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(54) METHOD FOR MANUFACTURING PROCESSED LEAF TOBACCO, AND METHOD FOR STORING LEAF TOBACCO

(57) The present invention addresses the problem of providing: a method for manufacturing processed leaf tobacco, the method making it possible to obtain leaf tobacco in which a desired green color is maintained even after the elapse of a storage period, and having a storage step in which a storage method is applied; and a method for storing leaf tobacco. A method for manufacturing processed leaf tobacco, the method having a storage step for storing leaf tobacco using a storage container, wherein, in the storage step, the initial moisture content of the leaf tobacco is 8.5 wt.% or less, and the moisture content of the leaf tobacco is retained at 8.5 wt.% or less.

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Description

Technical Field

[0001] The present invention relates to a method for manufacturing processed leaf tobacco and a method for storing leaf tobacco.

Background Art

[0002] In general, the leaf tobacco used for manufacturing tobacco products such as smokeless tobacco including snus and the like is, after its harvest, subjected to a treatment including a step of increasing the enzyme activity to intensify the inhaling flavor component and a step of subsequently curing the leaf tobacco to fix the quality. After this treatment, in general, in the ingredient factory, the leaf tobacco is subjected to a step of being separated into laminae and midribs and stored in a state of being packed into cases having a content of about 200 kg. The time (including this storage period) taken for the separated tobacco ingredient such as laminae to reach manufacturing factories of tobacco products such as cigarettes is ordinarily (including the period of transportation by ship), from harvest, about one month or longer, or about one year to about two years in some cases.

[0003] As described above, before harvested leaf tobacco is treated in manufacturing factories of final products, it undergoes a storage period for a relatively long time. In the case of storing leaf tobacco for a long period, in the storage period, the leaf tobacco discolors from the green color, which is a problem. In the case of using the discolored leaf tobacco to manufacture smokeless tobacco, basically, the manufactured smokeless tobacco takes on the color of the discolored leaf tobacco, which may make the consumers unpleasant.

[0004] In order to address the problem, in general, a pouch containing leaf tobacco is colored using a coloring agent (Patent Literature 1) or a coloring agent is added to a leaf tobacco-containing composition used during manufacturing of smokeless tobacco (Patent Literature 2), to thereby change the color of smokeless tobacco.

[0005] However, such cases result in occurring of, in addition to the problem of an increase in the ingredient costs, a problem of a change in the flavor due to addition of the coloring agent and another problem in which, at the time of use, the colored leaf tobacco component leaches from the leaf tobacco and hence the smokeless tobacco after use takes on an undesirable color.

[0006] Thus, in recent years, studies on how to, without using external additives, prevent discoloration of leaf tobacco during the storage period have been performed; for example, there is a known technique of adjusting a plurality of parameters of a storage sheet used for storing cured leaf tobacco so as to be within desired ranges, to thereby prevent discoloration of the leaf tobacco (Patent Literature 3).

Citation List

Patent Literature

[0007]

PTL 1: Japanese Unexamined Patent Application Publication (Translation of PCT Application) No. 2011-529343
PTL 2: Japanese Unexamined Patent Application Publication (Translation of PCT Application) No. 2009-508523
PTL 3: Japanese Unexamined Patent Application Publication No. 6-113807

Summary of Invention

Technical Problem

[0008] PTL 3 above has focused on the relationship between the parameters of the storage sheet for leaf tobacco and discoloration of leaf tobacco stored; however, it has substantially not studied the relationship between storage conditions such as specific parameters of leaf tobacco itself in the storage period and discoloration of leaf tobacco stored.

[0009] When control of specific storage conditions in the storage period can achieve suppression of discoloration of leaf tobacco even after storage, in other words, can provide leaf tobacco having a desired green color, for example, problems such as limitation on the type of the storage container expected from the technique in PTL 3 above are not caused.

[0010] Thus, an object of the present invention is to provide a method for manufacturing processed leaf tobacco, the method including a storage step to which a storage method for providing leaf tobacco having a desired green color maintained even after the elapse of a storage period is applied, and a method for storing leaf tobacco.

Solution to Problem

[0011] The inventors of the present invention performed thorough studies and, as a result, have found that, for leaf tobacco in the storage step, the initial moisture content and the moisture content during storage can be set in specific ranges, to thereby achieve the above-described object; thus, they have arrived at the present invention.

[0012] Specifically, the gist of the present invention is as follows.

[1] A method for manufacturing a processed leaf tobacco, the method comprising a storage step of storing a leaf tobacco using a storage container,
wherein, in the storage step, an initial moisture content of the leaf tobacco is 8.5 wt.% or less and a moisture content of the leaf tobacco is retained at 8.5 wt.% or less.
[2] The method for manufacturing the processed leaf tobacco according to [1], wherein, in the storage step, an initial a* value in the CIELab colorimetric system of the leaf tobacco is -2.0 or less.
[3] The method for manufacturing the processed leaf tobacco according to [1] or [2], wherein, in the storage step, an a* value in the CIELab colorimetric system of the leaf tobacco is retained at -2.0 or less.
[4] The method for manufacturing the processed leaf tobacco according to any one of [1] to [3], wherein, in the storage step, a storage temperature is ordinary temperature.
[5] The method for manufacturing the processed leaf tobacco according to any one of [1] to [4], wherein, in the storage step, the storage container is sealed.
[6] The method for manufacturing the processed leaf tobacco according to any one of [1] to [5], the method comprising a processing step of processing the processed leaf tobacco having been subjected to the storage step.
[7] The method for manufacturing the processed leaf tobacco according to any one of [1] to [6], wherein the processed leaf tobacco is manufactured for smokeless tobacco.
[8] A method for storing a leaf tobacco, the method comprising storing leaf tobacco using a storage container,
wherein an initial moisture content of the leaf tobacco is 8.5 wt.% or less and a moisture content of the leaf tobacco is retained at 8.5 wt.% or less.

Advantageous Effects of Invention

[0013] The present invention provides a method for manufacturing processed leaf tobacco, the method including a storage step to which a storage method for providing leaf tobacco having a desired green color maintained even after the elapse of a storage period is applied, and a method for storing leaf tobacco.

Description of Embodiments

[0014] Hereinafter, embodiments according to the present invention will be described in detail; however, such descriptions are examples (representative examples) of embodiments according to the present invention and the present invention within the spirit and scope thereof is not limited to the contents of the descriptions.

[0015] In this Description, numerical ranges described as "numerical value 'to' numerical value" mean ranges including the numerical values as the lower limit value and the upper limit value; "A to B" means A or more and B or less.

[0016] In this Description, "plurality of" means 2 or more.

[0017] In this Description, "leaf tobacco" is a generic name for harvested tobacco leaves to be subjected to aging (storage step). For example, harvested tobacco leaves that have been subjected to stripping and separation and processing into laminae, midribs, etc., but are not subjected to aging (storage step) are referred to as "leaf tobacco". By contrast, "processed leaf tobacco" is a generic name for the leaf tobacco having been subjected to aging (storage step). For example, even harvested tobacco leaves that are to be processed into laminae, midribs, etc., but that have been subjected to aging (storage step) are referred to as "processed leaf tobacco". Note that, since leaf tobacco having been subjected to the storage step is referred to as processed leaf tobacco, in the case of performing, after the storage step, a step such as a stripping step or a blending step, the objects treated in these steps will all be referred to as processed leaf tobacco.

[0018] In this Description, the color of leaf tobacco is evaluated using the CIELab colorimetric system. In the CIELab colorimetric system, L' represents the lightness of the color; as L* increases, the color nears white; as L* decreases, the color nears black. In the CIELab colorimetric system, a* corresponds to positions between magenta and green; as a* increases, the color nears magenta; as a* decreases, the color nears green. In the CIELab colorimetric system, b* corresponds to positions between yellow and blue; as b* increases, the color nears yellow; as b* decreases, the color nears blue.

[0019] In the case of final products in which leaf tobacco is visually observed or in the case of a member that is used in combination with leaf tobacco, that is visually observed in final products, and that is changeable in color due to the

color of leaf tobacco, the closer to green the color of leaf tobacco, the better impression on the final products the users tend to have. Thus, from the viewpoint of color, the color of leaf tobacco is preferably green; in other words, a* of leaf tobacco is preferably small.

<Method for manufacturing processed leaf tobacco>

[0020] A method for manufacturing processed leaf tobacco according to an embodiment of the present invention (may also be simply referred to as "method for manufacturing processed leaf tobacco") is a method for manufacturing processed leaf tobacco including a storage step of storing leaf tobacco using a storage container,
wherein, in the storage step, the initial moisture content of the leaf tobacco is 8.5 wt.% or less, and the moisture content of the leaf tobacco is retained at 8.5 wt.% or less.

[0021] The reaction involving discoloration of leaf tobacco is an irreversible reaction; the reaction of change from the green color to a color such as brown can occur while the reaction of change from the color such as brown to the green color never occurs. Thus, leaf tobacco having discolored cannot be brought back to the green color and hence it is very important to suppress discoloration in the storage step in which leaf tobacco tends to discolor.

[Leaf tobacco]

[0022] Leaf tobacco is not particularly limited in terms of species and various species are usable. Examples include Nicotiana tabacum species including flue-cured tobacco, Burley tobacco, Oriental tobacco, domestic tobacco, and other species, and Nicotiana-rustica species. These species may be used alone or may alternatively be used, in order to obtain the target flavor, by being blended in the process of being turned from leaf tobacco to processed leaf tobacco.

[0023] The details of the species of leaf tobacco are disclosed in "Encyclopedia of Tobacco, Tobacco Academic Studies Center, 2009. 3. 31".

(Flue-cured tobacco)

[0024] Flue-cured tobacco is the generic name for the species of leaf tobacco heat-cured by the flue-curing method or the circulation-curing method. The leaf tobacco is yellow and has high sugar content and a unique flavor including sweetness; it is used as the main ingredient of cigarettes referred to as Virginia blend and is also added to cigarettes of other blend types, pipe tobacco, and chewing tobacco, for example.

[0025] Flue-cured tobacco is characterized by, compared with other species, having a high ratio of sugar to nitrogen. In flue-cured tobacco, the reducing sugar content relative to dry leaf mass is about 2.5% or more and about 30% or less. Examples of the reducing sugar include glucose and fructose.

(Burley tobacco)

[0026] Burley tobacco is the generic name for tobacco species having properties such as tending to have pale leaves, compared with other species. It is classified, together with domestic tobacco, as light air-cured tobacco, has a high capability of adsorbing flavoring, and hence is used as one of main ingredients of cigarettes referred to as American blend. It is characterized by providing smoke including chocolate-like flavor; those of high quality provide refreshing stimulation referred to as kick.

[0027] Burley tobacco is characterized by, compared with other species, having a low ratio of sugar to nitrogen. In Burley tobacco, the reducing sugar content relative to dry leaf mass is less than about 2.5%.

(Oriental tobacco)

[0028] Oriental tobacco is the generic name for tobacco species originally cultivated in Mediterranean-climate limestone regions extending from Greece and Bulgaria to Turkey. The leaf tobacco has a unique flavor and is used as the main ingredient of oriental cigarettes such as Turkish cigarettes. Oriental tobacco provides mild smoke taste and burns well, and hence is in high demand as an ingredient for cigarettes.

[0029] Oriental tobacco is characterized by, compared with other species, having large amounts of leaf surface resins.

(Blending of tobacco species)

[0030] As described above, blending of leaf tobacco species can be performed in the process of being turned from leaf tobacco to processed leaf tobacco.

[0031] In general, "blend" means mixtures of leaf tobaccos belonging to the same species or different species; in this

Description, combining together different processed leaf tobaccos may also be referred to as "blend".

[0032] For each of tobacco species, leaf tobaccos are graded in accordance with, for example, characteristics such as the place of origin, positions within plants, color, surface state, size, and shape. Leaf tobaccos inferentially contain 300-plus chemical components; tobaccos belonging to different species have different chemical properties. Even leaf tobaccos that belong to the same species but belong to different grades may be different in chemical properties.

[0033] Thus, in order to obtain leaf tobacco having desired characteristics and desired chemical properties, the above-described blending is performed.

[0034] In the storage step, the average particle size of leaf tobacco is not particularly limited, but is ordinarily 0.5 mm or more, preferably 1 mm or more, more preferably 3 mm or more, still more preferably 5 mm or more, and is ordinarily 5 cm or less, preferably 3 cm or less, more preferably 2 cm or less, still more preferably 1 m or less. In this Description, the average particle size is measured by actual measurement or the laser diffraction/scattering method, and is volume-average size.

[Storage step]

[0035] The method for manufacturing processed leaf tobacco according to this embodiment includes a storage step of storing leaf tobacco using a storage container. The method for storing leaf tobacco is not particularly limited as long as it is a method for storing leaf tobacco using a storage container.

[0036] In this Description, the point of time when leaf tobacco is placed into a storage container is defined as the point of time when the storage step starts; the point of time when leaf tobacco is taken out of the storage container is defined as the point of time when the storage step ends. The point of time when the storage step starts is more strictly the point of time when, immediately before placing of leaf tobacco into the storage container, the moisture content of the leaf tobacco is measured. The period from the point of time when the leaf tobacco is placed into the storage container to the point of time when the leaf tobacco is taken out of the storage container is defined as the storage period; being in this period may be referred to as "during storage". In this Description, immediately before leaf tobacco is placed into the storage container, the moisture content of the leaf tobacco is referred to as initial moisture content.

[0037] At an intermediate time in the storage period, a portion of the leaf tobacco stored may be taken out of the storage container; in this case, the storage step of the leaf tobacco having been taken out of the storage container ends while the storage step of the leaf tobacco remaining in the storage container does not end. At an intermediate time in the storage period, leaf tobacco may be added to the storage container; in this case, for the leaf tobacco added at the intermediate time, the point of time when the leaf tobacco is placed into the storage container is the point of time when the storage step starts.

[0038] The type of the storage container is not particularly limited as long as it can contain leaf tobacco, but it is preferably impermeable to water molecules. The storage container may be a container that has high rigidity and is less likely to deform, or may be a container that has low rigidity and is likely to deform.

[0039] The material for the storage container can be appropriately selected in accordance with the storage environment; examples include metal materials, inorganic materials, and organic materials; from the viewpoint of flexibility and light-weight properties, it is preferably organic material, more preferably polymer material, particularly preferably polyethylene. Such materials may be used alone or in combination of two or more thereof.

[0040] The shape of the storage container can be appropriately selected in accordance with the storage environment; for example, it may have a bag shape, a rectangular parallelepiped shape, or the like and may have an opening that may be circular, elliptical, rectangular, or the like.

[0041] The volume of the storage container can be appropriately selected in accordance with the storage environment and, for example, may be 0.1 m^3 or more and 2 m^3 or less, may be 0.2 m^3 or more and 1 m^3 or less, but is preferably 0.3 m^3 or more and 0.7 m^3 or less.

[0042] The storage container may be sealed or may not be sealed; however, from the viewpoint of suppressing variations in the moisture content of leaf tobacco and from the viewpoint of reducing the risk of entry of foreign matter, it is preferably sealed. In this Description, sealing means a state in which the storage container is shut off from the outside air such that moisture movement between the inside and outside of the storage container substantially does not occur; for example, when the storage container is a plastic bag, the plastic bag whose opening is tied up using a string-like member is regarded as being sealed.

[0043] The inventors of the present invention have found the following: in the storage step, the initial moisture content of leaf tobacco is set in a specific range and the moisture content of leaf tobacco during storage is set in a specific range, to thereby obtain leaf tobacco having a desired green color. The specific ranges are as follows.

[0044] The initial moisture content of leaf tobacco is not particularly limited as long as it is, from the viewpoint of suppressing discoloration of leaf tobacco, 8.5 wt.% or less, but is preferably 7 wt.% or less, more preferably 5 wt.% or less, still more preferably 3 wt.% or less, particularly preferably 2 wt.% or less. From the viewpoint of suppressing discoloration due to moisture, the lower limit of the initial moisture content of leaf tobacco needs not to be defined; it is

difficult to bring the content to 0 wt.% and the content is ordinarily 1 wt.% or more. Note that initial means the point of time when the storage period starts, in other words, means at the point of time when leaf tobacco is placed into the storage container.

[0045] The moisture content of leaf tobacco in the non-initial storage period is not particularly limited as long as, from the viewpoint of suppressing discoloration of leaf tobacco, it is retained at 8.5 wt.% or less, but is preferably retained at 7 wt.% or less, more preferably retained at 5 wt.% or less, still more preferably retained at 3 wt.% or less, particularly preferably retained at 2 wt.% or less. From the viewpoint of suppressing discoloration due to moisture, the lower limit of the moisture content of leaf tobacco in the non-initial storage period needs not to be defined; for the same reason as in the above -described initial moisture content, it is difficult to bring the content to 0 wt.%, and the content is ordinarily 1 wt.% or more.

[0046] The moisture content of leaf tobacco during storage can be measured by taking leaf tobacco out of the storage container and subjecting the leaf tobacco taken out to a process described later; in the period from taking out of the storage container to measuring of moisture content, the moisture content may change, so that, immediately after taking out of the storage container, the moisture content needs to be measured; the environment within the storage container and the environment where the moisture content is measured are preferably similar to each other.

[0047] In the present invention, the moisture content of leaf tobacco is measured in the following manner. First, 1.0 g of a sample of the target leaf tobacco is weighed, and dried within a stationary moisture measurement instrument (for example, a halogen moisture analyzer manufactured by OHAUS Corporation) set at 100°C for 3 minutes. After the drying, the displayed value calculated by the moisture measurement instrument is defined as the moisture content.

[0048] For leaf tobacco in the storage step, the initial a* value in the CIELab colorimetric system is, from the viewpoint of obtaining leaf tobacco having a desired green color that makes the impression of the users on the final products be good, preferably - 2.0 or less, more preferably -3.0 or less, still more preferably -4.0 or less, particularly preferably -5.0 or less, and is ordinarily -30.0 or more, preferably -20.0 or more, more preferably -15.0 or more, still more preferably -10.0 or more. In the storage step, the range in which the a* value is retained is also preferably such a range. Note that the a* value, which changes depending on the moisture content, does not change immediately after a change in the moisture content, but gradually changes.

[0049] For leaf tobacco in the storage step, the initial L* value and the L* value during storage in the CIELab colorimetric system are not particularly limited and may be, for example, 20 or more and 60 or less.

[0050] For leaf tobacco in the storage step, the initial b* value and the b* value during storage in the CIELab colorimetric system are not particularly limited and may be, for example, 10 or more and 45 or less.

[0051] For the a* value, L* value, and b* value of leaf tobacco, the surfaces of leaf tobacco immediately before being subjected to the storage step or leaf tobacco immediately after being taken out of the storage container are measured using a spectrophotometer (for example, KONICA MINOLTA/CM3500d, Konica MinoltaHoldings, Inc). The color measurement operation is performed by applying standard light (color-measurement standard illuminant D65, standard light by CIE and ISO) and measuring reflected light (reflection color measurement/specular component exclude method (SCE)) to obtain values.

[0052] The ratio of the weight of leaf tobacco to the volume of the storage container is not particularly limited; but, from the viewpoint of suppressing an increase in the moisture content of leaf tobacco or from the viewpoint of facilitating retaining of the moisture content at a constant value, the ratio is ordinarily 40 kg/m^3 or more, preferably 80 kg/m^3 or more and is ordinarily 240 kg/m^3 or less, preferably 180 kg/m^3 or less.

[0053] Hereinafter, in the storage period, temperature (storage temperature), relative humidity (storage relative humidity), and pressure (storage pressure) will be described; the temperature and pressure mean the temperature and pressure within the storage container.

[0054] The storage temperature is not particularly limited; but, from the viewpoint of suppressing discoloration of leaf tobacco, the temperature is preferably ordinary temperature or low temperature and, from the viewpoint of reduction in the production costs, the temperature is preferably ordinary temperature. In this Description, ordinary temperature means specifically 10°C or more and less than 40°C; the temperature range above this upper limit is defined as high temperature, and the temperature range below this lower limit is defined as low temperature. The storage temperature is, from the viewpoint of suppressing discoloration of leaf tobacco, preferably 15°C or more and 35°C or less, more preferably 15°C or more and 30°C or less, still more preferably 15°C or more and 25°C or less, particularly preferably 18°C or more and less than 23°C.

[0055] The storage relative humidity is not particularly limited; but, from the viewpoint of suppressing discoloration of leaf tobacco, the humidity is preferably ordinary humidity or low humidity and is, from the viewpoint of the production costs, preferably ordinary humidity. In this Description, ordinary humidity means specifically 30%RH or more and 70%RH or less; the humidity range above this upper limit is defined as high humidity and the humidity range below this lower limit is defined as low humidity.

[0056] The storage pressure is not particularly limited; but, from the viewpoint of suppressing discoloration of leaf tobacco, the pressure is preferably ordinary pressure or low pressure and is, from the viewpoint of reduction in the

production costs, preferably ordinary pressure. In this Description, ordinary pressure means specifically 86 kPa or more and 106 kPa or less; the pressure range above this upper limit is defined as high pressure and the pressure range below this lower limit is defined as low pressure.

[0057] Note that, in the storage step, the atmosphere within the storage container is not particularly limited, and may be air or may be, as long as advantages of the present invention are provided, another atmosphere (for example, an inert gas such as nitrogen or argon). In the storage step, for the brightness around the storage container, light can cause a reaction of leaf tobacco; for this reason, the brightness is preferably minimized.

[0058] The storage period is not particularly limited, but, for example, may be 10 days or more, 30 days or more, 60 days or more, 90 days or more, 120 days or more, or 150 days or more and may be 540 days or less, 510 days or less, 480 days or less, 450 days or less, 420 days or less, 390 days or less, 360 days or less, 330 days or less, 300 days or less, 270 days or less, 240 days or less, or 210 days or less.

[0059] The method for storing leaf tobacco according to another embodiment of the present invention is the above-described storage method, specifically, a method for storing leaf tobacco, the method including storing leaf tobacco using a storage container,
wherein the initial moisture content of leaf tobacco is 8.5 wt.% or less and the moisture content of leaf tobacco is retained at 8.5 wt.% or less.

[0060] Conditions of the storage method according to this embodiment are the same as the above-described conditions of the storage method.

[Other steps]

[0061] The method for manufacturing processed leaf tobacco according to this embodiment is not particularly limited as long as it includes the above-described storage step; as steps other than the storage step, publicly known steps can be applied. For example, the following steps (1) to (6) can be performed to manufacture processed leaf tobacco.

(1) cultivation-harvest step of cultivating and harvesting leaf tobacco.
(2) leaf tobacco curing step of curing leaf tobacco.
(3) leaf tobacco grading step of grading leaf tobacco.
(4) roughly grinding step of roughly grinding leaf tobacco.
(5) storage step of storing leaf tobacco to obtain processed leaf tobacco.
(6) processing step of further processing processed leaf tobacco having been subjected to the storage step.

[0062] The storage step (5) above is the storage step having been described above.

[0063] The steps (1) to (4) may be appropriately performed after the step (5); the step (6) may be appropriately performed before the step (5).

[0064] The processing step (6) above is a step of subjecting processed leaf tobacco obtained by being subjected to the storage step, to a treatment; specific examples include a blending step of blending a plurality of species of processed leaf tobaccos, a stripping step of subjecting processed leaf tobacco to stripping, a grading step of using sieves to grade processed leaf tobacco having specific sizes, and a processed leaf tobacco drying step of drying processed leaf tobacco.

[0065] For the steps of manufacturing processed leaf tobacco, not only in the storage step, but also in steps other than the storage step, the leaf tobacco or processed leaf tobacco preferably has low moisture content.

[0066] As in the above-described example, when the steps of manufacturing processed leaf tobacco include a plurality of steps, the steps may each be performed in the same region, or a single step may be performed in two or more regions.

[0067] Hereinafter, the above-described example will be specifically described.

[Cultivation-harvest step]

[0068] The method for manufacturing processed leaf tobacco according to this embodiment may include a cultivation-harvest step of cultivating and harvesting leaf tobacco. The method of cultivating and harvesting leaf tobacco is not particularly limited, and a publicly known method may be performed to achieve cultivation and harvest; leaf tobacco is preferably harvested at the point of time when its green color is darker. Early harvest enables harvest of leaf tobacco having a darker green color.

[Leaf tobacco curing step]

[0069] The method for manufacturing processed leaf tobacco according to this embodiment may include a curing step of curing harvested leaf tobacco. The method of curing leaf tobacco is not particularly limited, and a publicly known method such as natural curing, microwave curing, or control curing can be performed to achieve curing. The curing step

may activate the actions of various enzymes contained in leaf tobacco.

[0070] It is ordinarily 68°C or more and 99°C or less, preferably 72°C or more and 90°C or less, more preferably 75°C or more and 85°C or less. For the same reasons, the curing time is ordinarily 1 hour or more and 120 hours or less, preferably 1 hour or more and 72 hours or less, more preferably 1 hour or more and 24 hours or less. The curing is preferably performed such that leaf tobacco having been subjected to the curing step has a moisture content of 7 wt.% or less, more preferably 5 wt.% or less.

[Leaf tobacco grading step]

[0071] The method for manufacturing processed leaf tobacco according to this embodiment may include a leaf tobacco grading step of grading harvested leaf tobacco to provide leaf tobacco to be used. The method of grading leaf tobacco to provide leaf tobacco to be used is not particularly limited, and a publicly known method can be applied.

[0072] The leaf tobacco just harvested includes leaf tobacco of various sizes and hence can be subjected to the leaf tobacco grading step to provide uniform particle sizes.

[Roughly grinding step]

[0073] The method for manufacturing processed leaf tobacco according to this embodiment may include a roughly grinding step of roughly grinding leaf tobacco. Ordinarily, the leaf tobacco having been subjected to the leaf tobacco curing step is roughly ground. The method of roughly grinding leaf tobacco is not particularly limited, and a publicly known method can be performed to achieve rough grinding.

[0074] The average particle size of roughly ground leaf tobacco is not particularly limited and is ordinarily in the range of several hundreds of micrometers to several millimeters.

[Processing step]

[0075] The method for manufacturing processed leaf tobacco according to this embodiment may include a processing step of processing the processed leaf tobacco having been subjected to the storage step. The embodiments of the processing step are not particularly limited; examples include steps described below and these steps may be used in combination. Note that the steps described below as examples of the processing step may be performed before the storage step; for example, leaf tobacco blended in advance may be subjected to the storage step, or leaf tobacco stripped in advance may be subjected to the storage step.

[Processing step: blending step]

[0076] The method for manufacturing processed leaf tobacco according to this embodiment may include a blending step of blending a plurality of processed leaf tobaccos obtained by different steps. The blending of the step includes not only an example of blending leaf tobaccos of two or more species (for example, flue-cured tobacco and Burley tobacco), but also an example of, in the case of manufacturing processed leaf tobaccos of a single species (for example, flue-cured tobacco alone) by different steps, blending these. The blending step is preferably performed immediately after the storage step.

[0077] The plurality of processed leaf tobaccos to be blended may contain partially processed leaf tobacco not having been subjected to the storage step; however, all the processed leaf tobaccos preferably have been subjected to the storage step.

[Processing step: stripping step]

[0078] The method for manufacturing processed leaf tobacco according to this embodiment may include a stripping step of separating processed leaf tobacco into midribs and laminae to achieve stripping. The method of performing stripping is not particularly limited, and a publicly known method can be applied, such as a method of using a midrib feeding machine, a midrib conditioning apparatus, and a midrib silo to achieve separation into midribs and laminae. This stripping step is preferably performed after the blending step. In the case of performing the stripping step, laminae are provided as processed leaf tobacco.

[0079] In the midrib silo, the conveying speed is ordinarily 20 mm/min or more and 1500 mm/min or less. In the midrib silo, the layer of piled processed leaf tobacco has a thickness of ordinarily 1 cm or more and 3 cm or less.

[Processing step: processed leaf tobacco grading step]

[0080] The method for manufacturing processed leaf tobacco according to this embodiment may include a processed leaf tobacco grading step of grading processed leaf tobacco having been subjected to the storage step to provide processed leaf tobacco to be used. The method of grading processed leaf tobacco to provide processed leaf tobacco to be used is not particularly limited, and a publicly known method can be applied.

[0081] The processed leaf tobacco having been subjected to the blending step and/or the stripping step includes processed leaf tobacco of various sizes; from the viewpoint of providing uniform particle sizes, the grading step is preferably performed after the blending step and/or the stripping step.

[Processing step: processed leaf tobacco drying step]

[0082] The method for manufacturing processed leaf tobacco according to this embodiment may include a processed leaf tobacco drying step of drying processed leaf tobacco. The method of drying processed leaf tobacco is not particularly limited, and the same method as in the leaf tobacco curing step can be applied. Ordinarily, the drying is performed, using a multi-chamber dryer or a rotary dryer, by hot air, for example.

[0083] The drying temperature is not particularly limited; however, in order to minimize the moisture content of leaf tobacco before the storage step to provide leaf tobacco having a darker green color, the temperature is ordinarily 15 °C or more and 60°C or less, preferably 17°C or more and 50°C or less, more preferably 20°C or more and 40°C or less. For the same reasons, the drying time is ordinarily 2.5 hours or more and 5 hours or less, preferably 0.5 hours or more and 1 hour or less, more preferably 5 minutes or more and 15 minutes or less.

[0084] The drying is preferably performed such that leaf tobacco having been subjected to the drying step has a moisture content of 7 wt.% or less, more preferably 5 wt.% or less.

[0085] In the case of using a cut-stem dryer to dry processed leaf tobacco, the conveying speed of processed leaf tobacco may be set to, for example, 3 m/min or more and 25 m/min or less, 4 m/min or more and 20 m/min or less, or 5 m/min or more and 15 m/min or less.

[Moisture measurement step]

[0086] The method for manufacturing processed leaf tobacco according to this embodiment may include a moisture measurement step of measuring the moisture content of leaf tobacco or processed leaf tobacco. The timing of performing moisture measurement is not limited, it is appropriately performed before or after the steps or during the steps.

[0087] Even with, in the storage step, control of the moisture content of leaf tobacco or processed leaf tobacco, when the moisture content of leaf tobacco or processed leaf tobacco has increased in steps before or after the storage step, leaf tobacco may discolor in these steps; thus, also in the steps other than the storage step, moisture content is preferably measured to thereby determine whether the moisture content increases.

[0088] The processed leaf tobacco having been subjected to the above-described steps is finally packaged and shipped, or directly incorporated into final products.

<Applications of processed leaf tobacco>

[0089] The above-described processed leaf tobacco is not particularly limited in terms of applications, and can be appropriately subjected to treatment steps as needed and applied to smokeless tobacco, cigarettes, and electric-heating smoking articles, for example.

[0090] In the case of applying the processed leaf tobacco to smokeless tobacco, the usage form of processed leaf tobacco is not particularly limited and examples include snus, gum, chewing tobacco, snuff, compressed tobacco (tablets, sticks, and the like), and edible films.

[0091] For example, in the case of manufacturing, as snus, smokeless tobacco, the manufacturing can be performed by a publicly known method. In this case, it can be obtained by filling, by a publicly known method, the tobacco material manufactured by the above-described manufacturing method, into a package material formed of a material such as nonwoven fabric. For example, an adjusted amount of the tobacco material is filled and means such as heat-sealing is used to achieve sealing to obtain snus.

[0092] The package material used is not particularly limited, but, for example, cellulose-based nonwoven fabric is preferably used.

[0093] In the case of providing, as a smokeless tobacco product, for example, gum, it is obtained in the following manner: the tobacco material obtained by the manufacturing method according to the present invention is mixed with a publicly known gum base by a publicly known method. The chewing tobacco, snuff, and compressed tobacco can also be obtained, except for using the tobacco material obtained by the manufacturing method according to the present

invention, by publicly known methods.

[0094] In smokeless tobacco materials, the ratio of processed leaf tobacco according to the above-described embodiment may be 1 to 100 wt.%.

EXAMPLES

[0095] Hereinafter, the present invention will be described more specifically with reference to Examples. However, the present invention is not construed as being limited to the following Examples.

[Method of measuring moisture content]

[0096] In each of Experimental Examples below, the moisture content of leaf tobacco was measured in the following manner. First, 1.0 g of a sample of the target leaf tobacco was weighed, and dried in a stationary moisture measurement instrument (halogen moisture analyzer manufactured by OHAUS Corporation) set at 100°C for 3 minutes. After the drying, the displayed value calculated by the moisture measurement instrument was defined as the moisture content.

[Method of measuring a* value, b* value, and L* value in CIELab colorimetric system]

[0097] The a* value, b* value, and L* value of leaf tobacco were measured by measuring the surfaces of leaf tobacco using a spectrophotometer (KONICAMINOLTA/CM3500d, Konica MinoltaHoldings, Inc). The color measurement operation was performed by applying standard light (color-measurement standard illuminant D65, standard light by CIE and ISO), and measuring reflected light (reflection color measurement/specular component exclude method (SCE)) to obtain values. Note that color definition is expressed in accordance with the L*a*b* colorimetric system employed by Commission International de l'Eclairage (Commission International de l'Eclairage: CIE) and JIS.

<Experimental Example 1>

[0098] After leaf tobacco (average particle size: 10 mm or less) was harvested, 1 kg of the leaf tobacco was placed into a plastic storage container; immediately after that, the opening of the storage container was tied up to achieve sealing, and the leaf tobacco was stored under storage conditions at ordinary temperature (20°C), ordinary humidity (60%RH), and ordinary pressure (atmospheric pressure) for 120 days. After sealing of the storage container, the ratio of the weight of the leaf tobacco to the volume of the storage container was 60 wt.%.

[0099] At immediately before placing the leaf tobacco into the storage container (initial stage), after storage for 60 days, after storage for 90 days, and after storage for 120 days, the moisture contents and the L* values, a* values, and b* values in the CIELab colorimetric system will be described in Table 1 below. Note that L* and b* measured at these stages were respectively found to be within the range of 44.1 to 46.5 and within the range of 15.7 to 22.0. After storage for 60 days, after storage for 90 days, and after storage for 120 days, the moisture contents and the parameters in the CIELab colorimetric system were measured in the following manner: after the elapse of each of the storage periods, the sealed storage container was temporarily opened; 100 g of leaf tobacco was collected and then immediately the storage container was sealed; the collected leaf tobacco was measured. In Table 1 below, after storage for 60 days, after storage for 90 days, and after storage for 120 days, the moisture content slightly varies; one of the causes of the variations is inferentially variations in the time from opening of the storage container to the measurement of the moisture content.

[0100] In this Experimental Example 1, leaf tobacco having an initial moisture content of leaf tobacco of 6.19 wt.% was used. Note that, between Experiment 1 and Experiment 2 described later, the leaf tobaccos are different in the initial moisture content, but the initial a* values are the same. This is because, immediately before the storage step, the moisture contents of the leaf tobaccos were adjusted and the a* values do not change immediately after changes in the moisture contents, so that, at the initial stage, the a* values did not change.

[0101] Note that, after the elapse of each of the storage periods except for the initial stage, the moisture content and a* value of the leaf tobacco were measured, after the elapse of each of the storage periods, for a plurality of leaf tobaccos taken out of the storage container. The values described in Table 1 below are values calculated as average values of the measurement values of the plurality of leaf tobaccos taken out of the storage container after the elapse of each of the periods.

<Experimental Example 2>

[0102] The same experiment as in Experimental Example 1 was performed except that, as the leaf tobacco used, leaf tobacco having an initial moisture content of 9.57 wt.% was used. The results of this experiment will be described in Table 1 below. Note that L* and b* measured in the stages were respectively found to be in the range of 39.7 to 46.5

and in the range of 16.3 to 22.0.

[Table 1]

			Initial stage	60 days	90 days	120 days
Experimental Example 1	Moisture content	(wt.%)	6.19	8.11	8.23	8.50
	a* value	(-)	-5.2	-3.5	-3.7	-3.3
Experimental Example 2	Moisture content	(wt.%)	9.57	10.62	9.82	9.83
	a* value	(-)	-5.2	-2.7	-1.8	-1.9

[0103] Table 1 above has demonstrated the following: in Experimental Example 1 in which the initial moisture content of leaf tobacco is 8.5 wt.% or less and the moisture content of the leaf tobacco is retained at 8.5 wt.% or less, Experimental Example 1 falling within the scope of embodiments according to the present invention, after the elapse of each of the storage periods, the a* value is smaller than that of Experimental Example 2 not falling within the scope of embodiments of the present invention.

[0104] As has been demonstrated, the present invention provides a method for manufacturing processed leaf tobacco, the method including a storage step to which a storage method for providing leaf tobacco having a desired green color maintained even after the elapse of a storage period is applied, and a method for storing leaf tobacco.

Claims

1. A method for manufacturing a processed leaf tobacco, the method comprising a storage step of storing a leaf tobacco using a storage container,
wherein, in the storage step, an initial moisture content of the leaf tobacco is 8.5 wt.% or less and a moisture content of the leaf tobacco is retained at 8.5 wt.% or less.

2. The method for manufacturing the processed leaf tobacco according to claim 1, wherein, in the storage step, an initial a* value in the CIELab colorimetric system of the leaf tobacco is -2.0 or less.

3. The method for manufacturing the processed leaf tobacco according to claim 1 or 2, wherein, in the storage step, an a* value in the CIELab colorimetric system of the leaf tobacco is retained at -2.0 or less.

4. The method for manufacturing the processed leaf tobacco according to any one of claims 1 to 3, wherein, in the storage step, a storage temperature is ordinary temperature.

5. The method for manufacturing the processed leaf tobacco according to any one of claims 1 to 4, wherein, in the storage step, the storage container is sealed.

6. The method for manufacturing the processed leaf tobacco according to any one of claims 1 to 5, the method comprising a processing step of processing the processed leaf tobacco having been subjected to the storage step.

7. The method for manufacturing the processed leaf tobacco according to any one of claims 1 to 6, wherein the processed leaf tobacco is manufactured for smokeless tobacco.

8. A method for storing a leaf tobacco, the method comprising storing leaf tobacco using a storage container,
wherein an initial moisture content of the leaf tobacco is 8.5 wt.% or less and a moisture content of the leaf tobacco is retained at 8.5 wt.% or less.

INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl. A24B3/00(2006.01)i, A24B13/00(2006.01)i
FI: A24B3/00, 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)
Int.Cl. A24B3/00, 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.
X	WO 2014/156431 A1 (JAPAN TOBACCO INC.) 02 October 2014 (2014-10-02), paragraphs [0012]-[0027]	1-8
A	WO 2015/098743 A1 (JAPAN TOBACCO INC.) 02 July 2015 (2015-07-02), entire text, all drawings	1-8
A	WO 2018/139068 A1 (JAPAN TOBACCO INC.) 02 August 2018 (2018-08-02), entire text, all drawings	1-8

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/015217

WO 2014/156431 A1	02 October 2014	EP 2957185 A1 paragraphs [0018]-[0090]
WO 2015/098743 A1	02 July 2015	EP 3087851 A1 entire text, all drawings KR 10-2016-0082542 A
WO 2018/139068 A1	02 August 2018	EP 3556227 A1 entire text, all drawings CN 110290713 A

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REFERENCES CITED IN THE DESCRIPTION

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- JP 2011529343 W **[0007]**
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Non-patent literature cited in the description

- Encyclopedia of Tobacco. Tobacco Academic Studies Center, 2009, vol. 3, 31 **[0023]**