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METHOD OF MAKING RECONSTITUTED TOBACCO

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This invention relates to the manufacture of tobacco compositions. More particularly, the present invention relates to preventing dust loss from reconstituted tobacco compositions made from tobacco dust.

During the production and processing of tobacco products, including aging, blending, sheet forming, cutting, drying, cooling, screening, shaping and packaging, considerable amounts of tobacco fines and tobacco dust are produced. It is known that such tobacco fines and dust can be combined with a binder to form a coherent sheet, which resembles leaf tobacco and which is commonly referred to as reconstituted tobacco. One method for making reconstituted tobacco of this general character is disclosed in United States Patent 2,734,510, wherein the tobacco fine and dust are applied to a binder made of carboxymethyl cellulose, carboxymethyl hydroxyethyl cellulose or a suitable salt thereof. The binder, in such compositions, ranges from about 5% to about 50% of the weight of the tobacco employed. United States Patent 2,708,175 describes a binder for reconstituted tobacco which consists of a plant gum, principally of galactomannan. United States Patent 2,592,554 to Frankenburg describes as binders for reconstituted tobacco various water-soluble polysaccharides, such as alginic and pectinic acids and their sodium and potassium salts, derived from plants other than tobacco. However, the addition of cellulosic binders further increases the amount of cellulosic material in the product and tends to create an acrid and bitter smoke when the product is used to make cigarettes. The natural hydrophilic colloid gums such as guar, locust bean, algin and other commonly used material such as Irish moss, have additional disadvantages. These materials contain proteins and other materials not found in tobacco which add distinctive flavors of their own tobacco products during smoking. Thus, Frankenburg, in describing the use of various water-soluble polysaccharides derived from plants other than tobacco, teaches that care should be exercised that they must be in a state of refinement. Frankenburg teaches that these materials should be free of extraneous matter containing compounds of nitrogen particularly proteins, and compounds of sulfur, phosphorus and the halogens, i.e., compounds giving undesirable products of combustion or dry distillation. Such refining is often a very tedious and difficult operation.

The invention set forth in copending application Ser. No. 557,903, filed of even date herewith in the names of the present inventors and entitled Smoking Compositions and Method of Preparing Same, now Patent No. 3,353,541, which is a continuation-in-part of application Ser. No. 336,009, filed on Jan. 6, 1964, now abandoned, and which makes possible the production of improved reconstituted tobacco by a method which is simpler and more effective than the methods previously employed. Said invention involves a method which does not require refining of the binder and is, therefore, more easily and efficiently employed than other methods for making binders and for making reconstituted tobacco. The reconstituted tobacco which is obtained in accordance with said invention need not contain any additional cellulose or protein foreign to tobacco, since the binder which is employed is derived solely from tobacco, and contains no materials other than those which naturally occur in tobacco. Thus, reconstituted tobacco produced in accordance with said invention can be so formulated as to be similar in physical properties and chemical compositions to natural tobacco.

In accordance with said invention, tobacco parts are bonded together by tobacco pectins which are especially prepared by a process which yields these pectins in a form in which they can be employed as binder materials. The process for preparing tobacco pectins comprises first reacting tobacco parts, preferably in form in which they present a large surface area, with an aqueous solution of a nontoxic reagent which is capable of reacting with and destroying the calcium and magnesium cross-links in the pectinaceous substances which naturally occur in tobacco. By destroying the calcium and magnesium cross-links, the tobacco pectins are liberated and are available for use as a binder. The tobacco pectins are then dissolved or dispersed in solution or are at least sufficiently released from the interstices of the tobacco mass so that they form a coating on the surface thereof. Tobacco pectins which are dissolved or dispersed are thereafter precipitated or deposited from the solution, so that they become available for use as a binder material. In this way, the tobacco parts can be bonded together without introducing any materials as binders which are foreign to the tobacco, and without the need for the purification of the tobacco pectins, inasmuch as any impurities present are normally present in tobacco and, thus, do not add any undesired qualities to the tobacco. In general, a number of methods are known for the production of reconstituted sheets.

One method involves the formation of a continuous homogeneous sheet. The sheet may be formed from the fines and dust alone or together with other parts of the tobacco, such as portions of the stems or stalks, and portions of the leaves by methods which involve operations such as digesting the particles and beating them until they form a pulp. This pulp may be formed into a reconstituted sheet, using equipment which is similar to that used in the paper industry.

Another method involves treating pulp produced by digesting and beating, or the like, with an adhesive and forming the treated pulp into a film by casting it on a non-porous surface, such as a stainless steel belt.

Another method involves forming the pulp into a thick viscous paste and forming said paste into a film or sheet by compressing it between rollers.

Another method involves applying ground tobacco dust into a sheet composed of two layers of dry dust separated by an adhesive layer. The adhesive layer may comprise a pulp obtained by refining tobacco stems to solubilize the natural gums and adhesives normally present in the stems. It may also comprise a pulp produced by various other methods set forth above. It may also contain additives such as natural and synthetic gums, humectants, flavors and other materials to control the smoking, color and burning characteristics of the product.

Sandwich-type reconstituted tobacco sheets of the type described in the United States Patent 2,734,513 are characterized by severe dust-off, particularly from the top side. Various means of preventing the loss of dust have been used in the tobacco industry without appreciable success. For example, in United States Patent 3,016,907, sheet surface dustiness is controlled by the addition thereto of a tacky material which may be, for example, honey, corn syrup or the like. However, the usual materials, gums, syrups polysaccharides and the like, used in such conventional oversprays on the sheet and particularly on sandwich-type sheets, have had either insufficient sticking power or have had excessive wetting power. Another complication in the use of conventional oversprays is

related to the fact that, in production manufacture, tobacco dust is placed on a belt, is then sprayed with a binder material, additional dust is blown on the binder material, and the entire reconstituted sheet is oversprayed for the purpose of decreasing the amount of dust that is lost after the sheet is dried. Surplus dust that did not adhere is picked up by vacuum and removed before the drying process begins. Overspray materials that give excessive wetability to the dust prevent the removal of some of the surplus dust by vacuum means. Thus, the overspray can even contribute to dust loss since it prevents some of the dust from being recovered in usable form.

We have discovered a method for overcoming the above-enumerated disadvantages. We have found that when certain pectin-containing compositions are applied to the outer surfaces of reconstituted tobacco products made from finely divided tobacco, the loss of tobacco dust can be greatly diminished or eliminated. For example, when tobacco products are formed on metal surfaces, these surfaces can be coated with the pectin-containing compositions of the present invention prior to contact with tobacco dust. When the formed tobacco compositions are removed from the metal surface, the dust which is combined with the pectin-containing composition remains adhered to the tobacco composition and does not shake off easily.

The present compositions can be employed without resulting in any significant changes in smoking quality of the reconstituted tobacco product.

The present compositions comprise the following ingredients:

(1) A pectinaceous material. This may be a purified carbohydrate product obtained from the dilute acid extract of the inner portion of the rind of citrus fruits or from apple pomice. It may also be obtained by the treatment of tobacco with materials which release pectins, for example, by the method set forth in our copending application, referred to earlier in this specification.

(2) A sugar, which may be a monosaccharide, disaccharide or trisacchide and is, preferably, a hexose. Examples of suitable sugars include the following: dextrose, fructose, honey, invert sugar, sucrose, corn syrup solids, which are mixtures of dextrose and oligosaccharides derived from corn starch, and starch syrups derived from starches other than corn starch, such as rice, wheat, tapioca and sorghum syrups, and mixtures of the same.

The ratio of pectinaceous material to sugar is important, and may very from about 1:1 to about 1:25 (by weight) respectively, but is preferably from about 1:4 to 1.20 (by weight) respectively.

By varying this ratio within the above limits, the adhesive and film-forming characteristics of overspray material may be varied to suit the particular requirements of the tobacco fines mixtures, and control the tackiness of the final product.

The composition may be employed with water and may, if desired, be employed with other ingredients, such as those found in the conventional oversprays. Generally the water will comprise from 10 to 90% of the final composition. Sufficient alkali metal hydroxide, for example, sodium hydroxide or other base materials is preferably added to the composition to bring the pH of the ultimate composition employed to a range from about 7.0 to about 9.5. A preferred final composition comprises 12 to 20% of corn syrup and 2–4% of pectinaceous material, based on the weight of the sheet being sprayed.

The composition of the present invention is preferably applied to the reconstituted tobacco sheet comprising film-forming material and at least one layer of tobacco dust by spraying, the total amount of the composition being sprayed should comprise from about 1 to 10% by weight, and, preferably, from about 2 to 8% by weight of the weight of the sheet.

The following examples are illustrative:

Example 1

A layer of tobacco dust on a belt was coated with a thin layer of a film-forming material, and the exposed surface was then coated with tobacco dust. The sheet thus formed was sprayed with an overspray liquor to which had been added N. F. (National Formulatory) (62 DM) pectin in varying amounts. One portion of the sheet, Sample A, to serve as a control, was sprayed with a conventional overspray, an aqueous solution consisting of 2% corn syrup solids, 0.1% of a detergent and sufficient sodium hydroxide to bring the pH of the overspray to 8.5; the other portions of the sheet, Samples B–E, contained pectin, as indicated in the table below. The sheets were dried by hot air and electrical resistance heatings.

The dust loss of the sheet was determined for each sample by means of the Himhoff test and by the brush-off test.

In the Himhoff test, the sheet is cut by a Himhoff cutter into strips about 7" x 1½" and equilibrated to about 25% moisture. The strips are then cut into cigarette filler, the filler is shaken on a screen, and that part which is —50 mesh is weighed and counted as dust loss.

In the brush-off test, the top and bottom of the sandwich-type sheet is dusted with a brush, and the collected dust is weighed to give a dust-off value for the top and bottom of the sheet.

The results from the five samples are shown below:

Sample	Pectin N. F. (62 DM), Percent	Himhoff Test	Dust Loss Values (gms./ft.²), Brush-Off Test	
			Top	Bottom
A	[1] 0	2.3	1.99	0.26
B	0.5	1.4	0.58	0.22
C	1.0	1.7	0.46	0.28
D	2.0	[2]		
E	3.0	0.9	0.37	0.23

[1] Control.
[2] Not tested.

These data show that the addition of pectin to the overspray significantly reduced the dust loss from the reconstituted tobacco sheet.

Example 2

A sheet for use as a control was prepared as described in Example 1, and sprayed with a commercially available conventional overspray which contained 2% honey instead of 2% corn syrup solids, but was otherwise the same as in Example 1. The same type sheet was prepared and sprayed with overspray to which N. F. (81 DM) pectin had been added in 1.0% and 0.1% amounts:

Sample	Pectin N. F. (81 DM), Percent	Dust Loss (gms./ft.²), Brush-Off Test	
		Top	Bottom
A	[1] 0	2.1	0.31
B	1.0	0.93	0.30
C	0.1	1.91	0.34

[1] Control.

The decrease in dust loss by the brush-off test was significantly great when 1.0% of the pectin was used.

Example 3

Reconstituted tobacco sheets were prepared as described in Example 1. Samples A, C, D and E were treated with an overspray containing sodium polypectate (an aqueous solution of sodium polypectate made by the Sunkist Company, and which is converted to water insoluble calcium polypectate when it is sprayed on the tobacco sheet) in the amounts given below. The sheets were dried as described previously and tested for dust loss by the Himhoff and brush-off tests. Results are given below.

Sample	Sodium Poly-pectate, Percent	Basis Weight, gms./ft.^{2}	Dust Loss			
			Himhoff Test		Brush-off Test	
			gms./ft.^{2}	Percent	Top	Bottom
A	0.75	11.81	2.47	13.8	1.45	0.49
B	(1)	13.1	3.23	19.7	1.95	0.86
C	0.75	13.1	1.52	8.9	0.85	0.47
D	0.25	12.2	1.75	11.5	1.01	
E	0.25	11.7	1.63	10.6	0.90	0.33

[1] Control.

From the data given above, used in conjunction with the results obtained in Examples 1 and 2, it is evident that overspray water with a relatively low percentage of pectin material is more effective in decreasing dust loss than that with a high percentage. However, even the higher percentages of pectin materials do improve the dust-off characteristics of reconstituted tobacco sheet. As used herein all parts and percentages are by weight.

What is claimed is:

1. In the manufacture of reconstituted tobacco sheet from finely divided tobacco, the step of controlling sheet surface dustiness arising in the manufacture of sheets containing tobacco dust which comprises applying to the surface thereof at least 1% based on the weight thereof of a composition consisting essentially of a pectinaceous material and a sugar in the ratio, respectively, of from 1:1 to 1:25 by weight.

2. In the manufacture of reconstituted tobacco sheet from finely divided tobacco, the step of controlling sheet surface dustiness arising in the manufacture of sheets, containing tobacco dust which comprises applying to the surface thereof at least 1% based on the weight thereof, of a composition comprising a pectinaceous material and a sugar, in the ratio, respectively, of from 1:4 to 1:20.

References Cited

UNITED STATES PATENTS

3,016,907 1/1962 Rosenberg et al. ----- 131—140

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