United States Patent Office 2,776,916
Patented Jan. 8, 1957

2,776,916

TOBACCO COMPOSITION

Ralph L. Ericsson, Short Hills, N. J.

No Drawing. Application August 23, 1954, Serial No. 451,697

13 Claims. (Cl. 131—17)

This invention relates to an improved tobacco composition. More particularly, it relates to an improved humectant for the processing and utilization of tobacco, and to a tobacco composition comprised thereof.

In the preparation and consumption of tobacco, an important problem lies in the maintenance of an optimum moisture content in the material and in products prepared therefrom. If the leaves are too dry, they tend to crumble during shredding and packing, and cigars or cigarettes made therefrom tend to burn too rapidly. Excessive moisture, on the other hand, leads to spoilage of the crude leaf and to slow or defective burning of the finished product. For these reasons, it has long been the practice to add a moisture retaining and regulating substance to tobacco at one processing stage or another. Ordinarily, an aqueous solution of glycerin, molasses, a polyethylene glycol, or the like is sprayed on the leaves in a suitable amount before the leaves are shredded. Such added substances remain in the completed tobacco composition, where they function as humectants, holding the fluctuations in moisture content thereof to a narrow range while the relative humidity of the surrounding atmosphere may be varying over a relatively wide range.

Evidence has now been accumulating for some years, indicating that the organic humectants heretofore employed are not entirely free from objectionable qualities, and may in fact actually be dangerous to life and health. It has long been known that glycerin decomposes at high temperatures such as those exisiting in a burning cigar or cigarette and forms acrolein, a highly irritating olefinic aldehyde. Other hydroxyl-containing organic humectants such as the polyethylene glycols, molasses, sorbitol, and the like, readily undergo intramolecular dehydration, splitting out water and yielding double-bonded derivatives of objectionable physiological characteristics. It will be readily apparent that these substances leave a great deal to be desired when employed as humectants in combination with tobacco.

It is accordingly an object of my invention to provide an improved humectant for use in combination with tobacco. Another object is to provide a stable humectant for tobacco, having no tendency under pyrolysis conditions to break down into physiologically objectionable derivatives. Another object is to provide a stable, inorganic humectant composition for use in tobacco. Another object is to provide a stabilizing and buffering additive for smoking tobaccos. A further object is to provide an ash-strengthening agent for cigars and cigarettes. These and other objects of my invention will be apparent from the present description thereof and from the appended claims.

In one aspect, my invention involves a new, improved, and highly effective humectant for tobacco, consisting essentially of an inorganic salt or a mixture of inorganic salts having deliquescent and humectant properties and other characteristics as hereinafter defined.

In another aspect, my invention involves a tobacco composition containing a humectant of my improved

type, as well as cigars, cigarettes, and other articles of manufacture prepared from the said tobacco composition.

In a further aspect, my invention contemplates the pretreatment of tobacco with my improved humectant prior to, during, and/or as an incident of the customary processing of tobacco.

In a specific embodiment, my invention involves a tobacco humectant consisting essentially of a mixture of potassium hydrogen orthophosphates in a proportion affording a pH at 25° C. between about 4.2 and 8.5, preferably between about 6 and 8, when dissolved in water to a 0.1 molar concentration. Such a humectant may consist, for example, of a mixture of potassium dihydrogen orthophosphate (KH_2PO_4) and potassium monohydrogen orthophosphate (K_2HPO_4) in a molar ratio between about 4:1 and 1:4, preferably between about 2:1 and 1:1, and may conveniently be employed as an aqueous solution containing between about 25 and 75 percent by weight thereof, preferably between about 40 and 60 percent. The solution can be sprayed directly upon the tobacco, at an appropriate stage of processing, in a sufficient quantity to incorporate in the tobacco between about 0.5 and 5 percent by weight of humectant, dry basis, preferably around 3 percent.

A phosphate humectant composition, as hereinabove described, may include minor proportions of other potassium phosphates, so long as the potassium hydrogen orthophosphates predominate. For reasons which are not entirely clear, certain classes of phosphates, such as potassium metaphosphate and potassium polyphosphates, are more compatible and are tolerated in larger proportions, up to approaching 50 percent, than other classes, such as tripotassium orthophosphate and the potassium pyrophosphates. The polyphosphates, in fact, act as inhibitors of crystal growth, and thus are specifically advantageous as additives.

While the potassium phosphates are the basis for a preferred and superior form of my invention, inorganic salts of other classes can also be used, either alone or in combination with phosphates and/or other humectant salts. In order to be acceptable as a tobacco humectant, an inorganic salt must have moisture-retaining properties capable of maintaining tobacco at an acceptable moisture content when incorporated therein; it must be physiologically inert or insignificant in the amounts required in tobacco and therefore in the amounts that might come into contact with the lips, tongue, buccal surfaces, nose, throat, and lungs; it should have a buffering action around the neutral pH range in order to minimize the concentration of acidic constituents in the smoke and hence to reduce irritation of the mucous membranes; and it should not be converted on pyrolysis into substances having physiologically undesirable properties or into an objectionable concentration of such substances.

It is desirable to adjust the concentration and quantity of humectant solution so as to incorporate the desired quantity of humectant salts and simultaneously to adjust the water content of the tobacco to the desired level. The latter will vary depending upon the end use for which the tobacco is intended. Cured tobacco, as ordinarily marketed, contains around 12 to 14 percent moisture, or up to around 20 percent in the case of cigar tobaccos and other grades of finer leaf. After being processed and readied for packing, cigarette tobaccos ordinarily range from around 12 to 18 percent in moisture content. Other smoking tobaccos contain from 15 to 25 percent moisture, some of them up to 30 percent. It may thus be desirable or even necessary to further dry the cured leaf before incorporating the humectant therein, or to remove excess moisture therefrom after such incorporation.

The principal advantage offered by my invention lies in the fact that tobaccos containing my new humectant do not form physiologically objectionable derivatives such as acrolein or other unsaturated organic compounds when smoked. In order to realize the best results from my invention, it is therefore important that no organic humectant of the prior-art types be added to the tobacco, in particular hydroxyl-containing substances capable of undergoing dehydrogenation to aldehydes and/or intramolecular dehydration to yield derivatives containing carbon-carbon double bonds.

In addition to the foregoing, my new humectant has other important advantages, not the least of which is its outstanding effectiveness in its primary function of stabilizing the moisture content of the tobacco composition. For instance, it serves to strengthen the tobacco ash. It is non-toxic. It is a buffering agent, and serves to neutralize acidic substances, both those originally present and those formed in burning. In all of these important matters, my new humectant has properties which render it superior to the substances employed by the prior art.

My invention will be more fully understood from the following specific examples:

Example 1

Cured tobacco leaf containing 12 percent by weight of moisture, dry basis, is sprayed with 6 percent by weight of an aqueous solution containing 50 percent by weight of an equimolar mixture of potassium dihydrogen orthophosphate and potassium monohydrogen orthophosphate. The resulting composition, containing 3 percent by weight of the said mixed phosphates, is effectively stabilized in moisture content and evolves no physiologically objectionable substances on burning.

Example 2

Cured tobacco leaf is softened, stabilized, and buffered by addition thereto of 8 percent by weight of an aqueous solution containing 10 percent by weight of potassium dihydrogen orthophosphate, 5 percent by weight of potassium monohydrogen orthophosphate, and 10 percent by weight of potassium polyphosphate.

Example 3

A humectant solution is prepared by dissolving a 2:1 molar mixture of potassium dihydrogen orthophosphate and potassium monohydrogen orthophosphate in water to a concentration of 60 percent by weight, based on total solution, and saturating the resulting solution with potassium metaphosphate (KPO_3). The completed humectant solution is added to tobacco in the proportion of 5 percent by weight.

Example 4

An aqueous 10 percent potassium dihydrogen orthophosphate solution is adjusted to pH 7.0 by addition thereto of a sufficient quantity of tripotassium orthophosphate (K_3PO_4). The resulting solution is an effective humectant when incorporated in tobacco.

Example 5

An aqueous 25 percent solution of mixed potassium hydrogen orthophosphates having a pH of 6.0 is adjusted to pH 7.2 by addition thereto of a sufficient quantity of potassium pyrophosphate ($K_4P_2O_7$). The solution obtained thereby is sprayed upon tobacco in a quantity sufficient to incorporate a total of 3 percent by weight of potassium phosphates therein, effective to maintain the moisture content thereof at the optimum level.

While I have described my invention with reference to certain specific embodiments thereof, particularly in the operating examples, it is to be understood that such embodiments are illustrative only and not by way of limitation. Numerous modifications and equivalents will be apparent from the foregoing description to those skilled in the art. It will further be understood that not all of

the embodiments of my invention are equal in primary or overall effectiveness. While the humectant salts involved in my invention are broadly definable as inorganic moisture-retaining substances having other properties as set forth hereinabove, a superior and preferred subclass thereof is the potassium hydrogen orthophosphates, optionally admixed with a minor proportion of other potassium phosphates or other humectant salts of the broadly defined class.

In accordance with the foregoing description, I claim as my invention:

1. In a tobacco composition, an improved humectant consisting essentially of at least about 0.5 percent by weight, dry basis, of a deliquescent inorganic salt effective to maintain the moisture content of said tobacco composition substantially constant, said salt having the further properties of exerting a buffering action around the neutral pH range, being physiologically unobjectionable in the amount employed, and giving rise to physiologically unobjectionable pyrolysis products.

2. In a tobacco composition, an improved humectant consisting essentially of at least about 0.5 percent by weight, dry basis, of mixed potassium hydrogen orthophosphates having a pH between about 4.2 and 8.5, measured in 0.1 molar aqueous solution at 25° C.

3. In a tobacco composition, an improved humectant consisting essentially of between about 0.5 and 5 percent by weight, dry basis, of mixed potassium hydrogen orthophosphates having a pH between about 6 and 8, measured in 0.1 molar aqueous solution at 25° C.

4. Tobacco combined with a humectant proportion above about 0.5 percent by weight, dry basis, of mixed potassium hydrogen orthophosphates having a pH between 4.2 and 8.5, measured in 0.1 molar aqueous solution at 25° C.

5. A tobacco composition especially adapted for use in cigarettes, containing as the humectant between about 0.5 and 5 percent by weight, dry basis, of a mixture of potassium hydrogen orthophosphates having a pH between about 4.2 and 8.5, measured in 0.1 molar aqueous solution at 25° C., and free from added organic humectant substances.

6. A tobacco composition containing as the humectant between about 0.5 and 5 percent by weight, dry basis, of a mixture of potassium phosphates predominating in the potassium hydrogen orthophosphates and having a pH between about 4.2 and 8.5, measured in 0.1 molar aqueous solution at 25° C.

7. A tobacco composition substantially free from added organic substances capable of yielding unsaturated products on pyrolysis, and containing between about 0.5 and 5 percent by weight, dry basis, of a mixture of potassium dihydrogen orthophosphate and potassium monohydrogen orthophosphate having a pH between about 6 and 8, measured in 0.1 molar aqueous solution at 25° C.

8. A smoking tobacco composition containing around 3 percent by weight, dry basis, of a mixture of potassium dihydrogen orthophosphate and potassium monohydrogen orthophosphate in a molar ratio between about 4:1 and 1:4, said tobacco composition being substantially free from added hydroxyl-containing organic humectant substances.

9. A smoking tobacco composition especially adapted for use in cigarettes, containing around 3 percent by weight dry basis of a mixture of potassium dihydrogen orthophosphate and potassium monohydrogen orthophosphate in a molar ratio between about 2:1 and 1:1, said tobacco composition being substantially free from added hydroxyl-containing organic humectant substances.

10. In a smoking tobacco composition, an improved humectant consisting of between about 0.5 and 5 percent by weight, dry basis, of a mixture of potassium hydrogen orthophosphates stabilized against crystal growth with a minor proportion of a potassium polyphosphate, said humectant having a pH between about 4.2 and 8.5, measured in 0.1 molar aqueous solution at 25° C.

11. A tobacco composition substantially free from added organic substances capable of yielding unsaturated products on pyrolysis, and containing above about 0.5 percent by weight, dry basis, of a mixture of potassium dihydrogen orthophosphate and potassium monohydrogen orthophosphate in a molar ratio between about 4:1 and 1:4.

12. A smoking tobacco composition containing between about 0.5 and 5 percent by weight, dry basis, of a mixture of potassium dihydrogen orthophosphate and potassium monohydrogen orthophosphate in a molar ratio between about 2:1 and 1:1, said tobacco composition being substantially free from added hydroxyl-containing organic humectant substances.

13. In a smoking tobacco composition, an improved humectant consisting of between about 0.5 and 5 percent by weight, dry basis, of a mixture of potassium phosphates, said mixture consisting essentially of potassium dihydrogen orthophosphate and potassium monohydrogen orthophosphate in a molar ratio between about 4:1 and 1:4, stabilized against crystal growth with up to about 50 percent by weight, based on the total mixture, of a potassium polyphosphate, the total mixture having a pH between about 4.2 and 8.5, measured in 0.1 molar aqueous solution at 25° C.

References Cited in the file of this patent

UNITED STATES PATENTS

1,812,459	Verling	June 30, 1931
1,874,989	Harvey	Aug. 30, 1932