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ANTISEPTIC TOOTHBRUSHES

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6 Claims. (Cl. 15—159)

This application relates to the production of toothbrushes with germicidal properties, and its aim is to produce toothbrushes which are treated so as to have active bacteria inhibiting properties, and which retain these properties during the normal life of the brushes, without injury to the appearance of the toothbrushes. According to my invention, I treat toothbrushes, or components thereof before assembly, with an essentially aqueous and colloidal dispersion of an aromatic mercury compound which is normally insoluble or very slightly soluble in cold water, the dispersion containing a minor quantity of a bactericidal quaternary ammonium compound, and a non-ionic wetting agent to disperse the product evenly and to enhance the penetration of the germicidal ingredients to the toothbrush components.

It has been proposed to treat various materials including toothbrushes with aromatic mercury compounds and also to treat them with bactericidal quaternary ammonium compounds, to give them bacteria inhibiting properties. The principal difficulty with the treatments, especially on toothbrushes, has been that the bacteria inhibiting properties disappear soon after the toothbrushes are put in use. The apparent reason is that the dentifrices used when admixed with water or saliva have fairly strong detergent action, and remove the active materials too rapidly by a combination of solution and emulsification with subsequent leaching.

I have discovered that toothbrushes can be treated so as to give them bacteria inhibitive properties which they retain for up to a six month period of active use (the normal life of a toothbrush in active use. According to my invention, I treat the toothbrushes, or their components before assembly, with an essentially aqueous dispersion of an aromatic mercury compound which is either insoluble or only slightly soluble in cold water, together with a minor amount of a bactericidal quaternary ammonium compound, using a nonionic dispersant to disperse the aromatic mercury compound. The toothbrushes are immersed in the solution for a relatively short time (30 seconds to 30 minutes) and are then withdrawn and dried, either with or without a water rinse before drying.

The treatment is applicable to natural hog and other animal bristle brushes and to brushes with nylon bristles, and to handles of the various plastics used in the toothbrush industry including cellulose acetate, cellulose acetate butyrate and other conventionally used molded plastics.

Tests made on toothbrushes in daily use over a six month period indicate that the brushes retain their bacteria inhibitive properties over this period of normal useful life.

The nonionic dispersing agent has a two-fold function in the composition. It makes possible the use of considerably higher concentrations of aromatic mercury compounds than are soluble in the water alone. Sec-

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only, it acts as a penetrating agent, depositing the mercury compound well into the bristles and handle.

The quaternary ammonium compound is used for a three-fold purpose. First, its bactericidal activity reinforces that of the mercury compound. Secondly, its wetting properties help to drive the mercury compound into the brush structures. And finally, its presence helps retard and control the release of mercury compounds from the brush during using, contributing markedly to the results.

I can use any of the aromatic mercury compounds which are insoluble or only slightly soluble in cold water. I have used phenyl mercuric chloride, nitrate and propionate, p-tolyl mercuric salts, p-hydroxy phenyl mercuric derivatives, pyridyl mercuric compounds, etc.

I may use any quaternary ammonium compound which is germicidal in nature. (See Lawrence—Surface-Active Quaternary Ammonium Germicides—New York, 1950.) These quaternary ammonium compounds are generally excellent wetting agents. Typical of the products which may be used are the cetyl and other long chain alkyl trimethyl ammonium halides, the pyridinium and related heterocyclic alkyl halides, the aryl alkyl and the substituted aryl alkyl quaternary ammonium halides, and the like.

I use a small amount of quaternary ammonium compound relative to the aromatic mercury compound. In general, I use from about 2 to 20% of the quaternary based on the mercury compound.

The nonionic dispersants I have used include the polyoxyethylene sorbitan long chain fatty acid derivatives, the polyoxyethylene and polyoxypropylene alkyl phenols, the polyoxyethylene and polyoxypropylene fatty acid ethers, and polyoxyethylene-polyoxypropylene condensates.

Necessary treatment time may vary from 30 seconds up, depending on conditions. I prefer to operate at slightly elevated temperatures (50° C. up to the boiling point) to speed penetration. I find that 30 minutes immersion time is adequate under the mildest conditions; 5 minutes is generally adequate.

Typical examples of treating solutions are the following:

Example 1

	Percent
Phenyl mercuric acetate -----	0.8
Tween 60 (polyoxyethylene sorbitan monostearate) -----	1
Cetyl trimethyl ammonium bromide -----	0.06
Water to 100%.	

Example 2

	Percent
Phenyl mercuric acetate -----	1.00
Igepal CO880 (polyoxyethylene alkyl phenol) ----	0.8
Cetyl trimethyl ammonium bromide -----	0.05
Ethyl alcohol -----	16
Water to 100%.	

Example 3

	Percent
Pyridyl mercuric acetate -----	1
Tween 20 (polyoxyethylene sorbitan monolaurate) -----	1.5
Hexadecyldimethyl benzyl ammonium chloride ---	0.06
Water to 100%.	

Example 4

	Percent
Phenyl mercuric propionate -----	0.90
Igepal CO430 (polyoxyethylene alkyl phenol) ----	2.0
Hexadecyl pyridinium bromide -----	0.05
Ethyl alcohol -----	16
Water to 100%.	

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As indicated above, I may treat the bristles alone, the bristles and handle separately, or the completed brush.

Obviously, examples may be multiplied indefinitely without departing from the scope of the example which is defined in the claims.

I claim:

1. The method of making a plastic-handled toothbrush having bacteria inhibitive properties which it retains during an extended usage period, which comprises immersing the components of a toothbrush for between 30 seconds and 30 minutes, at a temperature between 50° C. and the boiling point, in an aqueous dispersion containing a non-ionic dispersant, more aromatic mercury compound than is soluble in the water alone, and a minor proportion by weight, as compared with the aromatic mercury compound, of a germicidal quaternary ammonium compound, removing the components of the toothbrush from the dispersion, and drying.

2. The method of claim 1, in which the weight of quaternary ammonium compound is between 2 and 20% of the weight of aromatic mercury compound.

3. An aqueous dispersion for treating plastic-handled toothbrushes to render them bacteria-inhibitive, comprising water containing a non-ionic dispersant, more aromatic mercury compound than is soluble in the water alone, and a minor proportion by weight, as compared with the mercury compound, of a germicidal quaternary ammonium compound.

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4. The dispersion of claim 3, in which the weight of quaternary ammonium compound is between 2 and 20% of the weight of the aromatic mercury compound.

5. A toothbrush having a plastic handle and bristles of the class consisting of animal bristles and plastic bristles, said toothbrush carrying a bacteria inhibitive impregnant comprising an aromatic mercury compound of very low water solubility, a non-ionic dispersant and a minor proportion by weight, based on the aromatic mercury compound, of a germicidal quaternary ammonium compound, the brush being characterized by its retention of bacteria inhibitive properties over long periods of use.

6. The toothbrush of claim 5, in which the weight of quaternary ammonium compound is between 2 and 20% of the weight of aromatic mercury compound.

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