ORAL POUCHED PRODUCT

The invention relates to an oral pouched product, such as an oral pouched smokeless tobacco product, comprising a filling material and a pouch enclosing the filling material, the pouch comprising a dry-laid nonwoven, the dry-laid nonwoven comprising staple fibres of regenerated cellulose and a binder, wherein the staple fibres of regenerated cellulose comprises lyocell staple fibres and the dry-laid nonwoven has a basis weight of at most 25 g/m², such as within the range of from 20 g/m² to 25 g/m² or from 20 g/m² to 23 g/m².

Figure 3
Description

TECHNICAL FIELD

[0001] The present disclosure relates to an oral pouched snuff product, such as an oral pouched smokeless tobacco product, comprising a filling material, such as tobacco material, and a saliva-permeable pouch enclosing the filling material.

BACKGROUND

[0002] Smokeless tobacco for oral use includes chewing tobacco, dry snuff and moist (wet) snuff. Generally, dry snuff has a water content of less than 10 wt% and moist snuff has a water content of above 40 wt%. Semi-dry products having between 10% to 40 wt% water content are also available.
[0003] Smokeless tobacco products for oral use are made from tobacco leaves, such as lamina and stem of the tobacco leaf. The material from roots and stalks are normally not utilized for production of smokeless tobacco compositions for oral use.
[0004] There are two types of moist snuff, the American type and the Scandinavian type which is also called snus. American-type moist snuff is commonly produced through a fermentation process. Scandinavian-type moist snuff is commonly produced in a heat-treatment process (pasteurization). The heat-treatment is carried out in order to degrade, destroy or denature at least a portion of the microorganisms in the tobacco preparation.
[0005] Both the American-type and the Scandinavian-type of moist snuff for oral use is available in loose form or portion-packed in a water-permeable, porous wrapper material forming a pouch. Pouched moist snuff is typically used by the consumer by placing the pouch between the upper or lower gum and the lip and retaining it there for a limited period of time. The pouch material holds the tobacco in place while allowing saliva to pass into the interior of the pouch and allowing flavours and nicotine to diffuse from the tobacco material into the consumer’s mouth.
[0006] The pouch material used in oral pouched snuff products is typically a dry-laid bonded nonwoven comprising viscose rayon fibres (i.e. regenerated cellulose) and an acrylic polymer that acts as binder in the nonwoven material and provides for heat-sealing of the pouches during manufacturing thereof. The viscose nonwoven material normally used for smokeless tobacco pouches is similar to the fabric used in tea bags. Nonwovens are fabrics that are neither woven nor knitted. Methods for the manufacturing of nonwoven materials are commonly known in the art. Further information on nonwovens is found in "Handbook of Nonwovens" by S. Russel, published by Woodhead Publ. Ltd., 2007.
[0007] Nonwoven properties depend, for instance, on the fibres used, the method used for web production and the method used for bonding of the web.
[0008] In view of the fibres used, nonwovens may be classified as staple fibre nonwoven or continuous filament nonwoven.
[0009] In view of the web production method used, nonwovens may be classified as wet-laid, dry-laid, spun laid or melt blown nonwoven.
[0010] Continuous filament nonwoven may comprise spun laid or melt blown webs.
[0011] Staple fibre nonwoven may comprise dry-laid or wet-laid webs.
[0012] Dry-laid webs may be carded or airlaid. If carded, the manufacturing process may result in fibres substantially being oriented in the carding direction. Dry-laid nonwoven may comprise parallel laid web, cross laid webs or randomly laid webs. Parallel laid webs and cross laid webs normally include two or more superimposed web layers, which normally are carded, while randomly laid webs normally include a single web layer, which may be airlaid.
[0013] Several methods may be used to bond together the fibres in the web (also called web consolidation). The different types of bonding methods may be classified as mechanical bonding (e.g. needle punching, stitch bonding, hydroentanglement), chemical bonding (e.g. saturation bonding, spray bonding, foam bonding, powder bonding, print bonding) and thermal bonding (e.g. hot calendering, through-air thermal bonding, ultrasonic bonding, radiant-heat bonding). More than one bonding method may be used to consolidate the nonwoven.
[0014] In chemical bonding, a binder (also called bonding agent or adhesive) is combined with the fibres. This type of nonwoven is generally called chemically bonded or adhesive bonded nonwoven.
[0015] Regenerated fibres, which are also called semi-synthetic fibres, are normally cellulose regenerated fibres (also called reconstituted cellulose fibres), such as rayon. The regenerated cellulose used in the manufacturing of rayon fibres is normally derived from wood pulp but regenerated cellulose from other origins, such as bamboo, may also be used.
[0016] Viscose rayon staple fibres may be formed by extruding a viscose solution (i.e. a solution of cellulose xanthate) through a spinneret and as the viscose exits the spinneret, it lands in a bath of mineral acid, such as sulfuric acid, resulting in the formation of filaments. These filaments are then cut to a desired length, thereby forming staple fibres. Lyocell is a form of rayon made from dissolving pulp (bleached wood pulp).
[0017] Pouched smokeless tobacco products may be produced by measuring portions of the smokeless tobacco
Pouched smokeless tobacco products may alternatively be produced by placing portions of moist snuff on a
nonwoven web using a pouch packer machine in accordance with the device disclosed in US 6,135,120. This device
comprises feeding means for feeding the tobacco material into pockets formed in a rotary portioning wheel for portioning
the material into portions, at least one compression means for compressing the tobacco material portions, a unit for
advancing a packaging material, such as a nonwoven web, in synchrony with the compressed portions, at least one
discharge means for discharging the portions from the pockets to the packaging material, and a forming unit for forming
individual portion packages (i.e. pouched smokeless tobacco products) from the discharged portions and the packaging
material. At the intended point of discharge of the portions of the packaging material, said packaging material has the
form of a tape, the compression means being arranged to compress the portions in a direction which differs from the
discharging and the feeding directions. The compression is preferably effected in a direction perpendicular to the dis-
charging and the feeding directions. The compression may be effected in the axial direction of the portioning wheel
whereas the feeding and discharging may be effected in the radial direction of said wheel. This technique is herein
referred to as the “NYPS” technique.

The individual portions are sealed and cut apart thereby forming rectangular “pillow shaped” (or any other
desired form) pouched products. Generally, each final pouched product includes parallel transverse seams with seals
at opposite ends and a longitudinal seal with a seal orthogonal to the transverse seams/seals. The seals should be of
sufficient strength to preserve the integrity of the pouched product during use while not disturbing the user’s experience.

The organoleptic properties, such as texture, aroma, taste, shape and appearance, of the pouched smokeless
tobacco product are of high importance to the user.

Oral pouch snuff products, such as oral pouched smokeless tobacco products, are normally sized and
configured to fit comfortably and discreetly in a user’s mouth between the upper or lower gum and the lip and may have
a generally rectangular shape.

The user’s experience may be affected by the initial moisture content of the pouched product when put in the
user’s mouth and the saliva uptake (rate of uptake and amount of saliva taken up) by the pouched product.

Oral pouch smokeless tobacco products may be post-moisturized after pouch formation or not post-mois-
turized after pouch formation which herein is referred to as non-post-moisturized. Post-moisturized pouched products
may be produced by spraying water on the pouched smokeless tobacco product before packaging the pouched products
in cans. Post-moisturized pouched products are sometimes referred to as “original snus”. Non-post-moisturized pouched
products are sometimes referred to as “white snus” and are by some users considered to have a more appealing
appearance. The moisture content of the pouched smokeless tobacco product comprising moist or semi-dry
snuff is normally within the range of from 25 to 55% w/w based on the weight of the pouched product (i.e. the total weight
of snuff and pouch material).

There are also nicotine-containing non-tobacco snuff products and nicotine-free non-tobacco snuff products
which may be offered as alternatives to smokeless tobacco products. These non-tobacco snuff products are
generally used in the same manner as the corresponding tobacco snuff products.

An example of a nicotine-containing non-tobacco snuff product is provided in WO 2012/134380.

Examples of nicotine-free non-tobacco snuff products and the manufacture thereof are provided in WO

It is generally desirable to provide oral pouched snuff products with rapid release of flavour and/or nicotine to
provide an initial strong flavour experience and/or reduce nicotine craving.

The release of flavours and/or nicotine from the filling material, such as a smokeless tobacco composition, of
an oral pouched snuff product, may be delayed and/or diminished by the pouch material. The initial amount of flavours
and/or nicotine released from the pouched tobacco may be experienced by the consumer as unsatisfactory or even
negligible. This problem is often more pronounced for non-post-moisturized oral pouched snuff products. To diminish
this effect and provide for a more rapid taste experience, it has been suggested to add flavouring agents to the pouch
material.

The material of a snuff pouch should during manufacturing of the pouch provide for heat-sealing, upon storage
of the pouch exhibit none or a low degree of discoloration and upon usage by a consumer preserve integrity and strength,
allow for a desired release profile of nicotine, if present, and flavours and provide a pleasant mouth-feel.

US 2014/0026912 relates to a viscose fleece for a smokeless tobacco pouch. The fleece is formed with apertures
and may comprise fibres having a decitex of 1.5 or less. The fleece is said to be softer than a standard fleece and a
pouch formed from the fleece is said to have a faster release rate of tobacco constituents compared to a pouch formed from a standard fleece.

Despite various attempts that have been made, there is a need for an improved pouch material in order to be able to meet diversifying consumer requirements.

SUMMARY OF THE INVENTION

An object of the present invention is to alleviate one or more of the problems discussed above, and to provide advantages and aspects not provided by hitherto known oral pouched snuff products, in particular oral pouched smokeless tobacco products.

There is, as disclosed herein, provided an oral pouched snuff product comprising a filling material and a saliva-permeable pouch enclosing the filling material, the pouch comprising a dry-laid nonwoven, the dry-laid nonwoven comprising staple fibres of regenerated cellulose and a binder, the staple fibres of regenerated cellulose comprising lyocell staple fibres, and the dry-laid nonwoven having a basis weight of at most 25 g/m², such as within the range of from 20 g/m² to 25 g/m² or from 20 g/m² to 23 g/m².

The basis weight of the dry-laid nonwoven, as disclosed herein, is measured according to the standard test method WSP 130.1(05). The basis weight is determined for the dry-laid nonwoven as a whole. Thus, the basis weight of the dry-laid nonwoven includes the mass of all components of the nonwoven, such as the staple fibres of regenerated cellulose and the binder, per unit area. WSP stands for Worldwide Strategic Partners, which indicates that the test method has been reviewed and approved by INDA and EDANA, being international associations serving the nonwovens and related industries.

The binder of the dry-laid nonwoven, as disclosed herein, may be one or more copolymers of vinyl acetate and acrylic acid ester.

The dry-laid nonwoven, as disclosed herein, may consist of a single web layer.

The dry-laid nonwoven, as disclosed herein, may be a carded dry-laid nonwoven.

The lyocell staple fibres may have a staple length within the range of from 20 to 60 mm, such as within the range of from 35 to 45 mm.

The lyocell staple fibres may be devoid of any colouring agent.

Lyocell staple fibres are commercially available from Lenzing AG under the trade names Lenzing Lyocell®, Tencel® and Tencel Skin®.

Tencel Skin® fibres are lyocell staple fibres devoid of titanium dioxide.

The dry-laid nonwoven of the oral pouched snuff product as disclosed herein may have an air permeability of at least 4 400 I/m²/s, preferably of at least 4 600 I/m²/s, or within the range of from 4 400 I/m²/s to 4 800 I/m²/s, as measured according to the standard test method WSP 070.1.R3(12) with a test area of 20 cm² and a pressure drop of 200 Pa.

The lyocell staple fibres may have a staple length within the range of from 20 to 60 mm, such as within the range of from 35 to 45 mm.

The lyocell staple fibres may have a linear mass density in the range of from 1.0 to 2.2 decitex, preferably in the range of from 1.5 to 2.0 decitex, more preferably in the range of from 1.6 to 1.8 decitex.

The dry-laid nonwoven of the oral pouched snuff product as disclosed herein may have a main fibre orientation, which may coincide or substantially coincide with the above-mentioned carding direction. The main fibre orientation is defined by that more than 50%, preferably more than 70%, of the staple fibres have an orientation being along the direction of the main fibre orientation +/- 45°. If the fibres are curved, a mean orientation is defined by the forming a theoretical straight fibre by minimizing the sums of the squared distances between the actual fibre and the theoretical straight fibre along the length of the actual fibre.

In the dry-laid nonwoven, as disclosed herein, at least 50%, such as at least 70%, or at least 90%, all or substantially all of the staple fibres of regenerated cellulose may be lyocell staple fibres. The staple fibres of regenerated cellulose may thus consist of lyocell staple fibres.

The lyocell staple fibres may be mono-component lyocell fibres.

The lyocell staple fibres may be devoid of whitening agent, such as being devoid of titanium dioxide. The lyocell staple fibres may be devoid of any colouring agent.

Lyocell staple fibres are commercially available from Lenzing AG under the trade names Lenzing Lyocell®, Tencel® and Tencel Skin®.

Tencel Skin® fibres are lyocell staple fibres devoid of titanium dioxide.

The dry-laid nonwoven of the oral pouched snuff product as disclosed herein may have a main fibre orientation, which may coincide or substantially coincide with the above-mentioned carding direction. The main fibre orientation is defined by that more than 50%, preferably more than 70%, of the staple fibres have an orientation being along the direction of the main fibre orientation +/- 45°. If the fibres are curved, a mean orientation is defined by the forming a theoretical straight fibre by minimizing the sums of the squared distances between the actual fibre and the theoretical straight fibre along the length of the actual fibre.

The lyocell staple fibres may have a staple length within the range of from 20 to 60 mm, such as within the range of from 35 to 45 mm.

The lyocell staple fibres may have a linear mass density in the range of from 1.0 to 2.2 decitex, preferably in the range of from 1.5 to 2.0 decitex, more preferably in the range of from 1.6 to 1.8 decitex.

The dry-laid nonwoven of the oral pouched snuff product as disclosed herein may have a thickness of at most 180 μm, such as within the range of from 100 μm to 180 μm, or within the range of from 100 μm to 170 μm as measured according to the standard test method WSP 120.6(05).

The dry-laid nonwoven of the oral pouched snuff product as disclosed herein may have an air permeability of at least 4 400 I/m²/s, preferably of at least 4 600 I/m²/s, more preferably of at least 4 800 I/m²/s, as measured according to the standard test method WSP 070.1.R3(12) with a test area of 20 cm² and a pressure drop of 200 Pa.

The dry-laid nonwoven of the oral pouched snuff product as disclosed herein may have a main fibre orientation, which may coincide or substantially coincide with the above-mentioned carding direction. The main fibre orientation is defined by that more than 50%, preferably more than 70%, of the staple fibres have an orientation being along the direction of the main fibre orientation +/- 45°. If the fibres are curved, a mean orientation is defined by the forming a theoretical straight fibre by minimizing the sums of the squared distances between the actual fibre and the theoretical straight fibre along the length of the actual fibre.

The lyocell staple fibres may have a staple length within the range of from 20 to 60 mm, such as within the range of from 35 to 45 mm.

The lyocell staple fibres may have a linear mass density in the range of from 1.0 to 2.2 decitex, preferably in the range of from 1.5 to 2.0 decitex, more preferably in the range of from 1.6 to 1.8 decitex.

The dry-laid nonwoven of the oral pouched snuff product as disclosed herein may have a thickness of at most 180 μm, such as within the range of from 100 μm to 180 μm, or within the range of from 100 μm to 170 μm as measured according to the standard test method WSP 120.6(05).

The dry-laid nonwoven of the oral pouched snuff product as disclosed herein may have an air permeability of at least 4 400 I/m²/s, preferably of at least 4 600 I/m²/s, more preferably of at least 4 800 I/m²/s, as measured according to the standard test method WSP 070.1.R3(12) with a test area of 20 cm² and a pressure drop of 200 Pa.
The tensile strength of the dry-laid nonwoven of the oral pouched snuff product as disclosed herein may, as measured in dry state, be in the range of from 1.5 to 2.0 N/mm, such as in the range of 1.5 to 1.7 N/mm in the MD direction and in the range of from 0.1 to 0.3 N/mm, such as in the range of 0.15 to 0.25 N/mm, in the CD direction, as measured according to the standard test method WSP 110.4(05).

The tensile strength index is obtained by dividing the tensile strength value with the basis weight. The dry-laid nonwoven of the oral pouched snuff product as disclosed herein may, in dry state, have a MD tensile strength index above 60 Nm/g, such as in the range of from 60 to 80 Nm/g or from 70 to 80 Nm/g. The CD tensile strength index may be in the range of from 7 to 11 Nm/g.

The relative wet strength, with wet tensile strength measured according to standard test method WSP 110.4(05) and taken in relation to the dry tensile strength measured according to standard test method WSP 110.4(05), may be above 40% or above 50% in the MD direction and above 30% or above 35% in the CD direction for the dry-laid nonwoven of the oral pouched snuff product as disclosed herein.

The saliva-permeable pouch enclosing the filling material of the oral pouched snuff product as disclosed herein may comprise one or more heat seals. The dry-laid nonwoven of the oral pouched snuff product as disclosed herein may, as measured in dry state, have a heat seal strength being at least 0.17 N/mm, preferably of at least 0.19 N/mm, more preferably of at least 0.21 N/mm. The method used to determine the heat seal strength in dry state is further described below.

The dry-laid nonwoven may have an open area of at least 12%, such as at least 15%. The method used to determine the open area is further described below.

The oral pouched snuff product as disclosed herein may be an oral pouched smokeless tobacco product. The filling material may then comprise tobacco material.

The oral pouched snuff product as disclosed herein may be a post-moisturized oral pouched smokeless tobacco product.

The post-moisturized oral pouched smokeless tobacco product may have moisture content within the range of from 45 to 55% w/w, such as within the range of from 50 to 53% w/w, based on the total weight of the product.

The oral pouched snuff product as disclosed herein may be a non-post-moisturized oral pouched smokeless tobacco product.

The oral pouched snuff product as disclosed herein may be an oral pouched non-tobacco nicotine-free snuff product. The filling material may then comprise any non-tobacco plant fibre. Examples of non-tobacco plant fibres are maize fibres, oat fibres, tomato fibres, barley fibres, rye fibres, sugar beet fibres, buck wheat fibres, potato fibres, apple fibres, cocoa fibres, bamboo fibres, and citrus fibres. The oral pouched smokeless tobacco product as disclosed herein may be an oral pouched non-tobacco nicotine-containing snuff product. The filling material may then, for instance, comprise microcrystalline cellulose and nicotine salt, such as nicotine bitartrate.

It has been found that the oral pouched snuff product according to the present disclosure provides a more transparent look than standard viscose nonwoven which results in the filling material, e.g. snus, inside the pouch being more visible which some consumers may find appealing. Moreover, the visual appearance of the oral pouched snuff product according to the present disclosure is preserved upon storage thereof. It has been found that the oral pouched snuff product as disclosed herein provides a very low degree of discoloration of the pouch material upon storage of the pouched snuff product.

In addition, the oral pouched snuff product according to the present disclosure may provide a more rapid taste experience in comparison to an oral pouched product made of standard viscose nonwoven. In addition, the oral pouched snuff product according to the present disclosure may provide a stronger taste in comparison to an oral pouched product made of standard viscose nonwoven.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will hereinafter be further explained by means of non-limiting examples with reference to the appended figures wherein:

Fig. 1 illustrates a sample used in a method for determining heat sealing strength,

Fig. 2 is a microscopy image of a Reference Example of the drylaid nonwoven, and

Fig. 3 is a microscopy image of Example 1A of the dry-laid nonwoven.

DETAILED DESCRIPTION

By “tobacco” as used herein is meant any part, e.g., leaves, stems, and stalks, of any member of the genus...
Nicotiana. The tobacco may be whole, shredded, threshed, cut, ground, cured, aged, fermented, or treated otherwise, e.g., granulated or encapsulated.

The term "tobacco material" is used herein for tobacco leaves or parts of leaves, such as lamina and stem. The leaves and parts of leaves may be finely divided (disintegrated), such as ground, cut, shredded or threshed, and the parts of leaves may be blended in defined proportions in the tobacco material.

"Oral" and "oral use" is in all contexts used herein as a description for use in the oral cavity of a human, such as buccal placement.

The term "oral pouched snuff products" as used herein includes oral pouched non-tobacco snuff products, which may be nicotine-containing or nicotine-free, as well as oral pouched tobacco-containing snuff products (also called oral pouched smokeless tobacco products).

As used herein the terms "pouched snuff product for oral use" or "oral pouched snuff product" refer to a portion of smokeless tobacco or tobacco-free filling material, which may be nicotine-containing or nicotine-free as described herein, packed in a saliva-permeable pouch material intended for oral use.

As used herein, the term "moisture content" refers to the total amount of oven volatile ingredients, such as water and other oven volatiles (e.g. propylene glycol) in the preparation, composition or product referred to. The moisture content is given herein as percent by weight (wt%) of the total weight of the preparation, composition or product referred to.

Some fibrous materials may exhibit hygroscopic properties. Hygroscopic materials maintain equilibrium moisture content depending on the ambient moisture and temperature.

The moisture content as referred to herein may be determined by using a method based on literature references Federal Register/ vol.74, no. 4/712-719/Wednesday, January 7, 2009/Notices "Total moisture determination" and AOAC (Association of Official Analytical Chemists), Official Methods of Analysis 966.02: "Moisture in Tobacco" (1990), Fifth Edition, K. H. Heirich (ed). In this method, the moisture content is determined gravimetrically by taking 2.5±0.25 g sample and weighing the sample at ambient conditions, herein defined as being at a temperature of 22°C and a relative humidity of 60%, before evaporation of moisture and after completion of dehydration. Mettler Toledo's Moisture Analyzer HB43, a balance with halogen heating technology, is used (instead of an oven and a balance as in the mentioned literature references) in the experiments described herein. The sample is heated to 105°C (instead of 99.5±0.5°C as in the mentioned literature references). The measurement is stopped when the weight change is less than 1 mg during a 90 seconds time frame. The moisture content as weight percent of the sample is then calculated automatically by the Moisture Analyzer HB43.

The term "additional ingredient" as used herein denotes substances other than tobacco material, salt (e.g. sodium chloride, potassium chloride, magnesium chloride, calcium chloride and any combinations thereof), pH adjuster (e.g. sodium hydroxide, potassium hydroxide, potassium carbonate, sodium carbonate or sodium bicarbonate) and water.

"Flavour" or "flavouring agent" is used herein for a substance used to influence the aroma and/or taste of the snuff product, including, but not limited to, essential oils, single flavour compounds, compounded flavourings, and extracts.

As used herein "finely divided" means an average particle size of less than 2 mm. The particles of the finely divided tobacco material may be sized to pass through a screen of about 10 (US) mesh, i.e. sieve size 2.0 mm, or 18 (US) mesh, i.e. sieve size 1.0 mm.

As used herein % w/w or "wt %" or "weight %" refers to weight percent of the ingredient referred to of the total weight of the preparation, composition or product referred to.

As used herein, reference to "dry weight percent" refers to weight percent of the ingredient referred to on the basis of the total weight of dry ingredients, i.e. all ingredients of the preparation, composition or product referred to excluding moisture content.

As used herein, the term "staple fibres" are used for fibres formed by cutting filaments to a desired staple fibre length. Thus, the staple fibre length is essentially the same for every fibre in a group of staple fibres. Staple fibres normally have a staple fibre length of at least 3 mm.

The term "mono-component fibre" is used herein for a fibre which consists of only one polymer component.

As disclosed herein, the oral pouched snuff product may be an oral pouched smokeless tobacco product and the filling material may then comprise tobacco material, in particular tobacco material in the form of moist snuff or snus.

However, the oral pouched snuff product may alternatively or additionally contain any other botanical filling material, such as any non-tobacco plant fibres.

The oral pouched snuff product as disclosed herein may be an oral pouched non-tobacco nicotine-containing snuff product. The filling material may then be a particulate material comprising nicotine or a salt thereof and one or more fillers, such as polysaccharides (e.g. maltitol and mannitol) and/or microcrystalline cellulose.
An oral pouched smokeless tobacco product generally includes a tobacco composition comprising divided (e.g. ground or cut) tobacco material, water, salt (e.g. sodium chloride, potassium chloride, magnesium chloride, calcium chloride or any combinations thereof), pH adjuster (e.g. sodium carbonate, sodium hydroxide, potassium hydroxide, potassium carbonate, sodium bicarbonate or magnesium carbonate) and optionally one or more additional ingredients, such as flavouring agents, cooling agents, heating agents, sweetening agents, colorants, humectants (e.g. glycerol or propylene glycol), antioxidants, preservatives (e.g. as potassium sorbate), binders, fillers, non-tobacco plant fibres and/or disintegration aids. The smokeless tobacco composition may be a moist snuff composition, such as a snus composition.

Typically, the amount of tobacco material in the smokeless tobacco composition is within the range of from about 50 to about 80% w/w based on dry weight of the smokeless tobacco composition.

The tobacco material is typically finely divided, such as cut (shredded) or ground tobacco material, in granulated form or in powder form, i.e. tobacco flour, for instance having an average particle size of about 1 mm to about 2 mm.

The tobacco material may be a cured (aged) tobacco material.

Generally, cured and ground or cut tobacco material has moisture content within the range of from 3% to 15% w/w, such as within the range of from 3 to 10% w/w or 5% to 8% w/w.

Generally, the pH of such finely divided tobacco material is within the range of from 4 to 6, such as within the range of from 4.5 to 6.

Tobacco can also be fermented before used to make an oral smokeless tobacco product. Fermentation may alter pH of the tobacco such as increasing the pH to 7.5.

pH of divided tobacco material, such as tobacco flour, can be measured by adding 100 ml of distilled water to 5 gram of tobacco material, for instance in a 100 ml Erlenmeyer flask, stirring the resulting mixture at room temperature with a magnetic stirrer at 100 rpm for about 5 minutes, and then measuring the pH of an extract obtained therefrom with a calibrated (according to the manufacturer’s instructions) pH metre. For correctness of readings, the sample solutions shall be analysed within one hour.

Salt, such as sodium chloride, potassium chloride, magnesium chloride, calcium chloride and any combinations thereof, is added mainly for its effect on taste but it also has a preservative action which contributes to improved shelf life of the product. Salt, such as sodium chloride lowers the water activity of the products, thus preventing microorganisms from growing. The natural occurrence of sodium chloride in tobacco material is normally below 2% w/w, typically below 1% w/w, based on dry weight of the tobacco material. Normally, the amount of added salt in the smokeless tobacco composition is within the range of from about 0.5 to about 10% w/w based on dry weight of the tobacco composition.

Humectants, such as propylene glycol or glycerol, may also be added to protect the product from drying out and may also have a preservative effect since the water activity of the product will be lowered, thereby preventing microorganisms from growing. Normally, the amount of humectant in the smokeless tobacco composition is within the range of from about 3 to about 5% w/w, based on dry weight of the tobacco composition.

Humectants, such as propylene glycol or glycerol, may also be added to protect the product from drying out and may also have a preservative effect since the water activity of the product will be lowered, thereby preventing microorganisms from growing. Normally, the amount of humectant in the smokeless tobacco composition is within the range of from about 3 to about 5% w/w, based on dry weight of the tobacco composition.

Flavours used are generally natural or nature identical compounds that comply with food regulations. Flavours are usually dissolved in ethanol when added.

In addition, the smokeless tobacco composition may optionally comprise other botanical filling material, such as any non-tobacco plant fibre. Examples of non-tobacco plant fibres are maize fibres, oat fibres, tomato fibres, barley fibres, rye fibres, sugar beet fibres, buck wheat fibres, potato fibres, apple fibres, cocoa fibres, bamboo fibres and citrus fibres. The amount of non-tobacco plant fibre material, such as bamboo fibres, in the smokeless tobacco composition may be within the range of from about 1 to about 60% w/w, such as from about 2 to about 20% w/w, based on dry weight of the smokeless tobacco composition.

The pouching product as disclosed herein are intended for use in the oral cavity, such as buccal placement (e.g. by placing the pouching product between the upper or lower gum and the lip or cheek), and may therefore be referred to as oral pouched snuff product or portion-packed (pouched) product for oral use. The oral pouched snuff product is sized and configured to fit comfortably and discreetly in a user’s mouth between the upper or lower gum and the lip or cheek.

The oral pouched snuff product as disclosed herein may be a post-moisturized or non-post-moisturized oral pouched smokeless tobacco product. The moisture content of the oral pouched smokeless tobacco product as disclosed herein may be within the range of from 10 to 60% w/w, such as within the range of from 15 to 60% w/w or from 20 to 60% w/w or from 30 to 60% w/w or from 30 to 55% w/w or from 40 to 55% w/w or from 45 to 55% w/w or from 50 to 55% w/w, based on the total weight of the product.

The oral pouched snuff product as disclosed herein may be a non-post-moisturized oral pouched smokeless
tobacco product having moisture content within the range of from 30 to 60%, such as within the range of from 30 to 55% w/w or from 40 to 55% w/w or from 45 to 55% w/w or from 50 to 55% w/w or from 50 to 53% w/w, based on the total weight of the product.

[0103] The total weight of the oral pouched snuff product (including filling material and pouch) may be within the range of from 0.2 g to 2.0 g, such as within the range of from 0.3 g to 1.5 g or from 0.3 to 0.7 g.

[0104] The pouch material may comprise additional ingredients, such as flavouring agents and/or colorants.

[0105] When making snus according to GothiaTek® standard, which implies hygienic handling of all ingredients and pasteurization of the loaded materials thus assuring a final tobacco composition with negligible levels of bacteria, the typical main ingredients, besides tobacco, are water, sodium chloride (NaCl) and sodium carbonate (Na₂CO₃). Flavours and humectants (e.g. propylene glycol or glycerol) are also common ingredients and additional food approved ingredients might be used.

[0106] There are normally two major steps in the manufacturing process of converting tobacco to a snus composition; a) grinding (or cutting) and sieving and b) snus-processing.

a) Grinding and sieving

[0107] Generally, tobacco flour is produced by batch grinding. Compressed tobacco is emptied from its cases and torn to large fragments which are cut to pieces. The cut tobacco pieces are dried and transported to a mill. The tobacco is ground and ground tobacco particles are sieved and separated into fractions. Too large particles may be brought back to the mill for re-grinding. The cutting, grinding and sieving is done in equipment where foreign objects such as fragments of metallic material and stones are separated and removed from the tobacco. A number of approved fractions are weighed in separate fractions scales. The weighed tobacco flour fractions are collected to pre-set quantities in a container and blended by circulation. The blended tobacco flour is stored in a container. Different types of tobacco flours are kept in separate containers.

b) Snus-processing

[0108] The snus mixture (herein referred to as smokeless tobacco composition) is produced by batch processing and should be carried out in a closed system to minimize the risk of contamination from bacteria or foreign substances. Since automatic feeding of tobacco and the other ingredients is preferred, the whole process may be computer controlled and can be run day and night, all week around.

[0109] The process normally starts with loading of tobacco material in powder form (tobacco flour), water, sodium chloride (NaCl) and possibly additional ingredients, into a cylindrical blender. Loading is done while stirring. The loaded materials are mixed to a homogeneous blend, which is heated by injection of steam. The blend is then kept heated for several hours with support of steam to ensure reduction of the natural bacterial flora in the tobacco and to bring texture, taste and colour to the snus blend. Time, temperature and frequency of stirring during heat treatment, parameters specified for different snus blend qualities, are preferably controlled by a process computer program. After heat treatment, the blend is normally chilled by flow of cold water through the blender jacket during stirring. Water, flavours, pH adjuster, such as sodium carbonate, and possibly additional ingredients may then be added to the chilled blend. The blend is finally mixed to a homogeneous snus composition.

[0110] The oral pouched (i.e. portion-packed) products, such as oral pouched smokeless tobacco products, as disclosed herein, may be positioned randomly in a container. Alternatively or additionally, each oral pouched (i.e. portion-packed) product may be placed in a sachet.

[0111] Manufacturing of non-tobacco snuff products, which also may be referred to as oral smokeless non-tobacco snuff products, is similar to the procedure of manufacturing oral smokeless tobacco products except for that the tobacco material is replaced by a non-tobacco plant material.

[0112] The nicotine-free non-tobacco snuff composition as disclosed herein may comprise divided non-tobacco plant material (e.g. in flour form), water, salt (e.g. sodium chloride, potassium chloride, magnesium chloride, calcium chloride and any combinations thereof), and optionally one or more additional ingredients, such as flavouring agents, cooling agents, heating agents, sweetening agents, colorants, humectants (e.g. propylene glycol or glycerol), antioxidants, preservatives (e.g. potassium sorbate), binders, fillers, and disintegration aids. Examples of these additional ingredients, and the amounts thereof which are normally used, are herein provided in the disclosure relating to smokeless tobacco compositions.

[0113] Suitable non-tobacco plant materials are non-tobacco plant fibres, in particular dietary plant fibres, such as maize fibres, oat fibres, tomato fibres, barley fibres, rye fibres, apple fibres, sugar beet fibres, potato fibres, corn fibres, buckwheat fibres, cocoa fibres, bamboo fibres, citrus fibres and any combinations thereof.

[0114] Typically, the amount of non-tobacco plant material in the nicotine-free non-tobacco snuff composition is within the range of from about 50 to 80% w/w based on dry weight of the composition.
The nicotine-free non-tobacco snuff composition as disclosed herein may be enclosed in a saliva-permeable wrapper material forming a pouch, thereby providing an oral pouched nicotine-free non-tobacco snuff product.

Manufacturing of nicotine-free non-tobacco snuff products are described inWO 2007/126361 and WO 2008/133563.

The nicotine-containing non-tobacco snuff composition as disclosed herein may comprise a particulate material comprising nicotine or a salt thereof (e.g. nicotine bitartrate) and one more fillers, such as polysaccharides (e.g. maltitol or mannitol) and/or microcrystalline cellulose.

The nicotine-containing non-tobacco snuff composition as disclosed herein may be enclosed in a saliva-permeable wrapper material forming a pouch, thereby providing a nicotine-containing oral pouched non-tobacco snuff product.

Manufacturing of nicotine-containing non-tobacco snuff products is described in WO 2012/134380.

The non-tobacco snuff products as disclosed herein are used in the same manner as the corresponding tobacco snuff products. They offer a healthier alternative to oral smokeless tobacco products, since they do not contain tobacco and most often do not contain any nicotine either. Non-tobacco snuff products may also be used for the administration of drugs, as delivery systems intended for oral use and controlled release of biologically active substances.

The oral pouched snuff product may be packaged in a box, can, canister, cardboard box, bag, stick-pack wrapping, plastic wrapping, foil wrapping, blister pack or on a tray.

The oral pouched (i.e. portion-packed) snuff products, such as oral pouched smokeless tobacco products, as disclosed herein, may be positioned randomly in a container or in a pattern, for instance as described in WO 2012/069505. Alternatively or additionally, each oral pouched snuff product may be placed in a sachet.

The invention will be further described in the following non-limiting examples.

EXAMPLES

Example 1

Dry-laid nonwoven in accordance with the present disclosure was manufactured by spreading lyocell staple fibres on a conveyor belt and forming a single-layered web by carding. The dry-laid nonwoven was thereafter bound by impregnation using an aqueous dispersion of co-polymer of vinyl acetate and acrylic acid ester (binder). Examples 1A and 1B were taken from two different batches.

The thereby provided dry-laid nonwoven contained about 35% w/w, based on the dry weight of the nonwoven, of binder, and about 65% w/w, based on the dry weight of the nonwoven of lyocell staple fibres.

The lyocell fibres used, Tencel Skin®, were supplied by Lenzing AG. These fibres are devoid of titanium dioxide. The lyocell fibres had a linear mass density of 1.7 decitex and staple fibre length of 38 mm according to the supplier's product information.

Reference Example

Comparative data for a dry-laid viscose nonwoven which is used in present commercially available smokeless tobacco pouches and comprises two superimposed web layers are included as well; herein referred to as reference material (denoted Ref in Table 1 below). This nonwoven comprises a binder of co-polymer of vinyl acetate and acrylic acid ester, and staple fibres of viscose having a linear mass density of 1.7 decitex and a staple fibre length of 40 mm.

Characterization of nonwoven

The dry-laid nonwoven of Examples 1A and 1B and the Reference Example were characterized by the following measurements. The results (average values) are presented in Table 1.

The basis weight of the nonwoven (i.e. mass per unit area) was measured according to standard test method WSP 130.1(05). WSP stands for Worldwide Strategic Partners, which indicates that the test method has been reviewed and approved by INDA and EDANA, being international associations serving the nonwovens and related industries.

Thickness of the nonwoven was measured according to standard test method WSP 120.6(05).

Tensile strength of the nonwoven, in dry state, was measured according to standard test method WSP 110.4(05). The tensile strength was measured both in the machine direction (MD) and in the cross direction (CD) of the nonwoven. The MD/CD ratio was obtained by dividing the MD value with the CD value.

The tensile strength index was obtained by dividing the tensile strength value with the basis weight. This was made for the machine direction (MD) and for the cross direction (CD) of the nonwoven.

Elongation at break (in %) of the nonwoven in dry state was measured according to standard test method WSP 110.4(05). The elongation at break was measured both in the machine direction (MD) and in the direction transverse
to the machine direction, i.e. the cross direction (CD).

[0134] Tensile strength of the nonwoven, in wet state, was measured according to standard test method WSP 110.4(05). The wet tensile strength was determined both in the machine direction (MD) and in the cross direction (CD) of the nonwoven. The relative wet strength was calculated as the ratio between the wet tensile strength and the dry tensile strength in the same direction and is expressed in %.

[0135] Air permeability of the nonwoven was measured according to standard test method WSP 070.1.R3(12). In this test, the air flow passes through the tested material from the face side to the back of the material. The test area was 20 cm². The pressure drop was 200 Pa.

[0136] Heat sealing strength of the nonwoven, in dry state, was measured according to an in-house method of Swedish Match:

A strip of nonwoven having a length of about 1 m in the MD direction of the nonwoven and a width of 40 mm in the CD direction of the nonwoven is cut out. The strip is double-folded to obtain a two-ply material, which is about 0.5 m long. The two plies are welded to each other in a HS-2 laboratory heat sealer from RDM equipment. The dimensions of upper and lower seal bars are 50 mm × 5 mm. The seal bars are applied such that the 50 mm direction is perpendicular to the length direction of the double-folded strip. The upper seal bar is heated to 300°C. The lower seal bar is not heated. The force used to press the seal bars against the nonwoven is 0.24 kN and the contact time is 0.06 s. A number of seals are formed in the double-folded strip, see thick grey lines in Figure 1. The samples to be measured are then made by cutting at about 5 mm from the seal at one side and at about 50 mm from the seal on the other side of the seal, see dashed lines in Figure 1. In the illustrated example nine samples are provided.

[0137] The strength of the seal is then measured using an Instron 5943. One ply is attached to the upper gauge at the side cut 50 mm from the seal and one ply to the lower gauge at the side cut 50 mm from the seal. The force used to peel apart the seal is determined and expressed as maximum load/width in the unit N/mm. Settings of instrument during measurement are as follows:

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<tr>
<td>Load range</td>
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<td>Extension</td>
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<td>Speed</td>
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<tr>
<td>Preload</td>
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[0138] Bending length and bending stiffness of the nonwoven, in dry state, were measured according to standard test method WSP 090.5R4(12)A. Bending length and bending stiffness were measured both in the machine direction (MD) and in the cross direction (CD) of the nonwoven.

[0139] Wetting properties of the nonwoven material may be measured using the standard test method Tappi T-558-06. The initial water contact angle of the nonwoven materials is measured. Further, the water contact angle of the nonwoven materials is measured after 12 seconds. Water retardation time (WTR) is the time it takes for the contact angle to reach below 90°. The material is wetted when the contact angle reaches below 90°. The change in base diameter of the water droplet after 12 seconds indicates the spreading of the water.

[0140] Percentage of open (surface) area of the nonwoven material was measured according to an in-house method of Swedish Match:

A Carl Zeiss Axio Vision stereo microscope was utilized at 2.5X. An image analysis software called ZEN Lite 2013 was used to make a colour histograms for levels between 0 and 255. The histograms have two peaks, one representing the fibres and one representing the pores. A threshold of level 150 was used. The threshold is located in between the two peaks of the histograms. Hence levels from 0 to 149 are taken as an open surface in the material, i.e. a pore. The total number of pixels was 4 915 200. Five measurements were made for each material. Percentage of open area was calculated as (no of pixels below 150)/(total no of pixels) expressed as %.

[0141] For the Reference Example the average count of 5 replicates was 368 585, standard deviation was 124 578. Hence the open area is about 7.5% of the total area. See Figure 2 showing a microscopy image of the Reference Example.

[0142] For Example 1A the average count of 5 replicates was 884 392, standard deviation was 195 131. Hence the open area is about 18% of the total area. See Figure 3 showing a microscopy image of Example 1A.

[0143] The porosity (pore volume distribution) of the nonwoven may be measured using liquid extrusion porosimetry (LEP). This method is, for instance, described in Jena, Akshaya; Gupta, Krishna, Advances in Filtration and Separation Technology (2003), 16, 133-138. (Not in Table 1.)
These data show, for instance, that the air permeability of the nonwoven according to Example 1 is higher than the air permeability of the standard nonwoven (Reference), as measured according to the standard test WSP070.1.R3(12).

Moreover, the percentage of open area of the nonwoven according to Example 1 is higher than the percentage of open area of the standard nonwoven (Reference), as measured according to the herein described method.

**Claims**

1. An oral pouched snuff product comprising a filling material and a saliva-permeable pouch enclosing the filling material, the pouch comprising a dry-laid nonwoven, the dry-laid nonwoven comprising staple fibres of regenerated cellulose and a binder, characterized in that the staple fibres of regenerated cellulose comprises lyocell staple fibres; and the dry-laid nonwoven has a basis weight of at most 25 g/m², such as within the range of from 20 g/m² to 25 g/m² or from 20 g/m² to 23 g/m².

2. An oral pouched snuff product according to claim 1, wherein the dry-laid nonwoven consists of a single web layer.
3. An oral pouched snuff product according to claim 1 or 2, wherein the dry-laid nonwoven has a main fibre orientation.

4. An oral pouched snuff product according to any one of the preceding claims, wherein at least 50%, such as at least 70% or at least 90%, of the staple fibres of regenerated cellulose are lyocell staple fibres.

5. An oral pouched snuff product according to any one of the preceding claims, wherein the staple fibres of regenerated cellulose consist of lyocell staple fibres.

6. An oral pouched snuff product according to any one of the preceding claims, wherein at least 50%, such as at least 70% or at least 90%, of the staple fibres of regenerated cellulose are lyocell staple fibres.

7. An oral pouched snuff product according to any one of the preceding claims, wherein the lyocell staple fibres have a staple length within the range of from 20 to 60 mm, such as within the range of from 35 to 45 mm.

8. An oral pouched snuff product according to any one of the preceding claims, wherein the lyocell staple fibres have a linear mass density in the range of from 1.0 to 2.2 decitex, such as in the range of from 1.5 to 2.0 decitex or from 1.6 to 1.8 decitex.

9. An oral pouched snuff product according to any one of the preceding claims, wherein the dry-laid nonwoven has a thickness of at most 180 µm, such as within the range of from 100 µm to 180 µm or from 100 µm to 170 µm.

10. An oral pouched snuff product according to any one of the preceding claims, wherein the dry-laid nonwoven has an air permeability of at least 4 400 l/m²/s, such as at least 4 600 l/m²/s or at least 4 800 l/m²/s.

11. An oral pouched snuff product according to any of the preceding claims, wherein the dry-laid nonwoven in dry state has a tensile strength MD/CD ratio within the range of from 6 to 12, such as within the range of from 7 to 10.

12. An oral pouched snuff product according to any one of the preceding claims, wherein the dry-laid nonwoven has a dry heat seal strength of at least 0.17 N/mm, preferably of at least 0.19 N/mm, more preferably of at least 0.21 N/mm.

13. An oral pouched snuff product according to any one of the preceding claims, wherein the dry-laid nonwoven has an open area of at least 12%, such as at least 15%, as measured using the herein described method.

14. An oral pouched snuff product according to any of the preceding claims, wherein the dry-laid nonwoven comprises within the range of from 55 to 70 % by weight of lyocell staple fibres, based on the total dry weight of the dry-laid nonwoven.

15. An oral pouched snuff product according to any of the preceding claims, which is an oral pouched snuff product selected from the group consisting of an oral pouched smokeless tobacco product, an oral pouched non-tobacco nicotine-free snuff product and an oral pouched non-tobacco nicotine-containing snuff product.

16. An oral pouched snuff product according to any of the preceding claims, which is a post-moisturized oral pouched smokeless tobacco product.
# EUROPEAN SEARCH REPORT

**Application Number**

EP 16 15 0924

## DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of relevant passages</th>
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<td>A. SLATER ET AL.: &quot;TENCEL(R) A VERSATILE, HIGH PERFORMANCE FIBRE FOR NONWOVENS&quot;, LENZINGER BERICHT, vol. 82, 20 March 1937 (1937-03-20), XP002758767, LENZING AG, LENZING. ISSN: 0024-0907 * the whole document *</td>
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**TECHNICAL FIELDS SEARCHED (IPC)**

A24B
B65B

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The present search report has been drawn up for all claims

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<td>15 June 2016</td>
<td>Leprêtre, François</td>
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**CATEGORY OF CITED DOCUMENTS**

X: particularly relevant if taken alone
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T: theory or principle underlying the invention
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<td>DE 202015102564 U1</td>
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For more details about this annex: see Official Journal of the European Patent Office, No. 12/82.
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4703765 A [0017]
- EP 2428450 B1 [0017]
- US 6135120 A [0018]
- WO 2012134380 A [0025] [0119]
- WO 2007126361 A [0026] [0116]
- WO 2008133563 A [0026] [0116]
- US 20140026912 A [0030]
- WO 2012069505 A [0122]

Non-patent literature cited in the description

- S. RUSSEL. Handbook of Nonwovens. Woodhead Publ. Ltd, 2007 [0006]