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# NOVEL RECONSTITUTED TOBACCO COMPOSITIONS

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This invention relates to novel reconstituted tobacco compositions comprising primarily fragmented tobacco and a suitable binder for the tobacco fines. More particularly, this invention relates to a novel reconstituted tobacco composition which is suitable for blending with leaf tobacco in the manufacture of cigarettes and other smoking articles.

The history of the art of reconstituting tobacco fragments or fines has been concerned largely with the problem of forming the fragments of tobacco which inevitably result from the manufacture of cigarettes and other smoking articles from natural tobacco leaves, into a composition suitable for smoking. Preferably, the fragmented tobacco is sought to be combined with natural tobacco leaves in the manufacture of cigarettes and other smoking articles, in such a manner that the processes of manufacture of the smoking articles are not complicated by the presence of such reconstituted tobacco, and that the inclusion of such reconstituted tobacco does not adversely affect the qualities of the resulting cigarettes or other smoking articles from the point of view of their acceptability to the consumer. In the formulation of these compositions it has been found that it is desirable to employ a suitable binder to combine with the tobacco fragments in such manner so as to preferably produce sheets of material, primarily consisting of tobacco fragments, which on the one hand possess physical characteristics such that the sheets can be put through the normal manufacturing processes which leaf tobacco goes through in the production of cigarettes and other smoking articles, and on the other hand have taste and smoking characteristics such that the reconstituted tobacco may be added to the leaf tobacco without adversely affecting the smoking qualities of the resulting articles. One such prior art composition which has been found suitable is disclosed in U.S. Patent No. 2,708,175, wherein it has been proposed to use a galactomannan as the binder for the formation of reconstituted tobacco sheets.

While the reconstituted tobacco compositions formed using this gum are quite suitable, the raw material from which the gum is extracted comes from plant sources generally foreign to the United States of America. In fact, most of the plant sources are generally found in Far Eastern countries. It will thus be obvious that the source of supply is dependent not only upon the climatic conditions prevailing in these countries in any given year, but also upon the economic and political conditions prevailing in these countries at any given time.

It was thus of the utmost importance to find another binder which could be used instead of the binders specified in the above patent but which was obtainable from domestic sources and which was not dependent on so many extraneous factors.

In an effort to solve this problem, many different substances were tested but all of these materials were found unsatisfactory for one reason or another.

However, during the course of our investigations one compound was discovered which possessed all of the above-mentioned prerequisites and which was readily obtainable from domestic sources.

Therefore, according to this invention there is provided a tobacco composition comprising fragmented tobacco and a binder consisting essentially of hydroxyethyl amylose.



The hydroxyethyl amylose employed in the compositions of this invention is a derivative of the amylose fraction of potato starch and is hydroxyethylated to the extent of 0.15 hydroxyethyl groups per glucose molecule. Hydroxyethyl amylose is sold in the United States in a granular form under the trade name "Superlose HAA–11" by the Stein Hall Company. The hydroxyethyl amylose of this invention has far more desirable solubility characteristics than amylose which is only soluble in water under autoclave conditions, and is soluble in water by cooking to 95° C. Furthermore, it is soluble in glycerine to the extent of 35% by weight at 180° F.

The hydroxyethyl amylose is present in the compositions of this invention in a range of about 1 to 20%, and preferably about 3 to 12% based on the total weight of the composition.

It is also within the purview of this invention to employ a fibrous material, preferably alpha cellulose, in an amount of about 1 to 10%, preferably about 4 to 8% based on the total weight of the composition to furnish reinforcing fibers to increase the strength of the tobacco sheets. This invention also envisions the use of a suitable humectant such as glycerine and/or propylene glycol in an amount of about 5 to 12% based on the total weight of the composition. We have found it particularly satisfactory to use a glycerine-propylene glycol mixture in a 4:1 ratio.

In preparing the compositions of this invention, the hydroxyethyl amylose may be added to the tobacco fines in dry powdered form or it may be added in liquid form. In preparing the composition of this invention, it is essential that a small amount of moisture always be present in order to facilitate the preparation of tobacco leaves. Thus, when it is added in dry powdered form, it is mixed intimately with the tobacco fines to which mixture is preferably added the fibrous material in fibrous form. A small amount of water with or without a humectant is then added. If the hydroxyethyl amylose is added in liquid form, it may be mixed with a humectant, such as glycerine or a mixture of humectants such as a glycerine-propylene glycol mixture, diluted with water and then mixed with the powdered tobacco fines which may be in admixture with the fibrous material.

A detailed proceess for the preparation of smoking compositions is set forth in the above-mentioned U.S. Patent No. 2,708,175 and the process described in this patent is quite suitable for the preparation of the compositions of this invention.

Essentially, this process involves conveying the dry tobacco to a hammer-mill where it is ground until about 20% to 35% of the resulting fragments would pass through a 140-mesh screen and until about 0.5% to 10% would remain in a 30-mesh screen. The proportions of coarse and fine tobacco particles produced thereby are variable at random within these limits.

When the hydroxyethyl amylose is added in dry form, it is mixed together with the ground tobacco and preferably the fibrous material. The liquid ingredients, i.e., water, with or without humectants such as glycerine and propylene glycol, are then added to the pre-mixed dry ingredients, i.e., the dry-ground tobacco, floc and hydroxyethyl amylose, with constant stirring. The resulting damp mix is then processed by any suitable apparatus adapted to apply a shearing action to the mixture while it is in moist condition. The shearing action is valuable because it tends to distribute the hydroxyethyl amylose throughout the mixture. Suitable apparatus includes, for example, six pairs of rollers, each pair having a space between them of about 0.004", with one of each pair of rollers revolving at such a speed that its rolling surface when acting upon the material being rolled between that pair, travels faster than the other rolling surface when so acting, thus produc-

ing a shearing or wiping action on the material of the mixture. The rolled material will tend to stick to the faster moving surface, and should be removed therefrom by a doctor blade. The pairs of rollers may be conveniently placed so that the sheared material will drop by gravity from one pair of rollers to the next, and seriatim; and finally, the sheared material may be deposited on a moving belt or screen in the form of a coherent and continuous damp sheet or sheets.

The sheet is then dried to a degree such that the moisture content approximately equals that of natural leaf tobacco and is then ready to be blended with natural leaf tobacco in the manufacture of cigarettes and other smoking articles. During the drying process the sheet lies in an undisturbed position upon the belt or screen upon which is has been deposited on leaving the last pair of shearing rollers. An overhead infra-red electric resistance heater is suitable for the drying step. The tensile strength of the sheet produced is approximately the same as that of leaf tobacco, and similarly the thickness of the sheet of finished composition is about that of natural leaf tobacco while its ultimate moisture content, after drying, is about that of natural leaf tobacco when ready for blending, i.e., about 9% to 13% by weight of the total composition.

Alternatively, the hydroxyethyl amylose may be added to the dry mixture of dry-ground tobacco fragments which may contain the fibrous material, in the form of a solution. In this case, the dry-ground tobacco fragments and fibrous material are mixed together as a dry mix, while water with or without humectants and hydroxyethyl amylose are mixed together in the form of a solution. Thereafter this solution is cooked for about 15 minutes at about 92° C. This hot solution or the solution after cooling may then be added to the dry mix while the resultant mixture is constantly stirred. The resulting damp mix is then processed in a manner similar to that described above. In any case, a part of the liquid, whether water, a humectant or humectants, or both, may be supplied to the damp mix at the rollers, for instance, by moistening the latter with a measured part of the total liquid which is to be included in the mixture of dry and liquid mixes.

The following examples, without limiting in any way the scope of the invention which we claim, are specific embodiments of the invention showing illustrative proportions of the component materials which may be used.

*Example I*

A dry mixture was prepared by mixing the following ingredients together:

1816 grams dry-ground tobacco
159 grams alpha cellulose
204 grams hydroxyethyl amylose

A liquid mixture was prepared by mixing the following ingredients together:

1500 ml. water
112 ml. glycerine
33 ml. propylene glycol

The liquid mixture was then added to the pre-mixed dry ingredients while stirring constantly. The resulting damp mixture was then processed through rollers and dried in an infra-red drier as described above.

The finished sheet had the following composition (based on a 12.5% moisture sheet):

| | |
|---|---|
| Tobacco | 74.4% (8.5% moisture) |
| Alpha cellulose | 6.5% (8.0% moisture) |
| Hydroxyethyl amylose | 8.3% (12.0% moisture) |
| Glycerine | 5.5% (5.0% moisture) |
| Propylene glycol | 1.4% |
| Excess water | 3.9% |
| Total | 100.0% |



*Example II*

A dry mixture was prepared by mixing the following ingredients together:

1816 grams dry-ground tobacco
159 grams alpha cellulose

A liquid mixture was prepared by mixing the following ingredients together:

1500 ml. water
112 ml. glycerine
33 ml. propylene glycol

To the liquid mixture 75 grams of hydroxyethyl amylose were added. The mixture was cooked for 15 minutes at 92° C. The hot solution of hydroxyethyl amylose was then added to the dry mix with constant stirring. The resulting damp mix was then processed through rollers and dried in an infra-red drier as described above.

The finished sheet had the following composition (based on 12.5% moisture sheet):

| | |
|---|---|
| Tobacco | 78.7% (8.5% moisture) |
| Alpha cellulose | 6.9% (8.0% moisture) |
| Hydroxyethyl amylose | 3.2% (12.0% moisture) |
| Glycerine | 5.8% (5.0 moisture) |
| Propylene glycol | 1.5% |
| Excess water | 3.9% |
| Total | 100.0% |

*Example III*

A dry mixture was prepared by mixing the following ingredients together:

1775 grams dry-ground tobacco
245 grams hydroxyethyl amylose
159 grams alpha cellulose

A liquid mixture was prepared by mixing the following ingredients together:

1500 ml. water
112 ml. glycerine
33 ml. propylene glycol

The liquid mixture was added with constant stirring to the pre-mixed dry ingredients. The damp mix was then run through rolls and an infra-red drier as described above. The final sheet had the following composition (12.5% moisture sheet):

| | |
|---|---|
| Tobacco | 72.8% (8.5% moisture) |
| Hydroxyethyl amylose | 10.0% (8.0% moisture) |
| Alpha cellulose | 6.5% (8.0% moisture) |
| Glycerine | 5.5% (5.0% moisture) |
| Propylene glycol | 1.4% |
| Excess water | 3.8% |
| Total | 100.0% |

Having thus provided a written description of the invention along with specific examples thereof, it should be understood that no undue limitations or restrictions are to be imposed by reason thereof, but that the present invention is defined by the appended claims.

We claim:

1. A composition of matter suitable for smoking consisting by weight of a minor proportion, about 1 to 20%, of hydroxyethyl amylose, approximately 9 to 13% of moisture and the balance essentially all dry-ground tobacco with the individual finely-divided fragments thereof cohered together so as to have, when formed in sheets of about the thickness of natural leaf tobacco, a tensile strength approximately equal to the tensile strength of such leaf tobacco.

2. A composition of matter suitable for smoking consisting by weight of a minor proportion, about 1 to 20%, of hydroxyethyl amylose, about 1 to 10% of a fibrous material, approximately 9 to 13% of moisture and the

balance essentially all dry-ground tobacco with the individual finely-divided fragments thereof cohered together so as to have, when formed in sheets of about the thickness of natural leaf tobacco, a tensile strength approximately equal to the tensile strength of such leaf tobacco.

3. A composition according to claim 2 wherein said fibrous material is alpha cellulose.

4. A composition according to claim 2 wherein said hydroxyethyl amylose is present in an amount of about 3 to 12% by weight.

5. A composition according to claim 2 wherein said fibrous material is present in an amount of about 4 to 8% by weight.

6. A composition of matter suitable for smoking consisting by weight of a minor proportion, about 1% to 20%, of hydroxyethyl amylose, approximately 9% to 13% of moisture, a humectant in an amount not exceeding about 12%, and the balance essentially all dry-ground tobacco with the individual finely-divided fragments thereof cohered together so as to have, when formed in sheets of about the thickness of natural leaf tobacco, a tensile strength approximately equal to the tensile strength of such leaf tobacco.

7. A composition of matter suitable for smoking consisting by weight of a minor proportion, about 1% to 20%, of hydroxyethyl amylose, approximately 9% to 13% of moisture, about 1% to 10% of a fibrous material, a humectant in an amount not exceeding about 12%, and the balance essentially all dry-ground tobacco with the individual finely-divided fragments thereof cohered together so as to have, when formed in sheets of about the thickness of natural leaf tobacco, a tensile strength approximately equal to the tensile strength of such leaf tobacco.

8. A composition according to claim 7 wherein said fibrous material is alpha cellulose.



9. A composition according to claim 7 wherein said humectants are selected from the group consisting of glycerine, propylene glycol, and mixtures thereof.

10. A composition according to claim 7 wherein said hydroxyethyl amylose is present in an amount of about 3 to 12% by weight.

11. A composition according to claim 7 wherein said fibrous material is present in an amount of about 4 to 8% by weight.

12. A composition of matter suitable for smoking consisting by weight of a minor proportion, about 1 to 20% of hydroxyethyl amylose, approximately 9 to 13% of water, about 1 to 10% of a fibrous material, a humectant in an amount not exceeding about 12%, and the balance essentially all dry-ground tobacco with the individual finely-divided fragments thereof cohered together so as to have, when formed in sheets of about the thickness of material leaf tobacco, a tensile strength approximately equal to the tensile strength of such leaf tobacco.

13. A composition according to claim 12 wherein said hydroxyethyl amylose is present in an amount of about 3 to 12% by weight.

14. A composition according to claim 12 wherein said fibrous material is present in an amount of about 4 to 8% by weight.

15. A composition according to claim 12 wherein said humectants are selected from the group consisting of glycerine, propylene glycol, and mixtures thereof.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 2,769,734 | Bandel | Nov. 6, 1956 |
| 2,903,391 | Kerr | Sept. 8, 1959 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 10,267 | Great Britain | 1886 |