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TOILET PREPARATION

Benjamin G. Wilkes and Helen E. Wassell, Pitts-
burgh, Pa., assignors to Carbide and Carbon
Chemicals Corporation, a corporation of New
York

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This invention relates to toilet preparations comprising polyalkylene glycols.

The commonly used hairdressing preparations are oleaginous in nature, as illustrated by semi-solid "pomades" containing hydrocarbon greases and oils, or by liquid preparations in which mineral and vegetable oils are incorporated, usually in a medium containing a large proportion of alcohol. Such oily constituents must be applied with considerable care to avoid excessive amounts. Otherwise, there may be imparted elements of stickiness, greasiness and sheen which ordinarily are not considered desirable. In order to distribute these oily materials uniformly over the hair, without using excessive quantities, it is customary to apply them in the form of very dilute solutions. Because these oleaginous materials are insoluble in water, it is necessary to employ solvent media of which a considerable part is alcohol, or other suitably active solvent. A further disadvantage of such "oily" preparations is that they can not be removed from the hair between successive applications except by shampooing or other detergent processes.

In order to counteract drying of the hair as a result of permanent waving treatment or operations, oil is also added to the permanent waving solutions. The alkalinity necessary in permanent waving solutions, seems to remove or modify chemically some of the natural oils during the heating process, leaving the hair harsh and dried. Only comparatively small amounts of oil can be used, however, because the oil seems to retard the curling of the hair.

Glycerol, glycols and the ethyl ether of diethylene glycol are commonly used in hand lotions or face creams as softening agents. These solvents unless used in relatively small amounts and rubbed thoroughly into the skin produce an undesirable moist or tacky feeling on the skin because of the hygroscopic nature of such solvents.

We have found that the foregoing objections and disadvantages are substantially eliminated, and that improved cosmetic preparations result from the use of the relatively high molecular weight members of the polyalkylene glycols and especially those polyoxyalkylene glycols of the 1,2 series containing not more than three carbon atoms to the oxyalkylene radical and having an average molecular weight not less than about 400. The polyoxyalkylene glycols, or polyalkylene glycols, which are used in the compositions of the present invention may be represented by the following formula:



in which n is 2 or 3 and x is a whole number such that the average molecular weight is as set forth above. They may be prepared by reacting such

1,2 alkylene oxides as ethylene oxide and propylene oxides, having 2 to 3 carbon atoms to the molecule, with an alkylene glycol under the influence of an alkaline catalyst. By way of illustration ethylene oxide may be reacted with ethylene glycol, for instance, to give a polyoxyethylene glycol and 1,2 propylene oxide may be reacted with propylene glycol to give a polyoxypropylene glycol.

We have found that hair dressing preparations containing polyethylene glycols dissolved in water or aqueous alcohol control the hair in desirable physical fashion and impart thereto a well groomed appearance without such objectionable features as excessive stickiness or oily appearance. Because of their complete solubility in water, these dressing constituents can readily be applied to the hair and uniformly distributed without the use of organic solvents. They can be removed from the hair without employing detergents.

A new "permanent" is usually required or desired before the waves of a previous "permanent" have been entirely removed by growth of the hair. Polyalkylene glycols may be applied directly to the ends of such hair to prevent the extreme drying effect of the recurling operation as well as to avoid too tight a curl.

Vegetable oils, lanolin, and various other materials are commonly used in creams, liquid face powders and the like for the purpose of softening and conditioning the skin. We have found that polyalkylene glycols can be used in place of, and in addition to, such substances, and the resulting products are superior in the desired properties of softening and smoothing the skin.

A further advantage of the polyalkylene glycols lies in the physical stability of their aqueous and alcoholic solutions which permits their storage over prolonged periods of time without the occurrence of the separation of an oil phase. Unlike vegetable oils, they do not develop rancidity.

Example I

Polyethylene glycol having an average molecular weight of approximately 1500 was applied to the hair in the form of a 2.5% and a 5% solution in water and in a 50% aqueous alcohol (50% alcohol) solution, respectively. These preparations were found to give very desirable grooming action without imparting greasiness or excessive sheen. Daily applications were made over prolonged periods of time without the appearance of any objectionable effects.

Polyethylene glycol having an average molecular weight of about 1500 is a semi-solid substance of petrolatum-like consistency, having a relatively low order of hygroscopicity. Polyethylene glycols of lower molecular weight are also suitable for use in accordance with the present

invention, although polyethylene glycols of about 1500 average molecular weight, or higher, are preferred because of their non-hygroscopicity. The relatively greater hygroscopicity of the lower members of this series of compounds introduces an element of stickiness, by reason of water absorption and retention, which is considered to be less desirable in the film-forming constituent of a hair dressing. For a hair dressing preparation the average molecular weight should not be substantially less than 400.

Polyethylene glycols having an average molecular weight of about 4000 and higher are waxy solids which tend to flake off the hair unless plasticized with a suitably compatible and water-soluble material.

The polypropylene glycols may also be used. Those having an average molecular weight of about 500 or more are relatively water insoluble, and are preferably applied as hair dressings from aqueous solutions containing a sufficient proportion of ethanol, diethylene glycol monoethyl ether, or other water-soluble solvent of relatively low hygroscopicity, suitable for dermal application, to insure physical homogeneity.

Example II

Polyethylene glycol having an average molecular weight of about 1500 may be applied by brushing it onto the hair and continuing the brushing for about three minutes or more. If desired, the hair may then be shampooed and a small amount of the polyethylene glycol brushed onto the hair while it is still wet from the shampooing. The polyethylene glycols having a lower molecular weight may be applied in a similar manner.

After the application of the polyethylene glycol, either before or after shampooing, the hair is softer, more pliable, and has improved luster. The water solubility of the polyethylene glycols gives them a decided advantage over the use of oils for this purpose because the polyethylene glycols are readily rinsed from the hair as desired.

Example III

About three ounces of polyethylene glycol having an average molecular weight of about 4000 was added to about a gallon of a permanent waving solution having the necessary alkalinity. The addition of the polyethylene glycol prevented the hair from becoming dry during the heating and assisted in the curling process, rather than retarding it, as does the addition of oil. The hair was curled tighter in the usual heating time in one of the waves, and curled as desired in other waves by decreasing the length of the heating time. In each wave, where the polyethylene glycol was used in the permanent waving solution the curled hair was soft and sufficiently pliable to be set in a broad wave by the fingers even where it had originally been curled tighter than was desired. Ordinarily, in permanent waving operations, the hair will not finger wave as desired but springs back into small waves. Polyethylene glycols of average molecular weight less than 4000 are also suitable for use but the average molecular weight should not be lower than about 400. A polyethylene glycol of petroleum-like consistency, having an average molecular weight of about 1500, is preferred however.

Example IV

About three ounces of polypropylene glycol having a viscosity of about 420 Saybolt seconds

at 78° F. was added to about a gallon of hair waving solution having a suitable alkalinity to give a mixture of the following composition:

- Polypropylene glycol-----fluid ounce-- 3.0
 5 Sodium sulfate derivative of 3,9-diethyl tri-decanol-6 -----do----- 0.1
 Aqueous morpholine solution (16 $\frac{2}{3}$ % morpholine) to make-----gallon-- 1
 10 This polypropylene glycol having an average molecular weight of about 400 is soluble in water at room temperature (about 65° to 75° F.) but is insoluble at about 95° F. or above. On heating the hair during the waving, this polypropylene glycol was thrown out of solution and was more readily taken up by the hair. The curled hair was soft and pliable. This solution is particularly suited for waving "dry" hair because it not only prevented the hair from becoming drier but the curled hair seemed to be even less dry than it was prior to waving. Polypropylene glycols of higher and lower viscosities may also be employed, but those having properties substantially identical with those of the above polypropylene glycol are preferred, however.

Example V

Cosmetic preparations for softening and conditioning the skin were prepared as follows:

	Vanishing cream	Cleansing cream
	Pounds	Pounds
35 Stearic acid.....	50.0	29.0
Polyethylene glycol (average molecular weight about 4000).....	9.0	8.0
Triethanolamine.....	2.7	3.8
Mineral oil (white).....		50.0
Diethylene glycol monoethyl ether.....	18.0	10.0
Water.....	120.0	100.0
40 Perfume.....		

These products were found to effect improved softening and conditioning of the skin. The presence of polyalkylene glycols in the vanishing cream formulation imparted a more desirable consistency or body thereto and improved its behavior as a powder base. The cleansing cream functioned in excellent manner for its intended purpose and was distinguished by a less pronounced sensation of residual "oiliness" on the skin following its removal therefrom with cleansing tissue in the conventional manner. Polyalkylene glycols having a molecular weight of about 1500 or lower may also be used with good results but the average molecular weight should not be substantially below about 400. Excellent results have been obtained with the polyethylene glycol present in amounts from about 3% to about 15% by weight, although other quantities may be used.

Example VI

Hand lotions were prepared as follows:

	Emulsion type	Mucilaginous type
	Pounds	Pounds
70 Stearic acid.....	15.0	
Mineral oil (white).....	25.0	
Diethylene glycol monoethyl ether.....	25.0	
Quince seed mucilage.....	17.5	40.0
Polyethylene glycol (average molecular weight about 4000).....	25.0	2.5
Triethanolamine.....	7.5	
Alcohol.....	25.0	5.0
Water.....	380.0	25.0

These products were found to soften and smooth badly chapped hands, and to keep the hands in excellent condition without any undesirable moist feeling. Although other amounts of polyalkylene glycols may be used, from about 1% to 10% by weight gives good results.

Example VII

A liquid powder was made by stirring face powder into an aqueous solution containing about 20% of polyethylene glycol having an average molecular weight of about 4000. When the resulting product was applied to the skin, an even film of powder was obtained that adhered well without having a caked appearance. The product produced a more even film of powder which dried more readily with better adherence of the powder and without the undesirable moistness caused by the hygroscopic solvents, as is the case with other liquid powders usually containing alcohol and glycerine.

The polyalkylene glycols used in the compositions of the present invention may be made by sodium hydroxide catalyzed reactions. In the hair dressing preparations the polyethylene glycols of a petrolatum-like consistency are preferred because they have a low order of hygroscopicity and are sufficiently plastic to remain on the hair when dry. To these polyethylene glycols of petrolatum-like consistency which are preferred in the hair dressing preparations, a theoretical or calculated average molecular weight of about 1500 has been assigned.

The invention is susceptible of modification within the scope of the appended claims.

We claim:

1. A toilet preparation for dermal application containing as an essential ingredient a polyoxyalkylene glycol of the 1,2 series containing not more than three carbon atoms in each oxyalkylene radical, said polyoxyalkylene glycol having an average molecular weight not less than about 400.

2. An aqueous hair dressing composition containing as an essential ingredient a substantially

water-soluble polyoxyalkylene glycol of the 1,2 series containing not more than three carbon atoms in each oxyalkylene radical, said polyoxyalkylene glycol having an average molecular weight not substantially below about 400.

3. An aqueous hair dressing composition containing as an essential ingredient for softening and conditioning the hair a polyoxyethylene glycol having an average molecular weight about 400 to 4000.

4. An aqueous hair dressing composition containing as an essential ingredient for softening and conditioning the hair a polyoxyethylene glycol having an average molecular weight about 1500.

5. A cosmetic cream for softening and conditioning the skin which contains as an essential ingredient a substantially water-soluble polyoxyalkylene glycol of the 1,2 series containing not more than three carbon atoms in each oxyalkylene radical, said polyoxyalkylene glycol having an average molecular weight not less than about 400.

6. A cosmetic cream for softening and conditioning the skin which contains about 3 to 15 per cent by weight of a polyoxyethylene glycol of petrolatum-like or wax-like consistency, said polyoxyethylene glycol having an average molecular weight not less than about 1500.

7. A skin lotion containing as an essential ingredient for conditioning the skin a substantially water-soluble polyoxyalkylene glycol of the 1,2 series containing not more than three carbon atoms in each oxyalkylene radical, said polyoxyalkylene glycol having an average molecular weight not less than about 400.

8. An aqueous skin lotion containing about 1 to 10 per cent by weight of a polyoxyethylene glycol of petrolatum-like or wax-like consistency, said polyoxyethylene glycol having an average molecular weight not less than about 1500.

BENJAMIN G. WILKES.
HELEN E. WASSELL.