
PTL 2: Japanese Unexamined Patent Application Publication No. 2017-79764
PTL 3: Japanese Unexamined Patent Application Publication No. 2012-85643
PTL 4: International Publication No. 2013/098920

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0006] In the case where a tobacco raw material provided in the form of a fine powder is used as a flavoring agent raw material as in the method for adding a flavoring agent which is disclosed in PTL 1, dust particles may fly during the storage or transportation of the powder raw material, the amount of powder raw material may be reduced, and a flavor component may volatilize from the powder raw material. Accordingly, the development of a flavoring molded body which can be readily stored and transported and from which a flavor component is unlikely to volatilize during storage and transportation has been anticipated.

[0007] The binder used for molding the tobacco tablets for oral use enhances the moldability (i.e., strength) of the tablets, but may degrade the flavor of the tablets. Accordingly, the development of a flavoring molded body that has a sufficiently high strength and a suitable flavor has been anticipated.

[0008] An object of the present invention is to provide a flavoring molded body which can be readily stored and transported, from which a flavor component is unlikely to volatilize during storage and transportation, and which has a sufficiently high strength and a suitable flavor, and a tobacco material and a tobacco product produced using the flavoring molded body.

SOLUTION TO PROBLEM

[0009] The present invention includes the following aspects.

[0010]

[1] A method for producing a flavoring molded body, the method including:

mixing a tobacco raw material powder having an average particle size of 100 μm or less with an alcohol having 2 to 7 carbon atoms to form a mixture;
molding the mixture by compression molding; and

removing at least a part of the alcohol from the mixture.

[2] The method for producing a flavoring molded body according to [1], wherein the alcohol is at least one alcohol selected from the group consisting of ethanol, 2-propanol, and benzyl alcohol.

[3] The method for producing a flavoring molded body according to [1] or [2], wherein, in the step of forming the mixture, 1 to 20 parts by mass of the alcohol is mixed with 100 parts by mass of the tobacco raw material powder.

[4] The method for producing a flavoring molded body according to any one of [1] to [3], wherein, in the step of removing at least a part of the alcohol, at least a part of the alcohol is removed at 10°C to 40°C.

[5] The method for producing a flavoring molded body according to any one of [1] to [4], wherein a compression rupture strength of the flavoring molded body, the compression rupture strength being determined using a tablet hardness tester with a wedge-shaped plunger, is 10 to 200 N.

[6] The method for producing a flavoring molded body according to any one of [1] to [5], wherein the tobacco raw material powder is a fine leaf tobacco powder produced when leaf tobacco is shredded in production of a tobacco product.

[7] The method for producing a flavoring molded body according to any one of [1] to [6], wherein the flavoring molded body is tobacco for oral use.

[8] A method for producing a tobacco material, the method including:

preparing a flavoring molded body by the method according to any one of [1] to [6]; and
adding the flavoring molded body to a dispersion medium to prepare a tobacco material including the dispersion medium and the tobacco raw material powder dispersed in the dispersion medium.

[9] A method for producing a tobacco product, the method including:

preparing a tobacco material by the method according to [8]; and
adding the tobacco material to a tobacco product.

[10] A flavoring molded body produced by the method according to any one of [1] to [7].

ADVANTAGEOUS EFFECTS OF INVENTION

[0011] According to the present invention, a flavoring molded body which can be readily stored and transported, from which a flavor component is unlikely to volatilize during storage and transportation, and which has a sufficiently high strength and a suitable flavor, and a tobacco material and a tobacco product produced using the flavoring molded body can be provided.

DESCRIPTION OF EMBODIMENTS

[Method for Producing Flavoring Molded Body]

[0012] A method for producing a flavoring molded body according to this embodiment includes the following steps: mixing a tobacco raw material powder having an average particle size of 100 μm or less with an alcohol having 2 to 7 carbon atoms to form a mixture (hereinafter, this step is also referred to as "alcohol mixing step"); molding the mixture by compression molding (hereinafter, this step is also referred to as "compression molding step"); and removing at least a part of the alcohol from the mixture (hereinafter, this step is also referred to as "alcohol removal step").

[0013] In the method according to this embodiment, a tobacco raw material powder having an average particle size of 100 μm or less is mixed with an alcohol having 2 to 7 carbon atoms, and the resulting mixture is molded by compression molding. This enables the production of a flavoring molded body having a sufficiently high strength. As described below, it is considered that a flavoring molded body having a sufficiently high strength can be produced because the addition of an alcohol having 2 to 7 carbon atoms to a tobacco raw material powder causes a resin composition derived from the tobacco raw material powder to migrate toward the surfaces of particles of the tobacco raw material powder and the particles of the tobacco raw material powder are bonded to one another with the resin composition. It is also considered that a flavoring molded body having a sufficiently high strength can be produced because a part of the hydroxyl groups of cellulose molecules included in the tobacco raw material powder are lost due to dehydration and the cellulose molecules condensate with one another in the vicinity thereof. Using the flavoring molded body produced by the method according to this embodiment as a flavoring agent raw material in the above-described method for adding a flavoring agent increases ease of storage and transportation and reduces the volatilization of a flavor component during storage and transportation. In addition, since the flavoring molded body according to this embodiment can be easily disintegrated in a dispersion

medium, it becomes possible to prepare a suspension of a tobacco raw material powder in an easy and simple manner.

[0014] Moreover, since compression molding is performed using an alcohol having 2 to 7 carbon atoms in the method according to this embodiment, it is not necessary to use a binder, which is commonly used for molding. In addition, the most part of the alcohol used can be removed. This enables the production of a flavoring molded body having a sufficiently high strength and a suitable flavor. Therefore, a flavoring molded body produced by the method according to this embodiment is suitable as tobacco for oral use.

[0015] The tobacco raw material powder having an average particle size of 100 μm or less, which is used in the method according to this embodiment, may be a fine leaf tobacco powder produced when leaf tobacco is shredded in the production of tobacco products. Commonly, when tobacco products, such as cigarettes, are produced in a tobacco manufacturing factory, a fine leaf tobacco powder is produced when the leaf tobacco is shredded. The most part of the fine powder is transported to a reconstitution factory and reconstituted into a sheet-like shape by a sheet-making step. In the method according to this embodiment, a flavoring molded body can be produced using the fine powder. The flavoring molded body can be transported to a reconstitution factory and used as a starting material for the sheet-making step. In another case, the flavoring molded body can be reused as an additive in a step of mixing raw materials in the production of a tobacco granule raw material. Forming a fine leaf tobacco powder into a flavoring molded body as described above increases ease of storage and transportation and reduces the volatilization of a flavor component during storage and transportation. In addition, since a binder, which is commonly used for molding, is not used in the method according to this embodiment, a flavoring molded body produced by the above-described method does not produce a flavor other than that derived from tobacco and therefore can be readily used in the reuse step.

[0016] Each of the steps of the method according to this embodiment is described below. The method according to this embodiment may include a step other than the alcohol mixing step, the compression molding step, or the alcohol removal step. The alcohol removal step may be conducted at any timing subsequent to the alcohol mixing step, that is, may be conducted in the compression molding step or subsequent to the compression molding step.

(Alcohol Mixing Step)

[0017] In this step, a tobacco raw material powder having an average particle size of 100 μm or less is mixed with an alcohol having 2 to 7 carbon atoms to form a mixture. Examples of the tobacco raw material powder include leaf tobacco, veins, stems, roots, and flowers. As described above, the leaf tobacco may be, for example, a fine leaf tobacco powder produced, for example, when leaf tobacco is shredded in the production of tobacco products. Examples of types of the leaf tobacco which may be used include, but are not limited to, flue-cured tobacco, Burley tobacco, domestic tobacco, orient tobacco, and fermented leaves thereof. The above tobacco raw material powders may be used alone or in combination of two or more.

[0018] The average particle size of the tobacco raw material powder is 100 μm or less. Since the above average particle size is 100 μm or less, a flavoring molded body that does not deform over time and has a sufficiently high strength can be produced. The above average particle size is preferably 5 to 80 μm, is more preferably 10 to 60 μm, and is further preferably 20 to 50 μm. The above average particle size is determined by light scattering.

[0019] The number of carbon atoms included in the alcohol is 2 to 7, is preferably 2 to 5, and is more preferably 2 or 3. The alcohol is preferably at least one alcohol selected from the group consisting of ethanol, 2-propanol, and benzyl alcohol in order to produce a flavoring molded body having a further high strength and is more preferably ethanol.

[0020] In this step, it is preferable to mix 1 to 20 parts by mass of the alcohol with 100 parts by mass of the tobacco raw material powder. Mixing 1 part by mass or more of the alcohol with 100 parts by mass of the tobacco raw material powder enables the production of a flavoring molded body having a further high strength. Mixing 20 parts by mass or less of the alcohol with 100 parts by mass of the tobacco raw material powder makes it possible to readily perform compression molding. The amount of alcohol mixed with the tobacco raw material powder in this step is more preferably 3 to 17 parts by mass and is further preferably 5 to 15 parts by mass relative to 100 parts by mass of the tobacco raw material powder.

[0021] In this step, in addition to the alcohol, a cellulose powder or the like may be added to the tobacco raw material powder. Addition of a cellulose powder further increases the strength of the flavoring molded body.

[0022] The method for mixing the alcohol with the tobacco raw material powder is not limited; they can be mixed with each other using a common mixer, such as a V-shaped mixer.

(Compression Molding Step)

[0023] In this step, the mixture prepared in the alcohol mixing step is molded by compression molding. Examples of compression molding machines that can be used for the compression molding include, but are not limited to, a rotary tablet press. The conditions under which the compression molding is performed are not limited; for example, it is desirable to perform molding at a compression pressure of 2 kN or more. As described above, for example, at least a part of the

alcohol may be removed by air drying or the like during the compression molding.

[0024] Examples of the shape of the molded body formed by the compression molding include, but are not limited to, tablet-like, tabular, cylindrical, rod-like, and spherical.

(Alcohol Removal Step)

[0025] In this step, at least a part of the alcohol is removed from the mixture. As described above, at least a part of the alcohol may be removed from either the above mixture during the compression molding step or the molded body formed by the compression molding step.

[0026] In this step, the removal of at least a part of the alcohol is preferably performed at 10°C to 40°C. Removing at least a part of the alcohol at 10°C or more enables the alcohol to be removed to a sufficient degree. Removing at least a part of the alcohol at 40°C or less reduces the negative impacts of heating on a flavor. The temperature at which at least a part of the alcohol is removed is more preferably 15°C to 35°C and is further preferably 20°C to 30°C. In the case where at least a part of the alcohol is removed at 10°C to 40°C, at least a part of the alcohol can be removed by, for example, performing drying at 10°C to 40°C for 30 to 120 minutes. The removal of at least a part of the alcohol can be performed using a resistor oven, hot-air drying, a tunnel dryer, air drying, or the like. The removal of the alcohol is preferably performed not in a confined space but in an open space

[0027] It is preferable that 90% by mass or more of the alcohol included in the mixture (i.e., molded body) be removed in this step. It is more preferable that 95% by mass or more of the alcohol be removed. It is further preferable that 99% by mass or more of the alcohol be removed. It is particularly preferable that all the alcohol be removed.

[Flavoring Molded Body]

[0028] A flavoring molded body according to this embodiment is produced by the method for producing a flavoring molded body according to this embodiment. The flavoring molded body can be readily stored and transported. Moreover, a flavor component is unlikely to volatilize from the flavoring molded body during storage and transportation. Furthermore, the flavoring molded body has a sufficiently high strength and a suitable flavor.

[0029] The compression rupture strength of the flavoring molded body which is determined using a tablet hardness tester with a wedge-shaped plunger is preferably 10 to 200 N. When the above compression rupture strength is 10 N or more, the shape of the flavoring molded body can be readily maintained without deformation and it becomes easy to store and transport the flavoring molded body. When the above compression rupture strength is 200 N or less, the flavoring molded body can be further readily disintegrated in a dispersion medium and a suspension of the tobacco raw material powder can be prepared in an easy and simple manner. The above range of the compression rupture strength can also suitably apply in cases where the flavoring molded body is used as tobacco for oral use. The above compression rupture strength is more preferably 20 to 150 N. Note that the compression rupture strength is specifically the value determined by the method described below.

[0030] Examples of the shape of the flavoring molded body according to this embodiment include, but are not limited to, tablet-like, tabular, cylindrical, rod-like, and spherical.

[0031] The flavoring molded body according to this embodiment may be a flavoring molded body formed by a plurality of particles of the tobacco raw material powder which have an average size of 100 μm or less being bonded to one another with a resin composition derived from the tobacco raw material powder. It is considered that the sufficiently high strength is achieved because the addition of the alcohol causes a resin composition to be extracted from the inside of the particles of the tobacco raw material powder and migrate into the surfaces of the particles, which are bonded to one another with a resin included in the resin composition. Furthermore, since the resin derived from the tobacco raw material powder serves as a binder, the flavoring molded body does not need to include a common binder and therefore has a suitable flavor. Whether a plurality of particles of tobacco raw material powder are bonded to one another with a resin composition derived from the tobacco raw material powder can be determined using Raman imaging or the like.

[0032] The resin composition derived from the tobacco raw material powder may include a resin, such as solanesol, neophytadiene, or megastigmatrienone. The resin composition may include one of the above resins or two or more of the above resins. The resin composition derived from the tobacco raw material powder may include a flavor component included in the tobacco raw material powder, such as nicotine.

[0033] The flavoring molded body according to this embodiment may be a flavoring molded body including a tobacco raw material powder having an average particle size of 100 μm or less, wherein the content of cellulose is 5% to 15% by mass and at least a part of the cellulose is condensed by dehydration. It is considered that a flavoring molded body having a sufficiently high strength can be produced as a result of a part of the hydroxyl groups of cellulose molecules included in the tobacco raw material powder being condensed with nearby cellulose molecules by dehydration. In addition, since the cellulose content in the tobacco raw material powder is 5% to 15% by mass, the compression rupture strength of the flavoring molded body according to this embodiment can fall within the preferable range (10 to 200 N). The cellulose

content in the tobacco raw material powder can be measured by a TAPPI method or the like. Whether at least a part of the cellulose molecules are condensed by dehydration can be determined by NMR spectrum analysis or the like.

[0034] The flavoring molded body according to this embodiment can be used in, for example, a method including adding a flavoring molded body to a dispersion medium to form a tobacco material including the dispersion medium and the tobacco raw material powder dispersed in the dispersion medium and adding the tobacco material to a tobacco product in order to impart a flavor to the tobacco product, as described below. The flavoring molded body according to this embodiment is also suitable as tobacco for oral use. The tobacco raw material powder included in the flavoring molded body according to this embodiment may be a fine leaf tobacco powder produced when leaf tobacco is shredded in the production of tobacco products.

[Method for Producing Tobacco Material]

[0035] A method for producing a tobacco material according to this embodiment includes the following steps: preparing a flavoring molded body by the method for producing a flavoring molded body according to this embodiment; and adding the flavoring molded body to a dispersion medium to prepare a tobacco material including the dispersion medium and the tobacco raw material powder dispersed in the dispersion medium. The method for producing a tobacco material according to this embodiment enables a tobacco material used for imparting a flavor to a tobacco product to be produced in an easy, simple, and efficient manner. In particular, since the flavoring molded body according to this embodiment is used as a tobacco raw material instead of a tobacco raw material provided in the form of a fine powder, the tobacco raw material can be readily stored and transported, and a flavor component is unlikely to volatilize from the tobacco raw material during storage and transportation. In addition, since the flavoring molded body according to this embodiment can be easily disintegrated in a dispersion medium, it becomes possible to prepare a dispersion liquid of a tobacco raw material powder in an easy and simple manner.

[0036] Examples of the dispersion medium to which the flavoring molded body is added include water, a monohydric alcohol, a polyhydric alcohol, a sugar alcohol, a saccharide, and a polyhydric alcohol ester. Examples of the monohydric alcohol include monohydric aliphatic alcohols, such as methanol, ethanol, 1-propanol, 2-propanol, 1-butanol, 2-butanol, 2-methyl-1-propanol, 2,2-dimethylethanol, and cyclohexanol; monohydric alcohols having an aromatic substituent, such as benzyl alcohol; monohydric alcohols having one or more halogen elements; and monohydric alcohols having one or more ether linkages. Examples of the polyhydric alcohol include glycerine and propylene glycol. Examples of the sugar alcohol include sorbitol, maltitol, xylitol, erythritol, lactitol, sorbitan, xylose, arabinose, mannose, and trehalose. Examples of the saccharide include milk sugar, sugar, Coupling sugar, grape sugar, enzyme syrup, acid saccharification syrup, malt sugar syrup, malt sugar, isomerized sugar, fruit sugar, reduced malt sugar, reduced starch syrup, and honey. Examples of the polyhydric alcohol ester include fatty acid polyhydric alcohol esters, such as fatty acid triglyceride. Among the above dispersion media, water and a dispersion media that includes water and a water-soluble material are preferable.

[0037] The amount of the flavoring molded body added to the dispersion medium is not limited and may be, for example, 5 to 100 parts by mass relative to 100 parts by mass of the dispersion medium. The tobacco material produced by the method according to this embodiment may be a slurry-like material that includes a dispersion medium and the tobacco raw material powder included in the flavoring molded body which is dispersed therein.

[Method for Producing Tobacco Product]

[0038] A method for producing a tobacco product according to this embodiment includes the following steps: a step of preparing a tobacco material by the method for producing a tobacco material according to this embodiment; and a step of adding the tobacco material to a tobacco product. The method for producing a tobacco product according to this embodiment makes it possible to impart a flavor to a tobacco product in a uniform manner. In particular, since the tobacco material is produced by the method for producing a tobacco material according to this embodiment, the above-described advantageous effects based on the method for producing a tobacco material according to this embodiment can be produced.

[0039] Examples of tobacco products to which the tobacco material is added include, but are not limited to, leaf tobacco, dried leaf tobacco, flavored leaf tobacco, shredded tobacco, cigarette, cigar tobacco, a pipe, a water pipe, an oriental pipe, tobacco for oral use, and snuff. The method for adding the tobacco material to a tobacco product is not limited; it is preferable to spray the tobacco material to a tobacco product in order to impart a flavor component included in the tobacco material to the tobacco product in a further uniform manner.

[Examples]

[0040] Further details of this embodiment are described below. Note that this embodiment is not limited by Examples

below. The measurement of the compression rupture strength of a compression molded body and the evaluation of the flavor of a compression molded body were conducted by the following methods.

[Measurement of Compression Rupture Strength]

[0041] The compression rupture strength of each of the compression molded bodies prepared was determined using a tablet hardness tester with a wedge-shaped plunger. Specifically, a wedge-shaped plunger (product name: TH-1, produced by AS ONE Corporation) was slowly lowered toward the compression molded body to compress the compression molded body, and the strength at which compression molded body was ruptured was measured using a tablet hardness tester (product name: TH-1, produced by AS ONE Corporation). The above measurement was conducted three times, and the average of the values measured in the three measurements was considered as compression rupture strength (N).

[Flavor Evaluation]

[0042] Water was added to each of the compression molded bodies to form a slurry such that the amount of water was six times the mass of the compression molded body. Then, 2.8 g of the slurry was added to 20 g of a commercial tobacco product (shredded tobacco) by spraying in order to impart a flavor to the tobacco product. The tobacco product was subsequently conditioned at 22°C and a relative humidity of 60% for 24 hours. A cigarette was prepared using the conditioned tobacco product and a sensory evaluation of flavor was conducted. Note that the sensory evaluation was conducted by well-trained panelists. In the case (Reference) where the sensory evaluation was conducted using a cigarette prepared in the same manner as described above, except that the slurry was prepared using a tobacco raw material powder only instead of the compression molded body, a sugar odor and a sense of orange were increased.

[Example 1]

[0043] To 100 parts by mass of a tobacco raw material powder that was leaf tobacco (flue-cured tobacco of Brazil origin) having an average particle size of 30 μm, 3 parts by mass of ethanol was added, and the resulting mixture was stirred. The mixture was molded into a tablet from using a compression molding machine (product name: TDP 0, produced by LFA Machines Oxford Ltd). The resulting molded body was dried at 20°C for 2 days in order to remove ethanol included in the molded body. Hereby, a compression molded body was prepared. The compression rupture strength of the compression molded body was measured by the above-described method. Table 1 lists the results.

[Examples 2 to 4]

[0044] A compression molded body was prepared as in Example 1, except that the amount of ethanol added was changed as described in Table 1. The compression rupture strength of the compression molded body was measured. The flavoring molded body prepared in Example 3 was subjected to the flavor evaluation by the above-described method. Table 1 lists the results.

[Example 5]

[0045] A compression molded body was prepared as in Example 3, except that, after molded using the compression molding machine, the molded body was dried at 40°C for 2 hours in order to remove ethanol included in the molded body. The compression rupture strength of the compression molded body was measured. The flavor evaluation was conducted by the above-described method. Table 1 lists the results.

[Comparative Example 1]

[0046] A compression molded body was prepared as in Example 1, except that ethanol was not added to the tobacco raw material powder. The compression rupture strength of the compression molded body was measured. Table 1 lists the results.

[Comparative Example 2]

[0047] A compression molded body was prepared as in Example 1, except that, instead of ethanol, 40 parts by mass of microcrystalline cellulose (product name: cellulose, microcrystalline, produced by Alfa aesar), which served as a binder, was added to 100 parts by mass of the tobacco raw material powder. The compression rupture strength of the

compression molded body was measured. Table 1 lists the results.

[Comparative Example 3]

[0048] A compression molded body was prepared as in Example 1, except that, instead of ethanol, 80 parts by mass of microcrystalline cellulose (product name: cellulose, microcrystalline, produced by Alfa aesar), which served as a binder, was added to 100 parts by mass of the tobacco raw material powder. The compression rupture strength of the compression molded body was measured. The flavor evaluation was conducted by the above-described method. Table 1 lists the results.

[Comparative Example 4]

[0049] A compression molded body was prepared as in Example 3, except that a tobacco raw material powder composed of leaf tobacco having an average particle size of 0.68 mm (particle size: 0.35 to 1.0 mm) was used as a tobacco raw material powder. The measurement of compression rupture strength was attempted but could not be done because, after molded, the molded body became swollen with time and could not maintain its shape.

[Table 1]

	Average particle size of tobacco raw material powder (μm)	Amount of ethanol added (mass part)	Amount of binder added (mass part)	Drying temperature (°C)	Compression rupture strength (N)	Flavor evaluation
Example 1	30	3	0	20	18.6	-
Example 2	30	5	0	20	73.6	-
Example 3	30	10	0	20	125.0	Sugar odor and sense of orange were imparted. Sweetness was increased.
Example 4	30	20	0	20	104.0	-
Example 5	30	10	0	40	113.4	Sugar odor and strong sense of orange
Comparative Example 1	30	0	0	20	5.9	-
Comparative Example 2	30	0	40	20	3.9	-
Comparative Example 3	30	0	80	20	119.2	Irritant and fiber-like odor was distinctive.
Comparative Example 4	680	10	0	20	-	-

[0050] As described in Table 1, it was confirmed that the flavoring molded bodies prepared by the method according to this embodiment had a high compression rupture strength and a sufficiently high strength. It was also confirmed that the flavoring molded bodies prepared in Examples 3 and 5 were evaluated in terms of flavor as comparable to Reference, which was prepared using a slurry prepared using a tobacco raw material powder only, that is, the flavoring molded bodies prepared in Examples 3 and 5 had a suitable flavor.

[0051] In contrast, in Comparative Example 1, where ethanol was not used, the compression rupture strength was lower than in Examples, where ethanol was used. In Comparative Example 2, where 40 parts by mass of microcrystalline cellulose was used as a binder, the compression rupture strength was lower than in Examples, where ethanol was used. In Comparative Example 3, where 80 parts by mass of microcrystalline cellulose was used as a binder, the compression rupture strength was high, but an irritant and fiber-like odor derived from the binder was distinctive in the flavor evaluation and the flavor was poor compared with Examples. In Comparative Example 4, where the average particle size of the

tobacco raw material powder was more than 100 μm, the shape of the molded body could not be maintained after molding and the sample was considered poor as a compression molded body.

[Example 6]

[0052] A compression molded body was prepared as in Example 1, except that 5 parts by mass of benzyl alcohol was added to 100 parts by mass of the tobacco raw material powder instead of ethanol. The compression rupture strength of the compression molded body was measured. Table 2 lists the results.

[Examples 7 and 8]

[0053] A compression molded body was prepared as in Example 6, except that the amount of benzyl alcohol added was changed as described in Table 2. The compression rupture strength of the compression molded body was measured. Table 2 lists the results.

[Example 9]

[0054] A compression molded body was prepared as in Example 1, except that 3 parts by mass of 2-propanol was added to 100 parts by mass of the tobacco raw material powder instead of ethanol. The compression rupture strength of the compression molded body was measured. Table 2 lists the results.

[Examples 10 to 12]

[0055] A compression molded body was prepared as in Example 9, except that the amount of benzyl alcohol added was changed as described in Table 2. The compression rupture strength of the compression molded body was measured. Table 2 lists the results.

[Table 2]

	Amount of benzyl alcohol added (mass part)	Amount of 2-propanol added (mass part)	Compression rupture strength (N)
Example 6	5	0	9.8
Example 7	10	0	10.8
Example 8	20	0	19.3
Example 9	0	3	9.5
Example 10	0	5	10.1
Example 11	0	10	24.2
Example 12	0	20	29.7

[0056] As described in Table 2, it was confirmed that the addition of benzyl alcohol or 2-propanol as an alcohol also increases the compression rupture strength of the compression molded body.

Claims

1. A method for producing a flavoring molded body, the method comprising:

   mixing a tobacco raw material powder having an average particle size of 100 μm or less with an alcohol having 2 to 7 carbon atoms to form a mixture;
   molding the mixture by compression molding; and
   removing at least a part of the alcohol from the mixture.

2. The method for producing a flavoring molded body according to claim 1, wherein the alcohol is at least one alcohol selected from the group consisting of ethanol, 2-propanol, and benzyl alcohol.

3. The method for producing a flavoring molded body according to claim 1 or 2, wherein, in the step of forming the mixture, 1 to 20 parts by mass of the alcohol is mixed with 100 parts by mass of the tobacco raw material powder.

4. The method for producing a flavoring molded body according to any one of claims 1 to 3, wherein, in the step of removing at least a part of the alcohol, at least a part of the alcohol is removed at 10°C to 40°C.

5. The method for producing a flavoring molded body according to any one of claims 1 to 4, wherein a compression rupture strength of the flavoring molded body, the compression rupture strength being determined using a tablet hardness tester with a wedge-shaped plunger, is 10 to 200 N.

6. The method for producing a flavoring molded body according to any one of claims 1 to 5, wherein the tobacco raw material powder is a fine leaf tobacco powder produced when leaf tobacco is shredded in production of a tobacco product.

7. The method for producing a flavoring molded body according to any one of claims 1 to 6, wherein the flavoring molded body is tobacco for oral use.

8. A method for producing a tobacco material, the method comprising:

preparing a flavoring molded body by the method according to any one of claims 1 to 6; and
adding the flavoring molded body to a dispersion medium to prepare a tobacco material including the dispersion medium and the tobacco raw material powder dispersed in the dispersion medium.

9. A method for producing a tobacco product, the method comprising:

preparing a tobacco material by the method according to claim 8; and
adding the tobacco material to a tobacco product.

10. A flavoring molded body produced by the method according to any one of claims 1 to 7.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/023020

A. CLASSIFICATION OF SUBJECT MATTER
A24B 15/28(2006.01)i; A24B 13/00(2006.01)i
FI: A24B15/28; A24B13/00

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)
A24B15/28; A24B13/00

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

Published examined utility model applications of Japan	1922-1996
Published unexamined utility model applications of Japan	1971-2021
Registered utility model specifications of Japan	1996-2021
Published registered utility model applications of Japan	1994-2021

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	JP 2011-504733 A (PHILIP MORRIS PRODUCTS S.A) 17 February 2011 (2011-02-17) entire text, all drawings	1-10
A	JP 2013-544521 A (R. J. REYNOLDS TOBACCO COMPANY) 19 December 2013 (2013-12-19) entire text, all drawings	1-10

☐ 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 application or patent 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	Date of mailing of the international search report
03 August 2021 (03.08.2021)	10 August 2021 (10.08.2021)

Name and mailing address of the ISA/	Authorized officer
Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/023020

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
JP 2011-504733 A	17 Feb. 2011	WO 2009/068279 A1 entire text, all drawings US 2009/0293889 A1 US 2012/0298121 A1 CA 2707001 A1 KR 10-2010-0092013 A	
JP 2013-544521 A	19 Dec. 2013	US 2012/0138073 A1 entire text, all drawings JP 2017-79764 A US 2016/0073676 A1 WO 2012/074865 A1 CN 103442600 A KR 10-2013-0121897 A	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2014185103 A **[0005]**
- JP 2017079764 A **[0005]**
- JP 2012085643 A **[0005]**
- JP 2013098920 A **[0005]**