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

(11) EP 2 649 889 A2

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.10.2013 Bulletin 2013/42

(51) Int Cl.:
A24B 13/00 *(2006.01)* ***A24B 15/14*** *(2006.01)*

(21) Application number: **13163265.5**

(22) Date of filing: **11.04.2013**

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

(30) Priority: **11.04.2012 GB 201206402**

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(54) **Oral tobacco product**

(57) A preformed mouldable oral tobacco product which does not exhibit any brittleness and has a three-point bending strength of less than 4N, and method of manufacturing the same. Also, a preformed mouldable oral tobacco product which exhibits a friability value of less than 0.5%.

FIGURE 3

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Description

Technical Field

[0001] The present invention relates to a tobacco product and, more particularly, to a non-smokeable tobacco product for oral use and a method of manufacturing the same.

Background

[0002] Tobacco products for smokeless use include snuff, snus and other tobacco compositions. Snus can be in the form of loose tobacco particles or in pre-portioned fleece pouches. Smokeless oral-use tobacco products also include tobacco mixed with various additives including binding agents, and processed to produce a hardened tobacco product.

Summary

[0003] In accordance with embodiments of the invention, there is provided a preformed mouldable oral tobacco product which does not exhibit any brittleness and has a three-point bending strength of less than 4N.

[0004] The oral tobacco product may comprising a cellulose derivative as a binding agent, and may comprise carboxymethyl cellulose as a binding agent. The binding agent may consist exclusively of carboxymethyl cellulose.

[0005] The binding agent may be provided as a proportion of greater than 1% by weight, any may be between 1% - -10% by weight, and may be between 1% - 7% by weight, and may be between 1% - 5% by weight and may be between 2% - 4% by weight.

[0006] The oral tobacco product may have a three-point bending strength of between 1N and 4N, or between 1N and 3.5N, or between 1N and 3N, or between 1N and 2.5N, or between 1.5N and 3.5N, or between 2N and 4N, or between 2.5N and 4N, or between 3N and 4N, or around 2.5N.

[0007] The oral tobacco product may be substantially stable in water and substantially does not break down or dissolve in water in less than 30 minutes, and substantially may not break down or dissolve in water in less than 1 hour, and preferably substantially may not break down or dissolve in water in less than 2 hours.

[0008] The oral tobacco product may exhibit a percentage weight loss in water over 30 minutes of less than 25%, or less than 10%, and may be between 4% - 7%, and may exhibit an average weight loss of less than 6%.

[0009] The present invention also provides a mouldable oral tobacco product which exhibits a friability value of less than 0.5%.

[0010] The oral tobacco product may exhibit a friability value or less than 0.4%, and may be between 0.1% and 0.4%, or between 0.1% and 0.35%, or between 0.1% and 0.3%, or between 0.15% and 0.4%, or between 0.2% and 0.4%.

[0011] The oral tobacco product may not exhibit any brittleness and have a three-point bending strength of less than 4N.

[0012] The oral tobacco product of the invention may comprising any non-mutually exclusive combination of features defined above.

[0013] The present invention also provides a method of manufacturing a preformed mouldable oral tobacco product comprising combining tobacco with a binding agent and providing individual portions thereof.

[0014] The binding agent may comprise a cellulose derivative, and may comprises carboxymethyl cellulose, and may consists exclusively of carboxymethyl cellulose.

[0015] The method may further comprise kneading the mixture before the extruding step, and may comprise kneading the mixture for between 5-20 minutes, or between 5-15 minutes, or between 5-10 minutes, or between 15-20 minutes, or between 10-20 minutes. The method may comprise kneading the mixture for between 7-15 minutes, and may comprise kneading the mixture for around 10 minutes.

[0016] The method may further comprise heating the mixture before the extruding step.

[0017] The oral tobacco product may have a three-point bending strength of less than 3N, and may be less than 2.5N, and may be less then 0.5N, and may be less than 0.25N.

[0018] The method may comprise extruding the mixture and dividing the extruded mixture into the individual portions.

[0019] The method may further comprise heating the mixture before the extruding step, and may comprise heating the mixture to between 5°C and 70°C, preferably 50°C - 60°C. Alternatively, the method may not comprise heating the mixture and the process may take place at ambient temperature, such as 5°C and 20°C, or 5°C and 15°C, or 5°C and 10°C, or 10°C and 20°C, or 15°C and 20°C.

[0020] Embodiments of the present invention also provide a preformed mouldable oral tobacco product which exhibits a negative force greater than -0.1N in a three-point bending strength test.

[0021] The oral tobacco product may exhibit a negative force of between -0.1N to 0.9N, preferably between -0.4N to -0.6N, in a three-point bending strength test.

[0022] Embodiments of the present invention also provide a preformed oral tobacco product comprising tobacco and

a cellulose derivative as a binding agent.

[0023] The binding agent may comprise carboxymethyl cellulose, and the binding agent may consist exclusively of carboxymethyl cellulose.

[0024] The binding agent may be provided in the proportions defined above.

[0025] Embodiments of the present invention also provide an oral tobacco product which does not exhibit any brittleness and is substantially stable in water. Such an oral tobacco product may further comprise any feature or characteristic or non-mutually exclusive combination thereof, defined above.

Brief Description of the Drawings

[0026] Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of a plurality of continuous lengths of tobacco product of the invention being formed by an extruder;
Figure 2 shows the continuous lengths of tobacco product of Figure 1 having been cut into individual portions;
Figure 3 shows one individual portion of tobacco product of Figures 1 and 2;
Figure 4 shows three-point bend test results of a number of test tobacco product formulations, including product formulations according to the invention;
Figure 5 shows a wide continuous belt of tobacco product material being formed by an extruder;
Figure 6 shows the continuous belt of tobacco product material of Figure 4 having been processed by a cutter/scorer roller to divide the belt into individual tobacco product portions;
Figure 7 shows a double roller apparatus for producing individual portions of tobacco product of the invention; and
Figure 8 shows a friability test drum used to measure the friability physical property of the tobacco products of the invention.

Detailed Description

[0027] A first embodiment of the present invention comprises a soft and mouldable oral tobacco product comprising tobacco combined with a binding agent and extruded into continuous rods which are then cut into individual portions. Optionally, the product may additionally include further additives, such as, for example, flavourants and humectants.

[0028] A first method of the invention for producing such an oral tobacco product comprises combining moist snus tobacco with carboxymethyl cellulose ('CMC') as a binding agent at a proportion of 3% by weight. The snus tobacco typically includes a number of additional components already mixed therewith, which may include salt, soda, humectants such as propylene glycol and/or glycerol, flavouring and water. The moisture content of the snus is preferably around 55%. However, the moisture content is not limited to this value and may be from 30% - 60%, and 45% - 60%, or between 50% - 58%. The mixture is then heated to around 60°C and kneaded for around 10 minutes. The mixture is then extruded through a multiple orifice extruder (see Figure 1) - although other extruder configurations may be used within the scope of the invention - to form elongate strips of tobacco composition which are subsequently cut into individual portions (see Figures 2 and 3). It is to be noted that the invention is not intended to be limited to such a method including a heating step, and this step may be omitted.

[0029] A second method of the invention for producing oral tobacco products comprises feeding tobacco, and optionally other dry additives, into an extruding machine. The tobacco may be milled or ground tobacco, or may be tobacco processed in any other way. This feeds into an extruder that heats the tobacco (and dry additives), and combines water and CMC as a binding agent, and, optionally, other liquid additives, with the dry ingredients. CMC as a binding agent is included at a proportion of 3% by weight. The heated mixture is then fed through a die to form a continuous length of moist tobacco composition which is subsequently cut to desired lengths or individual portions. The first extruder may be a gravimetric counter-rotating twin-screw extruder, or a single screw extruder. The second extruder may be a twin-screw co-rotating extruder with variable heat zones and screw configurations, or a single screw with one heat zone. However, these extruders are only exemplary and are not limiting to the scope of the invention. The heat zones may be controlled to between 25°C - 150°C. Alternatively, it is intended within the scope of the invention that this method may not include any heating of the mixture from an external heat source and so the mixing process occurs at ambient temperature, for example 5°C - 20°C.

[0030] The resulting portions of tobacco product produced by both processes are soft and malleable, allowing them to easily be moulded by a user into a desired shape prior to insertion into the mouth in use. The product does not show any brittleness.

[0031] The physical characteristics of a number of tobacco products made using the above processes, but using a variety of different binding agents, were tested. In particular, each product of different composition was tested for hardness

and bending properties using a Three-Point Bending test (hereafter "TPB test"), a known test which measures how much force is required to bend/break a product into two or more pieces. The test involves a portion of product being placed on two spaced supports, and a probe presses against the upper surface of the product at the mid-point between the supports and moves at a rate downwards towards the two supports. The reactionary force exerted back by the test product on the probe is recorded as probe moves and as the product deforms between the supports and point of force application, until the product breaks or the test concludes.

[0032] A number of samples of oral tobacco products of the invention were also tested for the physical property of "friability". Friability is a measurement of the tendency of an object to be reduced to smaller pieces when subjected to pressure or friction. A numerical value for friability is the weight per cent of material lost when an individual product sample is placed within a friability drum and rotated at 25 rpm for 100 revolutions, which is equal to 4 minutes rotation. A friability drum is a standard test apparatus comprising a drum with a diameter of 152 mm with an paddle which lifts and drops the sample product on each rotation of the drum. In the tests conducted, the friability test drum was a Copley 1000 tester drum, as shown in Figure 8. Brittle products that have a tendency to chip or break will have a higher friability percentage value, whereas soft, mouldable products which do not readily chip or shatter exhibit much lower friability percentage values.

[0033] The numerical results of the friability of two sets of a number of samples of oral tobacco products of the invention are shown in Tables 1 and 2 below. The first sample set was also subjected to TPB tests and these values are additionally shown in Table 1. In addition to these test results, the results of further TPB tests of samples of oral tobacco products of the invention having differing compositions are shown in the graph of Figure 4, which includes tobacco composition products with various binding agents including pectin, carrageennan, gellan, guar, hamulsion, hydroxypropyl methyl cellulose (HPMC), locust bean gum (LBG), sodium alginate, xanthan, agar, and CMC.

Table 1: Sample set 1 - Friability and TPB test results

Sample Number	Weight before friability test (g)	Weight after friability test (g)	Difference (g)	Friability (%)	Three Point Bending-Minimum (N)	Three Point Bending-Maximum (N)
1	30.1085	30.0588	0.0497	0.17%	-	-
2	30.2742	30.2225	0.0517	0.17%	-	-
3	30.2483	30.1959	0.0524	0.17%	-	-
4	29.8301	29.7434	0.0867	0.29%	-0.302	2.8478
5	29.4287	29.3633	0.0654	0.22%	-0.3176	2.6677
6	29.7334	29.6665	0.0669	0.22%	-0.348	2.6945
7	29.6188	28.1016	1.5169	5%	-0.3506	2.6925
8	29.4723	29.4080	0.0643	0.22%	-0.3469	2.5659
9	29.4714	29.4005	0.0709	0.24%	-0.3406	2.5679
10	29.5698	29.4974	0.0724	0.24%	-	-
11	29.4400	29.3926	0.0474	0.16%	-	-
12	29.5254	29.4737	0.0517	0.18%	-0.3498	1.8336
13	29.5676	29.5199	0.0477	0.16%	-0.3626	1.9415
14	29.5371	29.4890	0.0481	0.16%	-0.3628	1.8474
15	29.8202	29.7750	0.0452	0.15%	-0.3008	1.9203
16	29.8016	29.7498	0.0518	0.17%	-0.3206	1.9037
17	29.9204	29.8657	0.0547	0.18%	-0.3144	1.7754
18	29.6358	29.5853	0.0505	0.17%	-0.2937	1.5397
19	29.4904	29.4478	0.0426	0.14%	-0.2951	1.421
20	29.5131	29.4522	0.0609	0.21%	-0.3037	1.5787
21	28.7602	28.7035	0.0567	0.20%	-2956	2.2142

(continued)

Sample Number	Weight before friability test (g)	Weight after friability test (g)	Difference (g)	Friability (%)	Three Point Bending-Minimum (N)	Three Point Bending-Maximum (N)
22	28.6516	28.6095	0.0421	0.15%	-0.2994	2.2862
23	28.9318	28.8785	0.0533	0.18%	-0.3185	2.3265
24	28.8972	28.8469	0.0503	0.17%	-0.2925	2.7956
25	29.1156	29.0540	0.0616	0.21%	-0.394	2.6525
26	28.9331	28.8758	0.0573	0.20%	-0.3975	2.5926
27	29.2892	29.2276	0.0616	0.21%	-0.3684	2.6506
28	29.7568	29.7004	0.0564	0.19%	-0.436	2.8467
29	29.5851	29.5184	0.0667	0.23%	-0.4232	2.7604
30	29.3904	29.3485	0.0419	0.14%	-0.3262	1.6799
31	29.2997	29.2583	0.0414	0.14%	-0.3297	1.7266
32	29.3207	29.2725	0.0482	0.16%	-0.3274	1.6928
33	29.2014	29.1476	0.0538	0.18%	-0.3242	1.7774
34	29.4028	29.3533	0.0495	0.17%	-0.3267	1.71
35	29.1155	29.0653	0.0502	0.17%	-0.3436	1.5883
36	29.4176	29.3774	0.0402	0.14%	-0.4845	2.9047
37	29.4210	29.3748	0.0462	0.16%	-0.4244	2.9382
38	29.3874	29.3360	0.0514	0.17%	-0.4293	2.7686
39	29.5111	29.4608	0.0503	0.17%	-0.3012	3.4808
40	29.7908	29.7428	0.0480	0.16%	-0.2256	3.4973
41	28.3111	28.2657	0.0454	0.16%	-0.3949	3.2675
42	29.7870	29.6899	0.0971	0.33%	-0.3022	1.6538
43	29.6391	29.5626	0.0765	0.26%	-0.3081	1.6347
44	29.6853	29.5987	0.0866	0.29%	-0.31	1.6526
45	29.6924	29.6352	0.0572	0.19%	-0.368	2.7362
46	29.2403	29.1959	0.0444	0.15%	-0.3958	2.8025
47	29.7833	29.7276	0.0557	0.19%	-0.3701	2.7801
48	29.0826	29.0255	0.0571	0.20%	-0.2761	2.7155
49	29.7832	28.7369	0.0463	0.16%	-0.2527	2.6535
50	28.9325	28.8851	0.0474	0.16%	-0.2376	2.5916
51	29.9879	29.9208	0.0671	0.22%	-0.331	2.516
52	29.6288	29.5642	0.0646	0.22%	-0.3424	2.6502
53	29.8454	29.7838	0.0616	0.21%	-0.3263	2.5361
54	29.6387	29.5482	0.0905	0.31%	-0.3248	2.4527
55	30.1406	30.0436	0.0970	0.32%	-0.2852	2.7934
56	29.9599	29.9027	0.0572	0.19%	-0.3251	2.4198
57	30.1920	30.1220	0.0700	0.23%	-0.2775	2.6153

(continued)

Sample Number	Weight before friability test (g)	Weight after friability test (g)	Difference (g)	Friability (%)	Three Point Bending-Minimum (N)	Three Point Bending-Maximum (N)
58	29.8984	29.8370	0.0614	0.21%	-0.2714	2.668
59	28.0844	28.0248	0.0596	0.21%	-0.3372	2.3507
60	29.3232	29.2622	0.0610	0.21%	-0.3635	2.5247
61	29.0555	28.9990	0.0565	0.19%	-0.3197	2.1457
62	27.8569	27.7890	0.0679	0.2%	-0.3015	2.3744
63	29.2768	29.2110	0.0658	0.22%	-0.3094	2.3606

Table 2: Sample set 2 - Friability and TPB test results

Sample Number	Weight before friability test (g)	Weight after friability test (g)	Difference (g)	Friability (%)
1	30.0930	30.0496	0.0434	0.14%
2	30.2595	30.2139	0.0456	0.15%
3	30.1713	30.1276	0.0437	0.14%
4	29.9503	29.9038	0.0465	0.16%
5	30.0988	30.0528	0.0460	0.15%
6	29.8706	29.8143	0.0563	0.19%
7	30.3218	30.2557	0.0661	0.22%
8	30.0644	30.0057	0.0587	0.20%
9	30.1581	30.0960	0.0621	0.21%
10	30.3498	30.2930	0.0568	0.19%
11	30.2619	30.2131	0.0488	0.16%
12	29.1994	29.1426	0.0568	0.19%
13	29.7700	29.7289	0.0411	0.14%
14	28.6369	28.5906	0.0463	0.16%
15	30.5005	30.4414	0.0591	0.19%
16	30.3697	30.2922	0.0775	0.255%
17	30.4545	30.3680	0.0865	0.28%
18	30.8266	30.7425	0.0841	0.27%
19	31.0328	30.9338	0.0990	0.32%
20	30.8475	30.7640	0.0835	0.27%
21	30.8582	30.7803	0.0779	0.25%
22	30.3752	30.3029	0.0723	0.24%
23	30.3466	30.2708	0.0758	0.25%
24	30.5830	30.4921	0.0909	0.30%

[0034] Referring first to the graph of Figure 4, it can be seen that the graph plot for many compositions of tobacco product and binding agent have a curve profile which initially increases to a peak force value, after which point, the force

plot drops. This signifies a product with an initial hardness before breaking, the peak of the graph being the break point, and indicates a brittleness to the products, after which break point, the force is reduced.

[0035] Conversely to the above, some of the plots for tobacco products of embodiments of the invention steadily increase in force value over time with no decrease in force value, illustrating that these products do not break and exhibit no brittleness, but instead, are malleable and continue to deform as increasing force is applied. Therefore, these tobacco products exhibit the desirable physical properties of being mouldable by a user into desired shape prior to insertion into the mouth, or mouldable once in the mouth, without breaking into smaller chunks as would a harder or brittle product. The height of the curves for these tobacco products indicates the force required to mould the product. It can be seen from the graphs for these products that comprise different tobacco blends results in products which require different degrees of force to be moulded. One of the binding agents that results in a product with such desirable physical properties is CMC. However, the invention is not intended to be limited to a tobacco product having this binding agent and other binding agents may also demonstrate such desirable properties, such as, for example, xanthan gum, pectin, locust bean gum, gellan, hydroxypropyl methyl cellulose (HPMC), guar gum, agar, carrageenan, tragacanth, sodium alginate or maltodextrin.

[0036] Referring to the test results in Table 1, it can be seen that, with the exception of sample 7 which has a friability value far outside the remaining sample range and so can be excluded from consideration as a test anomaly, the samples tested exhibited a friability percentage value within the range of 0.14% - 0.33%, with a sample set average of 0.20%. These samples also exhibited a maximum TPB test force value within the range of 1.42N - 3.50N, with a sample average of 2.37N. The low friability values illustrate the physical characteristics of the sample products as being soft, mouldable and not exhibiting any brittleness. The relatively low maximum TPB test force values also indicate a mouldable and malleable product.

[0037] Referring to the test results in Table 2, it can be seen that the samples tested exhibited a friability percentage value within the range of 0.14% - 0.32%, with a sample set average of 0.21N, very close to, and consistent with, the friability test results obtained from the first sample set in Table 1, again, illustrating the physical characteristics of the sample products as being soft, mouldable and not exhibiting any brittleness.

[0038] Another desirable physical property demonstrated by the tobacco composition products of the invention is that the preformed product does not, or substantially does not, stain the fingers of the user when being moulded and manipulated prior to use.

[0039] In addition to the above, with CMC as a binding agent at 3%, the tobacco composition products of the various formulations exhibit a maximum TPB test force of less than around 400g, equating to around 4N, consistent with the results in Table 1 discussed above. The highest maximum TPB test value of the products tested was achieved with the product made from coarse stem tobacco. The three products produced using coarse lamina tobacco, fine grade lamina and stem tobacco ("Granit Fine") and mixed grade lamina and stem tobacco ("Granit Mixed"), produced tobacco product formulations in which the three-point bending strength was less than 250g, or 2.5N, whilst all being soft, malleable products.

[0040] The tobacco products of the invention are not limited to such values, however, and some embodiments with varying types of dry tobacco, and CMC binding agent percentage by weight, may have a three-point bending strength less than 2.5N, less than 0.5N, and also less than 0.25N.

[0041] The loose tobacco used in the manufacture of the tobacco products of the invention and in the processes described above, is preferably relatively fine in size, and snus tobacco or other fine grade tobacco is preferred.

[0042] The tobacco products of the invention are also stable in water for at least 30 minutes, and preferably one hour, and substantially do not break down, dissolve, or otherwise lose product mass as do some known smokeless oral tobacco products. This results in a product which maintains its integrity and shape during three phases of consumer use (insertion, use and removal), making it convenient to use and also clean and convenient to dispose of after use.

[0043] The above property of resistance to disintegration in water of the tobacco products of the invention was tested using the following methodology. Five fleeces were identity marked WC (Wet Control) Replicate sample 1,2,3 and DC (Dry Control). Four flat bottomed round 150ml flasks were identified WC, 1, 2, 3. Five aluminium boats were identified WC, 1, 2, 3, DC. Samples WC, 1, 2, 3 were weighed ("weight 1" - see Table 1 below) and put into corresponding flasks. 100mls of de -ionized water was dispensed into each flask and stoppered. Flasks 1, 2, 3 were placed on a shaker for 30 minutes at 155rpm. The WC flask was placed to one side and not shaken. Samples 1, 2, 3 and WC were then drained through a sieve on top of their respective fleece. Sample DC was then weighed ("weight 1"). All samples were then arranged on sieve and placed in oven at 29 degree Celsius. Samples were then dried for over 12 hours (22 actual). Samples were then weighed and data recorded ("weight 2" - see Table 3 below).

[0044] The weight loss for each sample (weight 1 - weight 2) was then calculated and recorded. The percentage weight loss for each sample was then compared with that for the wet control, using an "average portion weight" (APW) value of finished products.

[0045] This APW value had previously been calculated from 20 sample products as being 1.5211g. The percentage weight loss was calculated using the following formula:

$$\{[\text{Weight difference (R1 – R3)} - \text{weight difference (WC)}] / \text{APW}\} \times 100$$

Table 1 below shows the results of the above test and the percentage weight loss values of those replicate samples 1-3:

	Weight 1 (g)	Weight 2 (g)	Difference (g)	Weight loss compared to WC using Average Portion Weight (APW) (%)
Dry Control (DC)	4.0932	3.5148	0.5784	
Wet Control (WC)	4.1190	3.3639	0.7551	
Replicate 1	4.1274	3.2900	0.8374	5.4
Replicate 2	4.0922	3.2676	0.8246	4.6
Replicate 3	4.1341	3.2825	0.896	6.3

Table 3: Disintegration test 1 results

[0046] The above results show the tested products of the invention show a weight loss percentage value of between 4.6% - 6.3%, and an average weight loss value of less than 6%.

[0047] The property of resistance to disintegration in water of the tobacco products of the invention was also tested using a second test methodology which is in accordance with recognised standard European Pharmacopoeia, Pharmaceutical Technical Procedures 2.9.1 - Disintegration of Tablets and Capsules. This test determines whether tablets or capsules can disintegrate within a prescribed time when placed in a liquid medium. In this test, product samples are placed within a tube, in a liquid-filled container and agitated within the liquid. When tested using this methodology, tobacco products of the invention were substantially stable in water for at least 30 minutes, and showed stability in water for at least 1 hour, and further were substantially stable in water for at least 2 hours.

[0048] Referring again to the graph of Figure 4, a further property exclusive to certain tobacco product formulations of the invention is shown, in that the end of the graphs dip below the zero on the Force x-axis at the end of the test when the force of the test probe stops moving. This indicates elasticity in the product, greater than other formulations of other known tobacco products that were tested with other binding agents. In the tested range of products, the negative force in the three-point bend test ranged between approximately -log (-0.1N) to around -90g (-0.9N). The greatest negative value was exhibited by the formulation in which course stem tobacco was used, other product formulations exhibiting a negative value of around -40g to -60g (-0.4N to -0.6N). Once binding agent used in tobacco products of the invention that exhibited such desirable physical characteristics is CMC, although the invention is not intended to be limited to a tobacco product having this binding agent and other binding agents, such as those listed above, may also demonstrate such desirable properties.

[0049] A further advantage of the tobacco products of the invention is that they may provide a flavour delivery comparable to that of loose snus without the inconvenience of small particles being spread around the inside of the mouth which can get caught in the gums/teeth, and the messy disposal after use, as is the case with loose snus and hard smokeless tobacco products. Furthermore, the products provide the convenience of pouched snus but without the requirement for the tobacco product to be contained within a pouch and the disadvantages that may be associated with pouched snus products.

[0050] In the first method described above, the mixture is described as being heated to around 60°C, although this temperature may vary, for example between 5°C and 70°C, or 50°C. In another method of the invention, the mixture may not need to be heated at all and the heating step of the process may be omitted entirely. In such a case, the mixture is processed at an ambient temperature of between 5°C and 20°C.

[0051] Furthermore, although the kneading step is described as being performed for around 10 minutes, the process of the invention is not intended to be limited to this duration and other kneading times may be used, for example, between 3- 20 minutes, preferably between 7- 15 minutes. Additionally, the binder is described as being added at a proportion of around 3% by weight, although the invention is not limited to this proportion, and may be between 1%- 5%, preferably between 2%- 4%. It has been found that a binding agent proportion less than 1% does not bind the tobacco together in the finished product to the required level, whereas a binding agent proportion more than 5% may result in undesirable product characteristics. The above binding agent proportions apply to CMC as a binding agent but the invention is not intended to be limited to a tobacco product having this binding agent and other binding agents, such as those listed above, in such proportions, may also demonstrate such desirable properties.

[0052] The extruding of the continuous lengths of tobacco product may alternatively be different to that of the processes described above, and may alternatively comprise extruding a wide belt of material (see Figure 5) then shaping using a

cutter/scorer (see Figure 6). Yet further, the product may be shaped and formed into individual dosages by being passed through double rollers (see Figure 7). Yet further, the product may be shaped and formed into individual dosages by being extruded into half-dies then pressed together.

[0053] In order to address various issues and advance the art, the entirety of this disclosure shows by way of illustration various embodiments in which the claimed invention(s) may be practiced and provide for superior oral tobacco products and methods of manufacture. The advantages and features of the disclosure are of a representative sample of embodiments only, and are not exhaustive and/or exclusive. They are presented only to assist in understanding and teach the claimed features. It is to be understood that advantages, embodiments, examples, functions, features, structures, and/or other aspects of the disclosure are not to be considered limitations on the disclosure as defined by the claims or limitations on equivalents to the claims, and that other embodiments may be utilised and modifications may be made without departing from the scope and/or spirit of the disclosure. Various embodiments may suitably comprise, consist of, or consist essentially of, various combinations of the disclosed elements, components, features, parts, steps, means, etc. In addition, the disclosure includes other inventions not presently claimed, but which may be claimed in future.

Claims

1. A preformed mouldable oral tobacco product which does not exhibit any brittleness and has a three-point bending strength of less than 4N

2. An oral tobacco product according to claim 1 comprising cut tobacco and carboxymethyl cellulose as a binding agent.

3. An oral tobacco product according to claim 2 wherein the binding agent consists exclusively of carboxymethyl cellulose.

4. An oral tobacco product according to any preceding claim wherein the binding agent is provided as a proportion of greater than 1% by weight, preferably between 1% - -10% by weight, preferably between 1% - 7% by weight, preferably between 1% - 5% by weight and preferably between 2% - 4% by weight.

5. An oral tobacco product according to any preceding claim having a three-point bending strength of between 1N and 3.5N.

6. An oral tobacco product according to any preceding claim which is substantially stable in water and substantially does not break down or dissolve in water in less than 30 minutes, and preferably substantially does not break down or dissolve in water in less than 1 hour, and preferably substantially does not break down or dissolve in water in less than 2 hours.

7. An oral tobacco product according to claim 6 which exhibits a percentage weight loss in water over 30 minutes of less than 25%, and preferably less than 10%, and preferably between 4% - 7%, and preferably an average weight loss of less than 6%.

8. A pre-formed mouldable oral tobacco product which exhibits a friability value of less than 0.5%.

9. An oral tobacco product according to claim 8 which exhibits a friability value or less than 0.4%, preferably between 0.1% and 0.4%.

10. An oral tobacco product according to claim 8 or claim 9 which does not exhibit any brittleness and has a three-point bending strength of less than 4N.

11. An oral tobacco product according to any of claims 8 to 10 further comprising any feature defined in any of claims 2 to 7.

12. A method of manufacturing a preformed mouldable oral tobacco product comprising combining tobacco with a binding agent and providing individual portions thereof.

13. A method according to claim 12 wherein the binding agent comprises a cellulose derivative, and preferably the binding agent comprises carboxymethyl cellulose.

14. A method according to claim 13 wherein the binding agent consists exclusively of carboxymethyl cellulose.

15. A method according to any of claims 12 to 14 further comprising kneading the mixture before the extruding step.

16. A method according to claim 15 comprising kneading the mixture for between 7-15 minutes, preferably 10 minutes.

17. A method according to any of claims 12 to 16 further comprising heating the mixture before the extruding step.

FIGURE 1

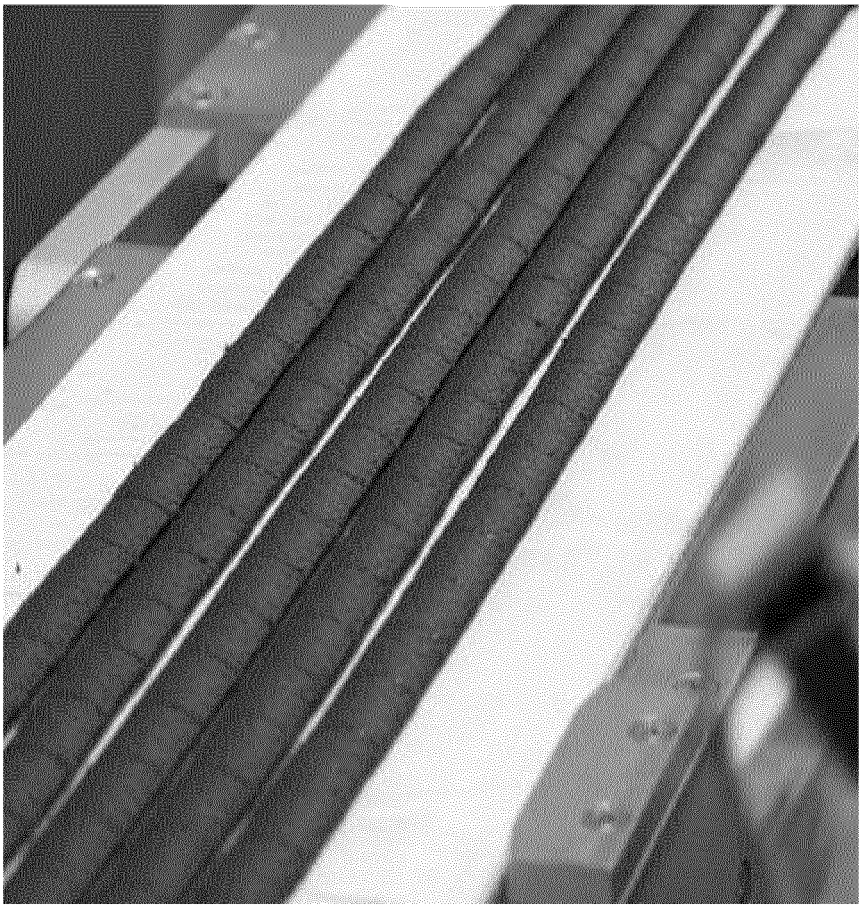

FIGURE 2

FIGURE 3

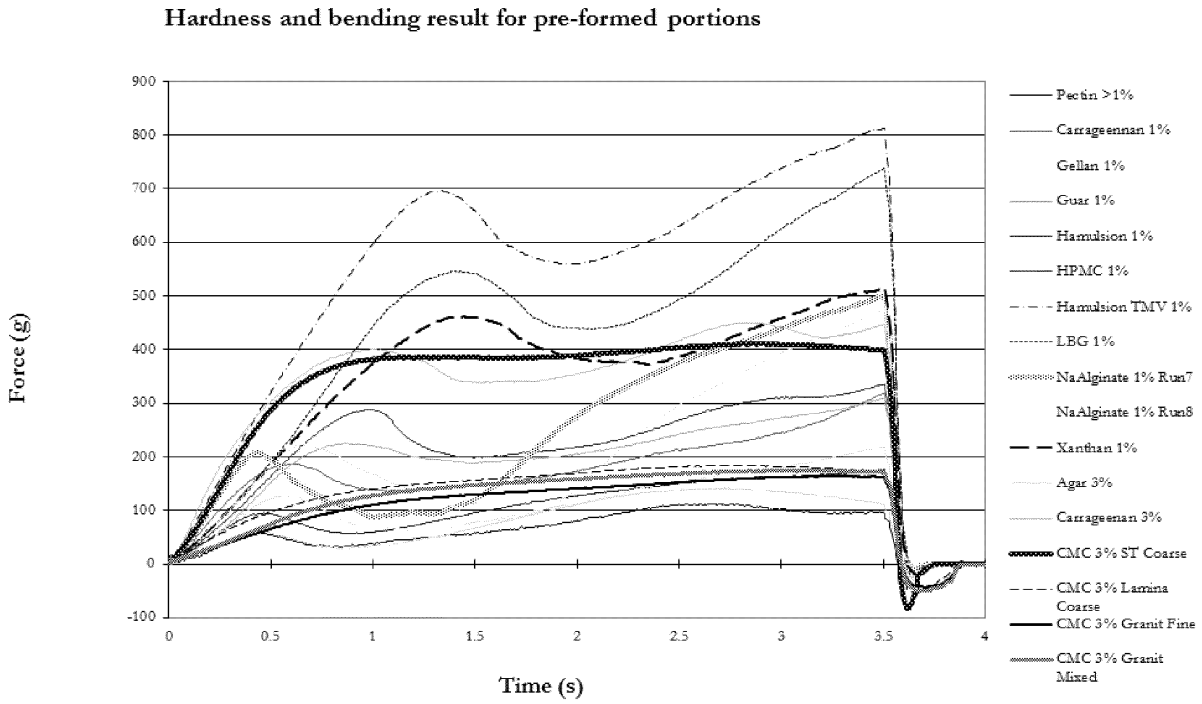
Hardness and bending result for pre-formed portions
Force (g)
900
800
700
600
500
400
300
200
100
0
-100
0
0.5
1
1.5
2
2.5
3
3.5
4
Time (s)
Pectin >1%
Carrageennan 1%
Gellan 1%
Guar 1%
Hamulsion 1%
HPMC 1%
Hamulsion TMV 1%
LBG 1%
NaAlginate 1% Run7
NaAlginate 1% Run8
Xanthan 1%
Agar 3%
Carrageenan 3%
CMC 3% ST Coarse
CMC 3% Lamina Coarse
CMC 3% Granit Fine
CMC 3% Granit Mixed

FIGURE 4

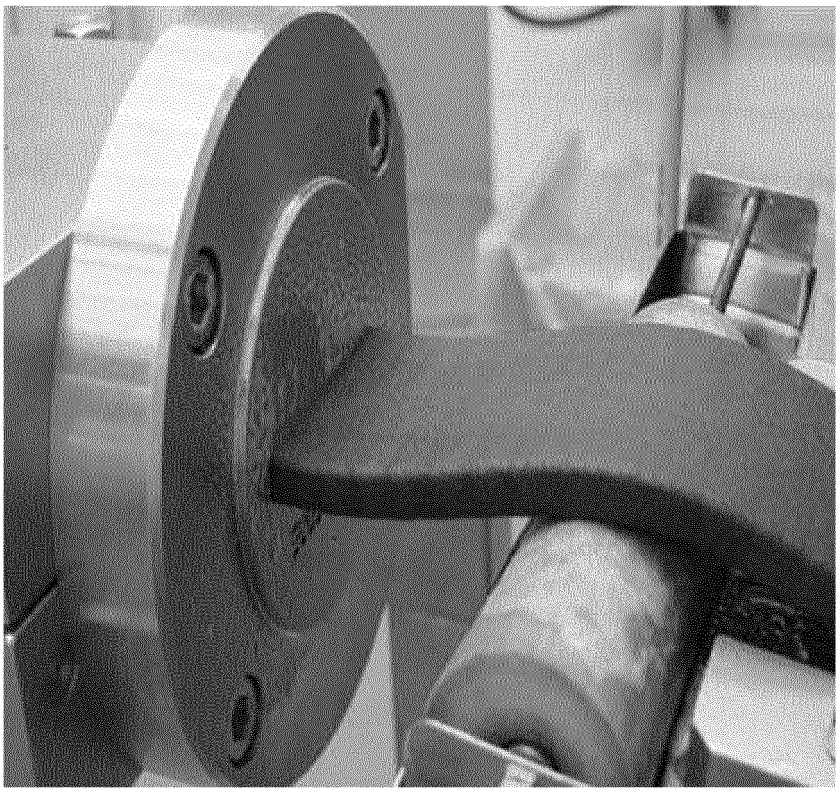

FIGURE 5

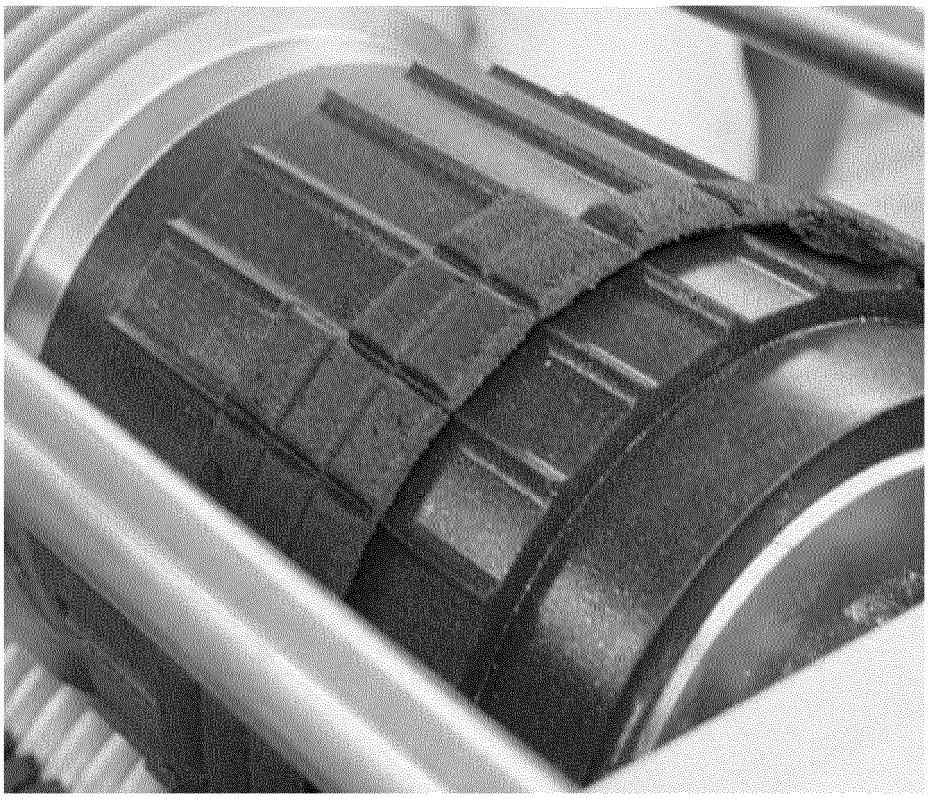

FIGURE 6

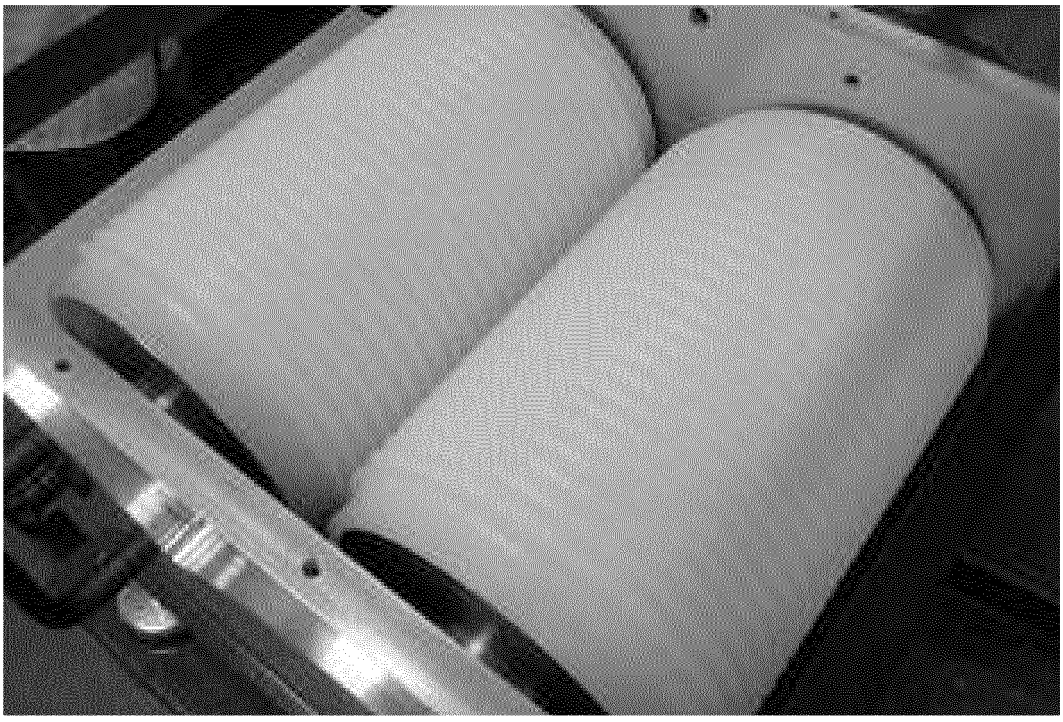

FIGURE 7

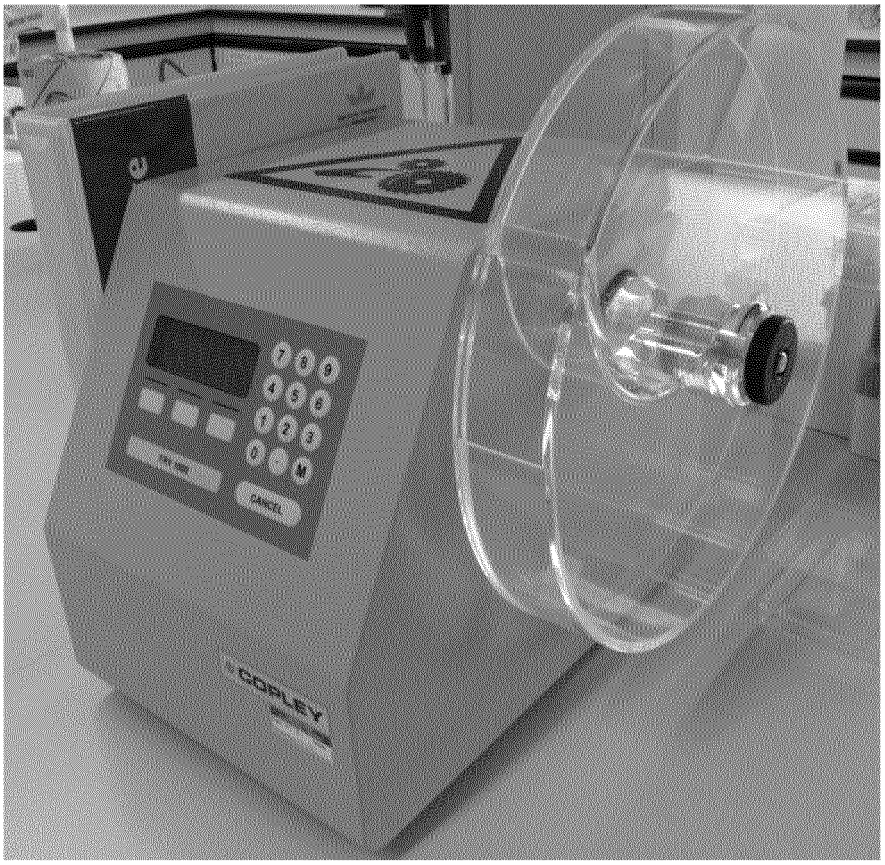

FIGURE 8