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(54) A METHOD FOR REDISTRIBUTION OF FILLING MATERIAL WITHIN A POUCHED PRODUCT FOR ORAL USE AND A POUCHED PRODUCT FOR ORAL USE

(57) The present invention relates to a method for redistribution of filling material within a pouched product for oral use. The pouched product for oral use comprises the filling material and a saliva-permeable pouch enclosing the filling material. The method comprises providing at least one pouched product for oral use, and mechanically shaking, tumbling and/or vibrating the at least one pouched product for oral use.

The present invention further relates to a pouched product for oral use and a user container comprising pouched products for oral use.

Fig. 2

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Description

TECHNICAL FIELD

[0001] The present invention relates to a method for redistribution of filling material within a pouched product for oral use. The pouched product for oral use comprises the filling material and a saliva-permeable pouch enclosing the filling material. The present invention further relates to a pouched product for oral use and a user container comprising pouched products for oral use.

BACKGROUND

[0002] Pouched products for oral use may be produced by measuring portions of a filling material, a smokeless tobacco composition, and inserting the portions into a tubular web of packaging material, which is to form a saliva-permeable pouch enclosing the filling material.

[0003] US 4,703,765 discloses a device for packaging precise amounts of finely divided tobacco products, such as snuff tobacco or the like, in a tubular packaging material into which snuff portions are injected via a fill tube, the tubular packing material thereby having a vertical orientation. Downstream from the tube, welding means are positioned for transverse sealing of the packaging material, and also cutting means for severing the packaging material in the area of the transverse seal to thus form discrete or individual portion packages.

[0004] EP 2 428 450 B1 relates to a snus dosing method, wherein a portion of tobacco is filled into a dosing chamber of a dosing device and then blown out of the dosing chamber by means of blow-out air to which water vapour has been added.

[0005] However, pouched products for oral use made in prior art apparatuses and/or with prior art methods may have a risk of getting an uneven weight distribution of the filling material within the pouch. For example, due to gravity and the potential use of pressurized gas in the dosage apparatus, there is a risk that the filling material will gather at the lower end of the pouched product when it is still in the vertical orientation. This may lead to an uneven weight distribution of the filling material within the pouch, i.e. a non-uniform filling of the pouched product, also known as a pear shape.

[0006] There is thus a desire of having a method being able to provide pouched products for oral use having a more even weight distribution of the filling material within the pouch.

SUMMARY

[0007] The object of the present disclosure is to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

[0008] The object above may be achieved by the subject-matter of the independent claims. Embodiments are set forth in the appended dependent claims, in the following description and in the drawings.

[0009] The present invention relates to a method for redistribution of filling material within a pouched product for oral use. The pouched product for oral use comprises the filling material and a saliva-permeable pouch enclosing the filling material. The method comprises providing at least one pouched product for oral use, and mechanically shaking, tumbling and/or vibrating the at least one pouched product for oral use.

[0010] The step of mechanically shaking, tumbling and/or vibrating the at least one pouched product for oral use is performed by an apparatus. It may comprise direct mechanical shaking, tumbling and/or vibrating, e.g. the pouched product being in direct contact to the apparatus performing the step of mechanically shaking, tumbling and/or vibrating. It may also be a step of indirect mechanically shaking, tumbling and/or vibrating, e.g. the apparatus producing a gas stream in which the pouched product tumbles around. Direct and indirect methods may be combined.

[0011] By performing the method according to the invention, it is possible to obtain a more even weight distribution of the filling material in the pouch by redistribution of the filling material within the pouched product. The method according to the invention is performed after the pouch has been formed, e.g. with apparatuses and/or methods as described in the above-mentioned prior art documents US 4,703,765 and EP 2 428 450 B1, such that the filling material is redistributed within the individual pouch.

[0012] As an alternative or a complement, the method may be utilized to increase the volume of the pouched product, which corresponds to decreasing its density. Hence, the filling material may be shaken, tumbled and/or vibrated in such a way that it increases its volume and thus better fills the pouch.

[0013] The pouched product for oral use is portion-packed, i.e. each pouch encloses an amount of filling material, which is intended to make up a portion of a suitable size. The pouched product is configured to fit comfortably and discreetly in a user's buccal cavity, e.g. between the upper and/or lower gum and the lip. It is not intended to be swallowed.

[0014] The pouched product for oral use may be a pouched tobacco product for oral use, e.g. a snuff product or a snus product, a pouched nicotine containing product for oral use or a pouched nicotine free product for oral use.

[0015] The pouched product for oral use described herein may be dry, semi-dry or moist. Generally, dry pouched products have a moisture content of less than 10 wt% and moist pouched products have a moisture content of above 40 wt%. Semi-dry pouched products have a moisture content between 10 wt% and 40 wt%.

[0016] As used herein the term "pouched product for oral use" may refer to a portion of smokeless tobacco or tobacco-free filling material, which may be nicotine-containing or nicotine free, packed in a saliva-permeable packaging material intended for oral use.

[0017] The pouched product may be flavourized by mixing the flavour in the filling material during manufacturing. Additionally or alternatively, the flavour may be added to the pouched product after it has been manufactured.

[0018] By the term "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.

[0019] 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.

[0020] The filling material may comprise a finely divided tobacco material such as a ground tobacco material or cut tobacco. In addition to the tobacco material, the filling material may further comprise at least one of the following: water, salt (e.g. sodium chloride, potassium chloride, magnesium chloride, and any combinations thereof), pH adjuster, flavouring agent, cooling agent, heating agent, sweetening agent, colorant, humectant (e.g. propylene glycol or glycerol), antioxidant, preservative (e.g. potassium sorbate), binder, disintegration aid. In an example, the filling material comprises or consists of finely divided tobacco material, salt such as sodium chloride, and a pH adjuster.

[0021] For nicotine-containing or low-tobacco pouched products, which contain nicotine in addition to the nicotine provided by the tobacco in said product, the nicotine of the filling material may be synthetic nicotine and/or nicotine extract from tobacco plants. Further, the nicotine may be present in the form of nicotine base and/or a nicotine salt. The nicotine salt may be free, i.e. it is mixed with the other components of the pouched product without combining chemically with said components. Additionally or alternatively, the nicotine salt may combine chemically with one or more components of the filling material. For instance, the nicotine salt may combine with alginate particles or cellulose.

[0022] 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 may be given herein as percent by weight (wt%) of the total weight of the preparation, composition or product referred to. If not stated otherwise moisture content is given in relation to the weight of the filling material.

[0023] The packaging material, which is used for the pouch, is typically a nonwoven material, such as viscose. It may include a chemical binder. Nonwoven materials are fabrics that are neither woven nor knitted. Methods for the manufacturing of nonwoven materials are commonly known in the art.

[0024] Pouched products for oral use are normally sized and configured to fit comfortably and discreetly in a user's mouth between the upper or lower gum and the lip. In general, pouched products for oral use have a generally rectangular shape. Some typical shapes (length x width) of commercially available pouched products for oral use are, for instance, 35 mm x 20 mm, 34/35 mm x 14 mm, 33/34 mm x 18 mm, 27/28 mm x 14 mm, 34 mm x 10 mm and 38 mm x 14 mm. Typical pouched products for oral use may have a maximum length within the range of from 25 to 40 mm along the longitudinal direction of the pouched product and a maximum width within the range of from 5 to 20 mm along the transverse direction of the pouched product. The thickness ("height") of the pouched product is normally within the range of from 2 to 8 mm. The total weight of commercially available pouched products for oral use are typically within the range from about 0.3 to about 3.5 g, such as from about 0.5 to 1.7 g, per pouched product.

[0025] The method according to the invention may be performed for a single individual pouched product. However, it may also be performed for a plurality of pouched products at the same time. The method may then comprise:

- providing a plurality of pouched products for oral use,
- mechanically shaking, tumbling or vibrating said plurality of pouched products for oral use together, preferably in contact with each other.

[0026] In that way, a number of pouched products to be filled in a user container, typically in the range of 10-30 pouched products, such as in the range of 20-25, may be shaken, tumbled and/or vibrated together. Thereby also the contacts between the pouched products, i.e. when they bump into each other, help to redistribute the filling material within the individual pouches.

[0027] It is also possible to mechanically shake, tumble and/or vibrate a higher number of pouched products at the same time, e.g. a whole batch, which may be in the range of up to hundreds, thousands, ten-thousands, hundred-thousands or millions of pouched products.

[0028] The step of mechanically shaking, tumbling and/or vibrating may be performed during at least 3 seconds, preferably at least 10 seconds, more preferably at least 30 seconds, most preferably at least 60 seconds.

[0029] The step of mechanically shaking, tumbling and/or vibrating may be performed during up to 15 minutes, such as up to 10 minutes, up to 5 minutes, up to 2 minutes or up to 1 minute.

[0030] The method may comprise that the tapped apparent volume of the at least one pouched product for oral use is increased by at least 10%, preferably at least 20%, more preferably at least 30%, most preferably at least 40%, during the step of *mechanically shaking*, *tumbling and/or vibrating* the at least one pouched product for oral use. The tapped apparent volume is measured with the method described in the method description herein.

[0031] The method may further comprise

- repeating the step of mechanically shaking, tumbling and/or vibrating at least once.

[0032] Thereby, other steps may be performed in between the repeated steps. In that case, the times disclosed herein for performing the mechanically shaking, tumbling and/or vibrating may be determined for each repeated step or as a sum of the repeated steps.

[0033] For example, the method may further comprise:

- moisturizing the at least one pouched product for oral use before, during and/or after the step of mechanically shaking, tumbling and/or vibrating.

[0034] The moisturizing may be performed by spraying water and/or another liquid on the at least one pouched product.

[0035] The step of mechanically shaking, tumbling and/or vibrating may be performed during transporting the at least one pouched product for oral use along a production line configured to manufacture pouched products for oral use. Hence, the method according to the invention may form a part of a manufacturing method for producing pouched products for oral use. Purely as an example, the step of mechanically shaking, tumbling and/or vibrating during transporting may thereby be performed in a rotating drum, in a feeding screw and/or by means of a gas flow, e.g. in a fluidized bed.

[0036] The step of mechanically shaking, tumbling and/or vibrating may be performed batch-wise or continuously in line, when the pouched products being manufactured are transported along the production line.

[0037] The method may further comprise placing a preselectable number of pouched products for oral use in a user container,
wherein the step of mechanically shaking, tumbling and/or vibrating comprises mechanically shaking, tumbling and/or vibrating the pouched products for oral use before placing them in the user container.

[0038] The method may further comprise placing a preselectable number of pouched products for oral use in a user container, wherein the step of mechanically shaking, tumbling and/or vibrating comprises mechanically shaking, tumbling and/or vibrating the user container with the pouched products for oral use being placed therein.

[0039] A user container typically comprises in the range of 10-30 pouched products, such as in the range of 20-25 pouched products. The pouched products may be placed randomly in the user container or in a pattern, for instance as described in WO 2012/069505. The user container as disclosed herein is consumer package having a shape and a size adapted for conveniently carrying the package in a pocket or in a handbag and may be used for packaging any known type of pouched product.

[0040] The method may comprise mechanically shaking, tumbling and/or vibrating the user container with the pouched products being placed therein for at least 1 minute, preferably at least 2 minutes, more preferably at least 3 minutes, most preferably at least 4 minutes.

[0041] The step of mechanically shaking, tumbling and/or vibrating the user container with the pouched products being placed therein may be performed during up to 15 minutes, such as up to 10 minutes, up to 8 minutes, up to 6 minutes or up to 5 minutes.

[0042] The present invention further relates to a pouched product for oral use. The pouched product for oral use comprises a filling material and a saliva-permeable pouch enclosing the filling material. The pouched product for oral use has at least 60%, preferably at least 70%, more preferably at least 80%, most preferably at least 90%, probability of passing a balance test, wherein the pouched product for oral use is placed on a 2.0 mm wide edge. The balance test is further described in the method description herein. It is thereby assumed that the pouched product has a mirror-symmetric shape, typically a generally rectangular shape, and that the pouched product is placed with the symmetry axis at the centre of the 2.0 mm wide edge.

[0043] The pouched product may have a tapped apparent density of less than 1.0 g/cm^3, preferably of less than 0.9 g/cm^3, more preferably of less than 0.8 g/cm^3, most preferably of less than 0.7 g/cm^3, the measurements being performed at a moisture content of the pouched product being 50%wt+/- 2%wt. The tapped apparent density is measured with the method described in the method description herein.

[0044] In order to make comparisons between different pouched products, the comparisons may be made at equal moisture content, since the moisture content otherwise will influence the result.

[0045] As an alternative for comparison of tapped apparent density of pouched products, the tapped apparent density

may be moist compensated, as described in the method description herein.

[0046] Optionally, the pouched product for oral use may have a degree of filling of at least 40%, preferably at least 45%, when compared to a volume of a theoretical corresponding sphere, the area of the corresponding sphere being the same as the area of the part of the pouched product, in which the filling material can be in contact with the material of the saliva-permeable pouch. For a typical pouched product, this area corresponds to the area inside of the two transverse seals. Hence, the area will be 2 x (length - (width of 1st transverse seal + width of 2nd transverse seal)) x width at transverse seal. This corresponds to a radius of a corresponding sphere of r = area/(4 x π), which gives a volume for the sphere of (4 x π x r^3)/3.

[0047] The present invention further relates to a pouched product for oral use obtained or obtainable by the method as described herein.

[0048] The present invention also relates to a user container comprising pouched products for oral use, the pouched products for oral use obtained by the method as described herein and/or being the pouched products for oral use as described herein.

[0049] The pouched products according to the invention may better fill up the user container than prior art pouched products. Purely as an example, for a commercial pouched product, for which 24 pouched products are placed in the user container to fill it up, the same user container was filled by only 20 pouched products after they had been treated with the method as described herein. Hence, the number of pouched products in the user container were reduced by 20%. In general, the number of pouched products utilized to fill a user container can be reduced by a percentage in the range 0-30%, or 0-20%, or 0-10%, if comparing unshaken pouched products for oral use to pouched products, to which the method according to the invention has been applied.

METHODS

Balance Test of Uniform Filling

[0050] The balance test is performed in order to determine if a pouched product is uniformly filled, i.e. if the filling material has an even weight distribution within the pouch. The test is performed at ambient conditions, herein defined as being at a temperature of 22°C and a relative humidity of 60%. It is further assumed that the pouched product has a mirror-symmetric shape, such as a generally rectangular shape, and that the pouched product is placed with the symmetry axis at the centre of the 2.0 mm wide edge.

[0051] A single pouched product is placed on top of a balance edge. The balance edge has a planar top surface with a width of 2.0 mm, see Figure 1, and may be of a plastic or metal material. The pouched product is placed on the balance edge such that the balance edge extends in a transverse direction at a longitudinal centre of the pouched product, i.e. at half the length of the pouched product in a width direction of the pouched product. Hence, the pouched product is placed in such a way that the balance edge divides it in two halves, as illustrated in Figure 1. The pouched product is initially held at its transverse ends. The grip at the ends of the pouched product is then released. If the pouched product is uniformly filled, it will stay on the balance edge for at least 3 seconds. On the other hand, if the pouched product is non-uniformly filled, i.e. its filling material has an uneven weight distribution, the pouched product will fall from the balance edge. The test is performed for 10 arbitrarily selected pouched products and the result is given as percentage number for the probability of staying on the balance edge.

Moisture content

[0052] 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. 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 Chemics), Official Methods of Analysis 966.02: "Moisture in Tobacco" (1990), Fifth Edition, K. Helrich (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.

Method to determine tapped apparent volume and tapped apparent density

[0053] The average tapped apparent volume and the average tapped apparent density of pouched products for oral use may be determined by using Tapping Density and Apparent Volume Tester PT-TD200 from Pharma Test and the test procedure described below. The test is performed at ambient conditions, herein defined as being at a temperature of 22°C and a relative humidity of 60%.

[0054] First, the tapped apparent density of about 100 g microcrystalline cellulose, Cellets® 200, with at least 85% of the microcrystalline cellulose particles having a size within the range of from 200 to 355 μm according to the supplier's product information, is determined by the following procedure.

a) A graduated measuring cylinder of 250 ml is placed on a reset scale and the mass thereof is recorded. The scale is thereafter reset.

b) About 100 g microcrystalline cellulose, Cellets® 200, is added to the graduated measuring cylinder of 250 ml (on the scale) and the mass ($\mathbf{m_{X1}}$) thereof is recorded.

c) The thereby resulting measuring cylinder containing about 100 g of microcrystalline cellulose is thereafter tapped 900 times from a height of 3 ± 0.2 mm and the tapped apparent volume thereof is read off; herein called $\mathbf{V_{X1}}$. The tapped apparent density ($\rho_{\mathbf{X}}$) of the microcrystalline cellulose is calculated as

$$\rho_x = \frac{m_{x1}}{V_{x1}}$$

[0055] Then, the tapped apparent volume and the tapped apparent density of the pouched products are determined by the following procedure.

a) A graduated measuring cylinder of 250 ml is placed on a reset scale and the mass thereof is recorded. The scale is thereafter reset.

b) About 10 g microcrystalline cellulose, Cellets® 200, is added to the graduated measuring cylinder of 250 ml (on the scale) and the mass thereof is recorded. The scale is thereafter reset.

c) 7 pouched products are added to the measuring cylinder and the mass thereof is recorded. The scale is thereafter reset.

d) Additional microcrystalline cellulose, Cellets® 200, is added to the measuring cylinder to cover the pouched products and the mass thereof is recorded. The scale is thereafter reset.

e) 7 additional pouched products are added to the measuring cylinder and the mass thereof is recorded. The scale is thereafter reset.

f) Additional microcrystalline cellulose, Cellets® 200, is added to the measuring cylinder to cover the pouched products and the mass thereof is recorded. The scale is thereafter reset.

g) 6 additional pouched products are added to the measuring cylinder and the mass thereof is recorded. The scale is thereafter reset.

h) Additional microcrystalline cellulose, Cellets® 200, is added to the measuring cylinder to cover the pouched products and the mass thereof is recorded. The scale is thereafter reset.

i) The thereby resulting measuring cylinder containing 20 pouched products and about 100 g of microcrystalline cellulose is thereafter tapped 900 times from a height of 3 ± 0.2 mm and the tapped apparent volume thereof is read off, herein called $\mathbf{V_{XP}}$.

[0056] The total mass of pouched products ($\mathbf{m_P}$) in the measuring cylinder is calculated by summarizing the above respective measured weights in steps c), e) and g).

[0057] The total mass of microcrystalline cellulose ($\mathbf{m_{X2}}$) in the measuring cylinder is calculated by summarizing the above respective measured weights in steps b), d), f) and h).

[0058] The tapped apparent volume of the pouched products; herein called $\mathbf{V_P}$, may be calculated by the following formula:

$$V_p = V_{xp} - \frac{m_{x2}}{\rho_x}$$

[0059] The tapped apparent density of the pouched products ($\rho_{\mathbf{P}}$) may be calculated by the following formula:

$$\rho_p = \frac{m_p}{V_p}$$

[0060] The average tapped apparent volume and density of three determinations using three different sample preparations is calculated.

Moist compensated tapped apparent density

[0061] In order to compare pouched products with different moisture content (mc), numbers for moist compensated tapped apparent density ($\rho_{\mathbf{PM}}$) may be determined. In order to perform the below calculations, the moisture content is determined as described above and given as weight% in relation to the weight of the pouched product.

[0062] The moist compensated tapped apparent density of the pouched products (ρ_{pm}) may be calculated by the following formula:

$$\rho_{pm} = \frac{(1 - mc)\, m_p}{V_p}$$

[0063] The average tapped apparent volume and density of three determinations using three different sample preparations is calculated with the method above.

[0064] It is known from above:

$$m_p = \rho_p V_p$$

[0065] Hence

$$\rho_{pm} = \frac{(1-mc)\, \rho_p V_p}{V_p}$$

[0066] It thus follows that:

$$\rho_{pm} = (1 - mc)\, \rho_p$$

BRIEF DESCRIPTION OF THE DRAWINGS

[0067] The present invention will hereinafter be further explained by means of non-limiting examples with reference to the appended drawings wherein:

Fig. 1 illustrates measuring with the Balance Test of Uniform Filling.

Fig. 2 shows the Reference and Samples 1-3 in a respective user container.

[0068] It should be noted that the appended drawings are not necessarily drawn to scale and that the dimensions of some features of the present invention may have been exaggerated for the sake of clarity.

DETAILED DESCRIPTION

[0069] The invention will, in the following, be exemplified by embodiments. It should however be realized that the embodiments are included in order to explain principles of the invention and not to limit the scope of the invention, defined by the appended claims. Details from two or more of the embodiments may be combined with each other.

[0070] In the below experiments, samples made according to the method were compared to one of the applicant's products being on the market under the name General 880, herein denoted Reference.

Generally about tested products

[0071] The pouched products of Reference, as well as for Samples 1-3, were made by forming a vertical tubular structure of pouch material, which was filled with individual portions of the filling material by using a dosage apparatus like the one disclosed in EP 2428450 A1. The tubular structure was sealed by transverse seals and separated into pouched products.

Reference

[0072] The reference is one of the applicant's products being on the market under the name General 880. The pouched products had a weight of 1.0 gram each and a moisture content of 51.55%. The pouched products of the Reference are post-moisturized to obtain the desired weight and moisture content. There were 24 products in each user container, packed in a randomized way. The user container had an inner diameter of 67.6 mm. The height without lid was 21.0 mm. When the user container is closed, there is a height of 15.9 mm from the bottom of the user container up to the lid.

Sample 1

[0073] A first sample, below called Sample 1, was prepared by applying the method as described herein to pouched products of the same type as the Reference, i.e. the filling material and the pouch are the same as for the Reference, as well as the post-moisturizing. Weight was 1.0 grams as for the Reference. Moisture content was 51.61%. The pouched products were thereafter subjected to shaking by placing 24 products of the Reference type in a plastic bag of the zipper type. The plastic bag was 304 mm wide and had a distance from the bottom to the zipper of 400 mm. Total height was 422 mm. These dimensions relate to an unfilled flat plastic bag. The plastic bag was filled with pressurized air to fill it up as much as possible. Thereafter the pouched products in the plastic bag were shaken for 60 seconds. For Sample 1, pouched products were placed in the user container in order to fill it up packed in a randomized way. It was then found out that 20 pouched products were enough, in order not to put on the lid of the user container using pressure.

Sample 2

[0074] A second sample, below called Sample 2 was prepared by applying the method as described herein to products of the same type as the Reference, i.e. the filling material and the pouch are the same as for the Reference. However, the desired weight was set to 0.9 grams. The pouched products of Sample 2 were first shaken for 60 seconds, 24 at the time, in a similar plastic bag as for Sample 1, i.e. before post-moisturizing. The pouched products were then post-moisturized and shaken again for 30 seconds in the same plastic bag. This was repeated three times. Moisture content of the end product was 50.93%. Similar as for Sample 1, 20 pouched products were suitably placed in each user container in order to fill it up, packed in a randomized way. The difference between Sample 1 and 2 is thus the weight difference and the way the pouched product was shaken and post-moisturized. For Sample 1 all shaking was made after post-moisturizing, while for Sample 2 shaking was performed both before the first post-moisturizing and after each post-moisturizing.

Sample 3

[0075] A third sample, below called Sample 3 was prepared by applying the method as described herein to products

of the same type as the Reference, i.e. the filling material and the pouch are the same as for Reference. Weight was set to 1.0 grams, as for Sample 1. The pouched products of Sample 3 were first shaken for 60 seconds, i.e. before post-moisturizing. The pouched products were then post-moisturized and shaken again for 30 seconds. This was repeated three times, just like for Sample 2. Moisture content was 49.75%. Similar as for Sample 1, 20 pouched products were placed in each user container in order to fill it up, packed in a randomized way. The difference between Sample 1 and 3, is that for Sample 1 all shaking was made after post-moisturizing, while for Sample 3 shaking was performed both before the first post-moisturizing and after each post-moisturizing.

Experiment 1: Balance Test of Uniform Filling - shaking pouched products

[0076] The effect of the method according to the invention can be seen in the below table, Table 1, as a difference between Reference and the samples of Samples 1-3. Table 1 presents the results of the Balance Test of Uniform Filling describe above. 10 pouched products of each type were tested. The difference is huge. Instead of all 10 pouched products falling from the balance edge due to uneven weight distribution, as for the Reference, all 10 pouched products stayed on the balance edge for Samples 1-3. There is no difference between the pouched products of the different Samples 1-3. See Figure 1 illustrating the Balance Test being performed for one of the pouched products of Sample 2.

[0077] Table 1 further comprises a comparison to ten different competitor products being on the market. The competitor products at the best scored a 50% probability of passing the balance test, i.e. staying on the edge. This is far from the result of Samples 1-3, for which 100% passed the balance test.

Table 1: Balance Test of Uniform Filling

Name	Manufacturer	Stays	Falls	Probability of passing balance test
Reference (General 880)	Swedish Match	0	10	0%
Sample 1		10	0	100%
Sample 2		10	0	100%
Sample 3		10	0	100%
Knox Dark Portion	Skruf	3	7	30%
LD Original Portion	Nordic Snus	0	10	0%
Knekt Portion	Lundgrens	3	7	30%
Lundgrens Perforerad Portion	Lundgrens	3	7	30%
Skruf Nyans Havsbris Vit Portion	Skruf	1	9	10%
Rite Cool Mint Chewing Tobacco Slim	Ministry of Snus	0	10	0%
Lyft ICE Cool Strong Slim	Winnington	0	10	0%
Skruf Slim Fresh White Portion	Skruf	5	5	50%
Lundgrens Västkusten	Lundgrens	5	5	50%
LD Vit Portion	Nordic Snus	2	8	20%

Experiment 2: Tapped apparent density

[0078]

Table 2: Tapped apparent density

Name	Moisture content	Tapped apparent density (g/cm^3)	Stdev (g/cm^3)	Moisture-compensated tapped apparent density (g/cm^3)	Stdev (g/cm^3)
Reference	51.55%	1.14	0.36	0.55	0.17
Sample 1	51.61%	0.69	0.12	0.34	0.06
Sample 2	50.93%	0.59	0.03	0.29	0.02
Sample 3	49.75%	0.63	0.01	0.31	0.01

[0079] The tapped apparent density and the tapped apparent volume were measured with the method as described herein. When comparing Samples 1-3 to the Reference having the same kind of filling material and the same kind of pouch, it can be seen that the shaking has a huge difference on the tapped apparent density as well as on the moisture-compensated tapped apparent density. For both parameters, there is thus obtained a significant density difference by performing the method but without any change of the type of filling material or of the pouch.

[0080] When comparing Sample 3 to Sample 1, i.e. at similar weight and moisture content, Sample 3 reaches somewhat lower values. However, the difference is low and within the standard deviations. The lowest value is obtained by Sample 2, which had the lowest weight per product.

[0081] Experiment 2 shows that it is possible to influence the tapped apparent density significantly without changing the moisture content of the pouched product. The lowest density was obtained for the sample having the lowest weight.

[0082] It is known from prior art that the moisture content influences the tapped apparent density. Hence, in order to make a fair comparison between pouched products, they may be compared at the same or similar moisture content.

[0083] The measurements of Experiment 2 can also be utilized to calculate the tapped apparent volume of the pouched products, see Table 3 below:

Table 3: Volume

Name	Moisture content	Volume (cm^3)	Stdev (cm^3)	Percentage of volume of corresponding sphere
Reference	51.55%	0.98	0.30	33%
Sample 1	51.61%	1.48	0.22	49%
Sample 2	50.93%	1.47	0.07	52%
Sample 3	49.75%	1.54	0.03	49%

[0084] Samples 1-3 have a tapped apparent volume which is about 50% larger than that of the Reference. As can be concluded from Table 3, the pouched products of Sample 2 obtained a similar volume as those of Samples 1 and 3, although the weight was 10% lower.

[0085] The values of the tapped apparent volume may be utilized to compare the actual volumes to a theoretical corresponding sphere. Thereby the area of the corresponding sphere is set to be the same as the area of the pouched product inside of the transverse seals, i.e. the part of the pouched product, in which the packaging material can be in contact with the filling material. For the Reference and Samples 1-3, this area has a length of 28.0 mm and a width of 18.0 mm, giving an area of 2 x 2.80 x 1.80 = 10.08 cm^2. This corresponds to a radius of a corresponding sphere of r = area/(4 x π) = 0.8958 cm, which gives a volume for the sphere of (4 x π x r^3)/3 = 3.00 cm^3.

[0086] In the right-hand column of Table 3, see above, the tapped apparent volumes of the Reference and Samples 1-3 are compared to a corresponding sphere. As can be seen, the pouched products of the Reference fills 33% of a corresponding sphere, while the pouched products of Samples 1-3 fill 49%- 52%. Hence, the pouched product for oral use according to the invention has a degree of filling of at least 40%, preferably at least 45% when compared to the volume of a theoretical corresponding sphere.

Experiment 3: Sensory Panel

[0087] A trained panel of 4 persons were used to compare Samples 1-3 to the Reference. Each sample was pairwise compared to the Reference. The evaluated parameters were:

a) fills the user container best
b) softest
c) most voluminous
d) best spring-back effect
e) most uniform filling
f) highest moisture feeling

[0088] Parameter a) was evaluated for the pouches when in the user container and is a visual impression. Parameters b)-f) are haptic parameters and were evaluated for an individual pouched product. The scale was: "no difference", "small difference" and "large difference". For all these parameters, it is preferred to have an as high value as possible, i.e. a "large difference" to the Reference.

[0089] As regards parameter a), 3 of 4 persons found each one of Samples 1-3 to better fill the user container than the Reference, but with a small difference. It is then to be noted that the user container of the Reference held 24 products,

while the user containers of Samples 1-3 held 20 products, with the user container being of the same type, size and shape. The user container had an inner diameter of 67.6 mm. The height without lid was 21.0 mm. When the user container is closed, there is a height of 15.9 mm from the bottom up to the lid. Please see Figure 2 showing the different samples with the pouched products in their respective user container.

[0090] Each one of Samples 1-3 was evaluated as generally better when pairwise compared to the Reference for features b)-f), with individual comparisons from "no difference" up to "large difference".

[0091] When making an overall comparison of all Samples and all parameters, 1 person preferred Sample 1, 1 person preferred Sample 2 and 2 persons preferred Sample 3. No person preferred the Reference.

Experiment 4: Sensory Panel - long-term effect

[0092] The same four-person panel as for Experiment 3 was used to evaluate the Reference and Samples 1-3 in a long-term test, which was performed after the pouched products, placed in the user containers, had been transported for 500 km in a luggage compartment of a car. The samples were compared pairwise to the Reference like in Experiment 3, using the same parameters as for Experiment 3.

[0093] As regards parameter a), Samples 1, 2 and 3 were all found to fill the user container better than the Reference, but with a small difference. It is then to be noted that the user container of the Reference had 24 products, while the user container of Samples 1-3 had 20 products, with the user container being of the same type, size and shape. No difference was seen between the three different samples, Samples 1-3.

[0094] Each one of Samples 1-3 was evaluated as generally better when pairwise compared to the Reference for features b)-f). No difference was seen between the three different samples, Samples 1-3.

[0095] Based on Experiment 4, it was concluded that the effects found in Experiment 3 remains also for pouched products having been transported around in user containers.

Experiment 5: Balance Test of Uniform Filling - shaking user containers

[0096] In Experiment 5, the user containers of three different commercial products, produced by Swedish Match, were shaken with the pouched products being placed in the user containers. The below table shows number of products per user container for the three different products. Each user container was shaken for 45 seconds by placing two user containers together in an empty 0.5 litre paint can, which was shaken at a paint shop using the machine, which normally is used for mixing paints.

[0097] The pouched products of the unshaken user containers at the best scored a 50% probability of passing the balance test, i.e. staying on the edge. This is far from the result of the corresponding shaken user containers, for which 100% of the pouched products passed the balance test.

Table 4: Balance Test of Uniform Filling, user containers

Name	Unshaken/ shaken	Number of pouched products in user container	Stays	Falls	Probability of passing balance test
880 General	unshaken	24	0	100	0%
880 General	shaken	24	10	0	100%
436 Xrange General	unshaken	21	5	5	50%
436 Xrange General	shaken	21	10	0	100%
437 Xrange Göteborgs Rapé	unshaken	21	5	5	50%
437 Xrange Göteborgs Rapé	shaken	21	10	0	100%

[0098] Further modifications of the invention within the scope of the appended claims are feasible. As such, the present invention should not be considered as limited by the embodiments and figures described herein. Rather, the full scope of the invention should be determined by the appended claims, with reference to the description and drawings.

Claims

1. A method for redistribution of filling material within a pouched product for oral use, said pouched product for oral use comprising said filling material and a saliva-permeable pouch enclosing said filling material, said method comprising:

   - *providing* at least one pouched product for oral use,

   characterized in that
   said method further comprises

   - *mechanically shaking, tumbling and/or vibrating* said at least one pouched product for oral use.

2. The method according to claim 1 comprising:

   - *providing* a plurality of pouched products for oral use,
   - *mechanically shaking, tumbling and/or vibrating* said plurality of pouched products for oral use together, preferably in contact with each other.

3. The method according to any one of claims 1-2, wherein said *mechanically shaking, tumbling and/or vibrating* is performed during at least 3 seconds, preferably at least 10 seconds, more preferably at least 30 seconds, most preferably at least 60 seconds.

4. The method according to any one of claims 1-3, wherein the tapped apparent volume of said at least one pouched product for oral use is increased by at least 10%, preferably at least 20%, more preferably at least 30%, most preferably at least 40%, during said step of *mechanically shaking, tumbling and/or vibrating* said at least one pouched product for oral use.

5. The method according to any one of claims 1-4, further comprising:

   - repeating said step of *mechanically shaking, tumbling and/or vibrating* at least once.

6. The method according to any one of claims 1-5, further comprising:

   - *moisturizing* said at least one pouched product for oral use before, during and/or after said step of *mechanically shaking, tumbling and/or vibrating*.

7. The method according to any one of claims 1-6, wherein said step of *mechanically shaking, tumbling and/or vibrating* is performed during *transporting* said at least one pouched product for oral use along a production line configured to manufacture pouched products for oral use.

8. The method according to claim 7, wherein said step of *mechanically shaking, tumbling and/or vibrating* during *transporting* is performed in a rotating drum.

9. The method according to claim 7, wherein said step of *mechanically shaking, tumbling and/or vibrating* during *transporting* is performed by means of a gas flow, e.g. in a fluidized bed.

10. The method according to any one of claims 1-9, further comprising

    - *placing* a preselectable number of pouched products for oral use *in a user container*,

    wherein said step of *mechanically shaking, tumbling and/or vibrating* comprises mechanically shaking, tumbling and/or vibrating said pouched products for oral use before placing them in said user container.

11. The method according to any one of claims 1-10, further comprising

    - *placing* a preselectable number of pouched products for oral use *in a user container*, wherein said step of *mechanically shaking, tumbling and/or vibrating* comprises mechanically shaking, tumbling and/or vibrating said

user container with said pouched products for oral use being placed therein.

12. The method according to claim 11, wherein said step of *mechanically shaking, tumbling and/or vibrating* is performed for at least 1 minute, preferably at least 2 minutes, more preferably at least 3 minutes, most preferably at least 4 minutes.

13. A pouched product for oral use,
said pouched product for oral use comprising a filling material and a saliva-permeable pouch enclosing said filling material,
characterized in that
said pouched product for oral use has at least 60%, preferably at least 70%, more preferably at least 80%, most preferably at least 90%, probability of passing a balance test, wherein said pouched product for oral use is placed on a 2.0 mm wide edge.

14. The pouched product for oral use according to claim 13, wherein said pouched product for oral use has a tapped apparent density of less than 1.0 g/cm^3, preferably of less than 0.9 g/cm^3, more preferably of less than 0.8 g/cm^3, most preferably of less than 0.7 g/cm^3, said measurements being performed at a moisture content of said product being 50%wt+/- 2%wt.

15. The pouched product for oral use according to claim 13 or 14, wherein said pouched product for oral use has a degree of filling of at least 40%, preferably at least 45%, when compared to a volume of a corresponding sphere, the area of said corresponding sphere being the same as the area of the part of the pouched product, in which said filling material can be in contact with the material of said saliva-permeable pouch.

16. The pouched product for oral use obtained or obtainable by the method according to any one of claims 1-12.

17. A user container comprising pouched products for oral use, said pouched products for oral use obtained by the method according to any one of claims 1-12 and/or being pouched products for oral use according to any one of claims 13-16.

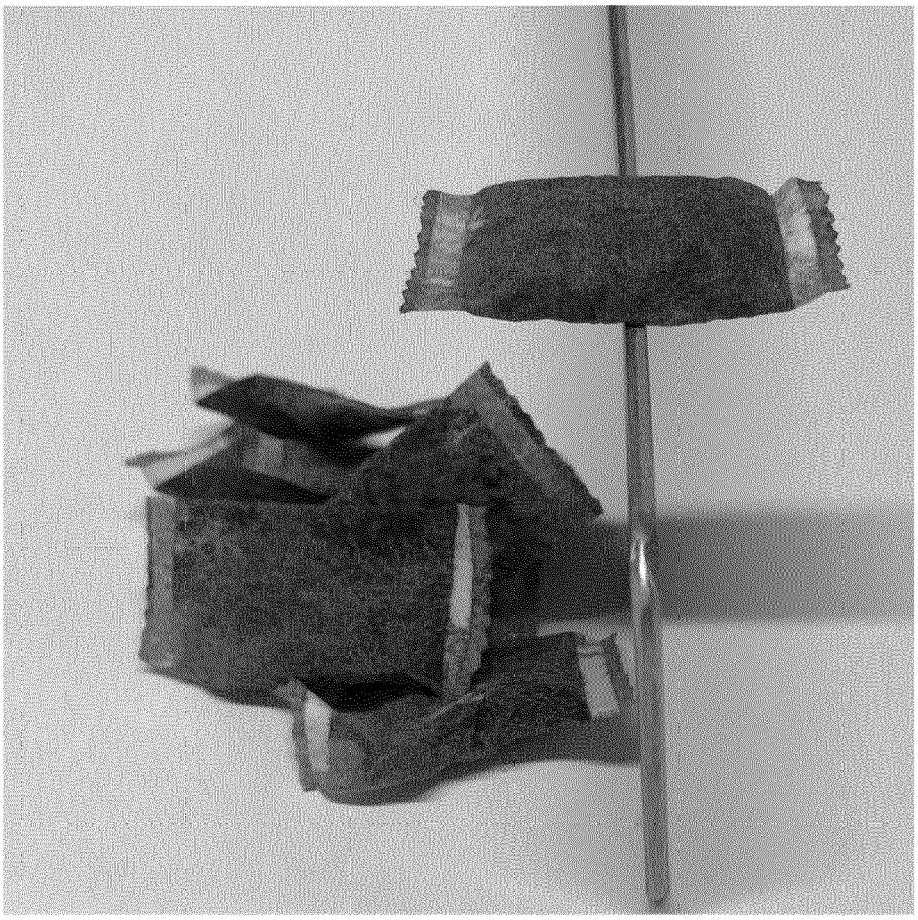

Fig. 1

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 19 21 1166

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 April 2020	Yazici, Baris

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
O : non-written disclosure
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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Application Number
EP 19 21 1166

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 19 21 1166

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-6, 11, 12, 16

   methods for vibrating plurality pouched products and moisturizing said products before during or after vibrating them and the pouched product obtained.

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2. claims: 7-10

   A method for transporting products along a production line.

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3. claims: 13-15, 17

   A pouched product with different probabilities of passing a balance test and with an edge dimension.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 21 1166

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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