VISUALLY CLEAR GEL DENTIFRICE

This invention relates to an antiplaque gel dentifrice which is visually clear.

Dentifrices which are visually clear are appealing to consumers. Numerous visually clear products have been sold commercially as gel dentifrices.

Occasionally, as described in U.S. Pat. No. 3,906,090 to Colodney, it is possible to attain very high clarity and transparency in a gel dentifrice. Frequently, however, because of the need to appropriately balance amounts and types of dentifrices components for optimum effectiveness and for cosmetic considerations other than translucency, clarity is sacrificed and the gel dentifrice, while still clear, is translucent, hazy or cloudy and not transparent. Indeed, the gel dentifrice may be opacified and not clear at all.

The prior art considerations for attaining clarity ranging from haze or translucency to high transparency have, in general, been based upon employing a dentifrice polishing agent having a refractive index of about 1.41 to about 1.47, properly balanced with water (refractive index 1.333) and humectant, most usually glycerine (refractive index 1.473) and sorbitol (refractive index 1.457, as 70% aqueous solution). Since the refractive index of grades of siliceous polishing agents, the most frequently used type of polishing agents in gel dentifrices, is usually about 1.41 to about 1.47, although water ranges in the dentifrices such as up to about 30% by weight have been disclosed, the amount of water is generally kept low, say about 3% by weight, when transparency and not merely turbid translucency is desired.

An exception permitting more water to be used in transparent gel dentifrices is described in U.S. Pat. No. 4,877,602 to Uematsu et al, wherein a special grade of sodium carboxymethyl cellulose binding agent having a viscosity of 5-20 cps measured as 1% aqueous solution at 25° C. is indicated to provide transparency to gel dentifrices wherein the liquid vehicle components vary over a wide range.

In more recent years, water-swellable synthetic anionic polymeric polycarboxylates have been introduced into oral compositions, particularly as agents which improve effectiveness in combatting negative conditions such as tartar and plaque. In antiplaque dentifrices, there is desirably present a substantially water-insoluble noncationic antibacterial agent such as triclosan (2',4,6'-trichloro-2-hydroxy-diphenyl ether). Such polycarboxylates are disclosed in British Patent Publications 2235133A, 2227660A and 2200551A, each to Colgate-Palmolive Company and U.S. Pat. No. 4,894,220 to Nabi et al, the disclosures of each of which are incorporated herein by reference. These disclosures set forth guides to preparing visually clear antiplaque dentifrices wherein there are described gel dentifrices containing about a siliceous polishing agent; broad weight ranges of water and humectant are indicated. This general guidance and specific illustrative examples within their parameters have provided some visual translucency but have not led to high transparency.

In antitartar dentifrices such as in U.S. Pat. No. 4,627,977 to Gaffar et al the disclosure of which is incorporated herein by reference, and in antiplaque dentifrices such as those of incorporated aforementioned British Patent Publications 2235133A; 2227660A; 2200551A and U.S. Pat. No. 4,894,220, the polymeric

materials have been described as present in a range of amounts such as up to about 3% or 4% by weight.

In practice, it has been observed that high visual clarity has been difficult to attain when the amount of polymer is at least about 1% by weight, and particularly when it is present in amount of about 2% by weight or more.

It is an advantage of this invention that excellent visual clarity is attained in a dentifrice containing water-swellable synthetic anionic polymer in amount of about 1%-4% with a particular liquid vehicle. It is noteworthy that liquid vehicles in dentifrices containing the polymer have not been particularly successful in providing gel dentifrice with superior visual clarity. Indeed, even liquid vehicles disclosed in U.S. Pat. No. 4,877,602 have not been employed in conjunction with water-swellable polymers which markedly affect the liquid vehicle.

Other advantages of the invention will be apparent from consideration of the following specification.

In accordance with certain of its aspects, this invention relates to a visually clear gel dentifrice comprising about 5-50% by weight of a dentally acceptable dentifrice polishing agent having a refractive index in the range of about 1.41 to about 1.47, about 0.1-10% by weight of a gelling agent to provide a gel consistency to said dentifrice, a liquid vehicle comprising an amount of about 25%-30% by weight of said dentifrice of total water and about 30-45% by weight of said dentifrice on a neat basis of humectant material wherein sorbitol is present in neat amount of at least about 30% by weight of said dentifrice and about 1%-4% neat amount by weight of dentifrice of a water-swellable synthetic anionic polycarboxylate polymer.

The dentally acceptable dentifrice polishing agent has a refractive index in the range of about 1.41 to about 1.47. Thus, it may be a finely divided synthetic amorphous silica having an average refractive index of from about 1.410 to 1.440 as has been described for translucent dental creams in U.S. Pat. Nos. 3,939,262 and 4,007,260, each to Kim or an alkali metal phosphate salt having a refractive index between 1.435 and about 1.465 as has been described in U.S. Pat. No. 3,927,202 to Harvey et al. The alkali metal phosphate polishing agents described therein are potassium metaphosphate, which is water-insoluble and water-soluble sodium pyrophosphate dodecahydrate, dibasic sodium orthophosphate dihydrate, dibasic sodium orthophosphate heptahydrate, dibasic sodium orthophosphate dodecahydrate and tribasic sodium orthophosphate dodecahydrate.

Preferably the polishing agent is a siliceous material such as a hydrous silica gel, a silica xerogel or a complex amorphous alkali metal aluminosilicate or zirconosilicate having a refractive index of about 1.44 to 1.48 or a precipitated silica having a refractive index of about 1.41 to 1.45. Colloidal silica materials include those sold under the trademark SYLOID such as those which have been sold as Syloid 72 and Syloid 74. Precipitated silicas include those sold under the trademark ZEODENT such as Zeodent 113 and Zeodent 115 and Zeodent 119.

The complex aluminosilicate salt appears to contain interbonded silica and alumina having Al-O-Si bonds as described by Tamele, "Chemistry of the Surface and Activity of Alumina-Silica Cracking Catalyst", Discussions of the Faraday Society, No. 8 Pages 270-279 (1950) and particularly at Page 273, FIG. 1, Curve 3 wherein the interaction between silica and aluminum