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Processing of tobacco materials containing a high proportion of tobacco fines

The present invention relates to a method of processing tobacco materials containing a high proportion of tobacco fines, in particular a method of processing tobacco dust when preparing tobacco for the production of smoking articles.

The idea of re-processing tobacco fines which occur at different points during tobacco processing (e.g. transportation, tobacco preparation, production of smoking articles) to enable them to be put to a meaningful use is already known. For example, tobacco fines may be used as one of the initial materials for tobacco reconstitution, e.g. producing tobacco film. Such processes usually enable continuous bodies of tobacco material to be produced, such as films, sheets, threads, etc..

Patent specification DE 100 65 132 A1 discloses a method of producing agglomerates. It proposes making agglomerates from the smallest tobacco particles, in particular from tobacco dust, in other words larger particle complexes which do not have to be separated out from a cigarette production machine as this is not desirable. The finest tobacco dust particles are mixed with binding agents and liquid and then sprayed out of compaction and heating chambers in order to form agglomerates, in other words the bigger units.

The disadvantage of processing the tobacco fines in this way but also more generally producing tobacco films or continuous bodies of reconstituted tobacco is the fact that the processes are very resource-intensive and binding agents have to be introduced to enable the tobacco fines to be meaningfully processed.

The objective of this invention is to propose a method of processing tobacco fines which overcomes the above disadvantages known from the prior art. In particular, processing of the tobacco fines should be of a simple and uncomplicated configuration.

This objective is achieved by the invention by a method as defined in claim 1. The dependent claims describe preferred embodiments of the invention.

As proposed by this invention, a material to be processed which contains tobacco fines and tobacco material is subjected to increased mechanical pressure and in particular also increased temperature and moisture, in order to keep the tobacco fines adhered to the tobacco material. In other words, the tobacco fines are no longer sorted and separated out for processing but are bound to form a unit with a tobacco material to enable the tobacco material with the tobacco fines bound to it to be used subsequently for the production of smoking articles. This obviates the need for expensive separate processes. The tobacco fines are simply adhered to a material or bound to the material that will be used subsequently to produce the smoking articles anyway.

As a result of this invention, there is a significant shift in size distribution towards larger particles, especially in the desired size range of 1-4mm. This is evidenced by screening tests conducted before and after the treatments proposed by the invention.

Within the context of this description, the expression tobacco fines refers in particular to small pieces of tobacco which are actually regarded as problematic (including from a taste point of view) and are otherwise merely discharged by suction or can be used to produce reconstituted tobacco (tobacco film). In particular, tobacco fines are smaller than the cut width of tobacco (e.g. < 1 mm) and more especially, tobacco fines are significantly smaller than the cut width of tobacco (e.g. < 0.5 mm).

The expression "tobacco material" is basically used to describe tobacco pieces which are bigger or significantly bigger than tobacco fines, in particular tobacco pieces which are suitable for use in smoking articles or at most require further cutting for this purpose. The tobacco material may be a tobacco stem material, in particular a winnowing material, stem fibres or a tobacco leaf material as well as a mixture of these.

The tobacco material and the tobacco fines to be processed are brought to a pre-defined increased moisture content in the context of this invention. The material to be processed is also subjected to an increase in temperature, which may be obtained in particular by applying heat from outside and/or by mechanically generating pressure.

The advantages of the method proposed by the invention specifically reside in the fact that tobacco material together with tobacco fines is subjected to a mechanical pressure at an increased temperature and defined moisture level (e.g. in an extruder or a conveyor screw-conditioner). Due to the mechanical pressure, the tobacco fines are pressed onto the tobacco material and intimately bound to it. As a result of the method conditions proposed by the invention, the binding of the tobacco material with the tobacco fines is so strong that the tobacco material treated as proposed by the invention is resistant to the normal stresses which occur during cigarette production, i.e. the tobacco fines no longer drop off when being conveyed by air under normal production conditions. Mechanical stability is therefore higher than is the case with conventional tobacco film materials.

In accordance with the method, the material to be processed may contain a quantity of tobacco fines corresponding to its processing state and may even contain more than such a quantity of tobacco fines, in particular a quantity that is increased by adding tobacco fines. This being the case, not only is it possible to process tobacco fines which occur anyway, additional tobacco fines which occur at other points during production can also be processed in addition.

As a result of the invention, it is not necessary to add extra or external binding agents to bind the tobacco fines to the tobacco material: neither binding agents that are foreign to the tobacco nor inherent binding agents, i.e. which naturally occur in the tobacco. Instead, as a result of the method proposed by the invention, the tobacco fines can be bound with the tobacco material mechanically and/or by the quantities of binding agents which naturally occur in the tobacco (inherent binding agents). As a result of the method conditions proposed by the invention, such inherent binding agents (starch, resins, sugars...) are activated and thus bind the tobacco fines firmly to the tobacco material. This is totally different from those methods where the

addition of binding agents is absolutely essential, namely the methods of producing films or agglomerates mentioned above.

In principle, the material to be processed can be processed in batches, in particular pressed in batches, for example in a piston-cylinder unit.

The material to be processed can be pre-conditioned in preparation for the method proposed by the invention, in order to render it suitable for processing. To this end, the tobacco material is brought to one or more of the following initial conditions (figures given for pressure are always above atmospheric pressure):

Temperature:	80 - 147°C, preferably 100 - 120°C
Moisture at inlet:	6 - 13%
Moisture at outlet:	18 - 35%, preferably 26 - 30%
Pressure (gas over-pressure):	0 - 3 bar, preferably 0 - 1 bar.

The method of processing tobacco fines proposed by the invention is preferably operated on the basis of one or more of the following parameters:

Temperature:	80 - 180°C, preferably 140 - 160°C
Moisture at inlet:	18 - 35%, preferably 26 - 30%
Moisture at outlet:	11 - 19%, preferably 15 - 17%
Mechanical pressure:	80 - 250 bar, preferably 80 - 110 bar.

The expressions moisture at inlet and moisture at outlet specifically relate to the tobacco material (stems, winnowings, stem fibres, leaf tobacco, etc.).

The processing proposed by the invention preferably results in a product which is a non-continuous tobacco material, in particular a fibrous and/or granular smoking material or smoking article filler material. In other words, the method proposed by the invention results in a product which is ready for consumption and can be used directly in the smoking article. This is very different from producing tobacco film (continuous tobacco material), which is more complex to produce and which still has

to be cut and dried after production. The product obtained as a result of this invention is of a size and moisture content which make it suitable for use directly as a filler material for smoking articles.

In one embodiment of the invention, the tobacco fines may be a tobacco dust material. The tobacco dust material may be present in significant quantities without detriment to the capacity of the method proposed by the invention to produce an outstanding product. The proportion of dust (tobacco dust) may even be as high as 100% of the material to be processed without detriment to the success of the method.

For the purpose of the invention, the method may be operated such that the material to be processed may represent a proportion of the tobacco material that is greater than 25%. The material to be processed may also contain a proportion of tobacco fines that is less than 75%.

Yet another positive effect of the method proposed by the invention will be described, which relates to the filling capacity of the end product. During processing, the material to be processed is subjected to an increased mechanical pressure, as explained above. At the end of processing, when the material leaves the processing based on the method as a product, this increased pressure drops again. This usually takes place on discharge from the processing device mentioned above (e.g. extruder, screw conveyor, piston-cylinder unit). The drop in pressure on discharge from this device results in a flash evaporation, thereby causing the material to expand. Depending on the initial filling capacity (as measured under ISO conditions) increases of up to 100% can be achieved. For example, in the case of an initial material with a filling capacity of 1.5 ml/g, the material at the outlet after processing will have a filling capacity of 3 ml/g. In the case of another material, the measured increases in filling capacity were from 1.5 ml/g (initial material) to 4.5 ml/g (material on output, product). As a result of the invention, therefore, materials with a high proportion of fines or dust have filling capacities comparable with those of cut lamina tobacco.

The invention further relates to a smoking article, the smoking material or parts of the smoking material of which are made using a method based on the different embodiments described and explained above.

Claims

1. A method of processing tobacco fines, wherein the tobacco preparation for producing smoking articles from a material to be processed comprises the following steps:
 - subjecting tobacco fines and tobacco material to an increased mechanical pressure in order to bind the tobacco fines permanently to the tobacco material, wherein
 - no extra or external binding agents are added to the material to be processed in order to bind the tobacco fines to the tobacco material;
 - bringing the material to be processed to a predefined, increased moisture content;
 - processing the material to be processed by conveying it through an extruder, wherein the material to be processed is subjected to an increase in temperature; and
 - expanding the processed material by discharging the processed material from the extruder.
2. The method as claimed in claim 1, wherein the increase in temperature can be obtained by adding external heat and/or can be a result of creating the mechanical pressure.
3. The method as claimed in claims 1 or 2, wherein the tobacco material comprises a tobacco stem material, in particular a winnowing material, or a tobacco leaf material, or a mixture of the two.
4. The method as claimed in any one of claims 1 to 3, wherein the tobacco fines are smaller than a tobacco cut width, in particular smaller than 1 mm, especially smaller than 0.5 mm.
5. The method as claimed in any one of claims 1 to 4, wherein the material to be processed has a quantity of tobacco fines corresponding to its processing state.

6. The method as claim in any one of the claims 1 to 5, wherein the material to be processed has more than a quantity of tobacco fines corresponding to its processing state, in particular a quantity that is increased by adding tobacco fines.

7. The method as claimed in any one of claims 1 to 6, wherein the tobacco fines are bound to the tobacco material mechanically and/or by binding agents which occur naturally or inherently in the tobacco material.

8. The method as claimed in any one of claims 1 to 7, wherein the material to be processed is processed by conveying it continuously, in particular by conveying it through a conveyer which builds up a mechanical pressure, especially an extruder.

9. A method as claimed in any one of claims 1 to 7, wherein the material to be processed in processed in batches, in particular is pressed in batches.

10. The method as claimed in any one of claims 1 to 9, wherein the material to be processed is a pre-conditioned material, pre-conditioned on the basis of one or more of the following parameters:

Temperature	80 - 147°C, preferably 100 - 120°C
Moisture at inlet:	6 – 13%
Moisture at outlet:	18 – 35%, preferably 26 – 30%
Pressure (gas over-pressure):	0 – 3 bar, preferably 0 – 1 bar.

11. The method as claimed in any one of claims 1 to 10, wherein processing of the material to be processed takes place on the basis of one or more of the following parameters:

Temperature	80 - 180°C, preferably 140 - 160°C
Moisture at inlet:	18 – 35%, preferable 26 – 30%
Moisture at outlet:	11 – 19%, preferably 15 – 17%
Mechanical pressure:	80-250 bar, preferably 80-110 bar.

12. The method as claimed in any one of claims 1 to 11, wherein the material to be processed contains a proportion of tobacco material that is greater than 25%.

13. The method as claimed in any one of claims 1 to 12, whereby the material to be processed contains a proportion of tobacco fines that is smaller than 75%.

14. A smoking article containing a material produced by the method as claimed in any one of claims 1 to 12.

15. A smoking article as claimed in claim 14, comprising a non-continuously formed tobacco material.

16. The smoking article as claimed in claim 14 or 15, comprising a fibrous and/or granular filler material.