Patented Nov. 26, 1940 2,222,976

# UNITED STATES PATENT OFFICE

2,222,976

## NASAL DROPS

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No Drawing. Application November 15, 1937, Serial No. 174,721

9 Claims. (Cl. 167—58)

This invention relates to new compositions adapted for use as nasal sprays or nose drops in the form of solutions of phenyl-1 amino-2 propanol in an oil base; and more particularly to solutions of phenyl-1 amino-2 propanol in a base consisting mainly of mineral oil, e. g., light paraffin oil of about the viscosity usually used in oil base nose drops or nasal sprays.

Nose drops or nasal sprays are commonly made in the form of oil solutions of suitable vaso-constricting agents, particularly ephedrine, in which case the solutions may contain a blending agent, such as an oil-soluble aldehyde, oil-soluble ketone, alcohol, oxygenated terpene derivative, etc., to increase the solubility of the ephedrine in the mineral oil to permit the use of solutions of effective therapeutic strength.

Phenyl-1 amino-2 propanol has been found to have valuable properties as a vaso-constricting agent for use in the treatment of head colds and the like; but it has not heretofore been usable in mineral oil base compositions because of its very low solubility in such oils as light paraffin oil; its solubility in such oils being very limited even at temperatures well above room temperature and being almost zero at temperatures around 0° C. The solubility of phenyl-1 amino-2 propanol in glyceride oils, such as vegetable and animal oils, for example, cottonseed oil, is somewhat greater, but is still so low as to make impractical the production of phenyl-1 amino-2 propanol solutions in such oils of therapeutic efficiency. Nor can the solubility of the phenyl-1 amino-2 propanol in the mineral oils, which are the most valuable for use as solvents for nasal sprays, nose drops and the like, be increased by the use of a single blending agent, such as an aldehyde, ketone, or alcohol, to an extent sufficient to permit the production of commercially distributable solutions.

In accordance with the present invention, solutions of phenyl-1 amino-2 propanol, which may contain as much as 5% of phenyl-1 amino-2 propanol, in a solvent consisting for the most part of a light mineral oil, such as a paraffin oil, are produced; the solution of the phenyl-1 amino-2 propanol in the mineral oil being effected by the use of at least two blending agents, one of which is a good solvent for the phenyl-1 amino-2 propanol and one of which serves as a blending agent between the mineral oil and the solution of the phenyl-1 amino-2 propanol in the first blending agent; this latter blending agent, while not necessarily a good solvent for the phenyl-1 amino-2 propanol, being readily soluble in the mineral oil and a good solvent for the first blending agent.

Thus in accordance with the present invention, mineral oil base compositions containing dissolved phenyl-1 amino-2 propanol are produced by incorporated the phenyl-1 amino-2 propanol in the mineral oil base with the aid of at least two blending agents, the first of which is a good solvent for the phenyl-1 amino-2 propanol and has some, though not necessarily high, solubility in mineral oil; while the second blending agent is quite soluble in the mineral oil, is a good solvent for the first blending agent, and dissolves phenyl-1 amino-2 propanol to some extent, though the solubility of the phenyl-1 amino-2 propanol in the second blending agent need not be high.

In general, vegetable and animal oils, particularly cottonseed oil, are advantageous for use as one of the blending agents, such oils being readily soluble in the mineral oil, and dissolving phenyl-1 amino-2 propanol to a sufficient extent.

The second class of blending agents, having the properties of readily dissolving the phenyl-1 amino-2 propanol and ready solubility in vegetable and animal oils, but not necessarily in mineral oil, includes a wide class of organic compounds of the general nature of aldehydes, ketones, aliphatic and aralkyl alcohols, aromatics, including both the benzene and terpene aromatics, and other mono-oxygen derivatives of relatively low molecular weight hydrocarbons, that is, hydrocarbons containing, in general, not more than about twelve carbon atoms, as well as fatty acids derived from animal or vegetable oils, such as stearic acid, oleic acid, palmitic acid, etc., chlorinated alcohols, sulfonated glyceride oils, and the like. Included among compounds which have been found useful, and which are examples of this class of blending agents, are the following:

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| Benzyl alcohol | n-Amyl alcohol |
| Isopropyl alcohol | n-Hexyl alcohol |
| Tertiary-butyl-alcohol | n-Heptyl alcohol |
| Methyl alcohol | n-Octyl alcohol |
| Ethyl alcohol | n-Nonyl alcohol |
| n-Propyl alcohol | Iso-butyl alcohol |
| n-Butyl alcohol | Iso-amyl alcohol |
| Menthol | Tertiary-amyl alcohol |
| Geraniol | Acetone |
| Benzaldehyde | Acetophenone |
| Thymol | Ethyl methyl ketone |
| Citronellol | Menthone |
| Oil thyme | Phenyl ethyl alcohol |
| Eucalyptol | Phenyl propyl alcohol |
| Camphor | Ethyl propyl ketone |
| Stearic acid | Sulfonated fixed oils |
| Oleic acid | Oil cassia |
| Palmitic acid | Oil cinnamon |
| Oil peppermint | Oil rose |
| Chlorbutanol | |

Said blending agents having the property of readily dissolving phenyl-1 amino-2 propanol and being thus readily soluble in a glyceride oil such as a vegetable or animal oil may be individually referred to as an oxygen-containing blending

agent readily dissolving phenyl-1 amino-2 propanol and readily soluble in a glyceride oil.

Of these compounds, the aralkyl alcohols, such as benzyl alcohol, phenyl ethyl alcohol, phenyl propyl alcohol, etc., have important advantages.

The invention will be illustrated by the following specific example, although it is not limited thereto.

*Example.*—In a light paraffin oil are dissolved about 0.5% of phenyl-1 amino-2 propanol, about 3% of benzyl alcohol, and about 20% of cottonseed oil. The resulting solution remains stable and unclouded even at temperatures as low as 0° C. If the amount of phenyl-1 amino-2 propanol is reduced to about 0.25%, the amount of benzyl alcohol may be reduced to about 1.5% and the amount of cottonseed oil to about 10%, with the production of a solution having similar freedom from cloudiness at low temperatures. If desired, to such solutions may be added one or more of the aromatics, such as menthol, camphor, or the like, and chlorbutanol or other analgesic and local anaesthetic; these substances not only serving to make the composition pleasant in use, but also serving as additional blending agents to increase the solubility of the phenyl-1 amino-2 propanol in the final composition.

In such compositions, the phenyl-1 amino-2 propanol is readily soluble in the benzyl alcohol; and the cottonseed oil serves as a blending agent between the mineral oil and the benzyl alcohol solution of the phenyl-1 amino-2 propanol. The cottonseed oil is required because the benzyl alcohol has but limited solubility in the mineral oil, and clear solutions cannot be obtained without its use, or the use of some similar oil, if sufficient phenyl-1 amino-2 propanol for therapeutic effectiveness be used.

In general, the amount of the blending agents used may be varied over more or less wide ranges. The amount of the agent in which the phenyl-1 amino-2 propanol is readily soluble may range up to 4 or 4½ molecular equivalents of the amount of phenyl-1 amino-2 propanol, while the other blending agent, such as an animal or vegetable oil, may be used in amounts ranging up to 10 to 20%, advantageously just sufficient of this material being used to insure the production of clear solutions with the amount of phenyl-1 amino-2 propanol used at all ordinary temperatures. The animal or vegetable oil used may be regarded as an intermediate solvent between the solution of phenyl-1 amino-2 propanol in the oxygenated hydrocarbon or sulfonated glyceride oil and the mineral oil, and, in general, should not be used in amounts greatly exceeding that required for the production of the desired clear solutions.

I claim:

1. A composition containing a mineral oil, a glyceride oil, an alcohol and phenyl-1 amino-2 propanol, said composition being in the form of a clear solution free from cloudiness at normal temperatures.

2. A composition containing a mineral oil, a glyceride oil, an aralkyl alcohol and phenyl-1 amino-2 propanol, said composition being in the form of a clear solution free from cloudiness at normal temperatures.

3. A composition containing a major proportion of mineral oil, a minor proportion of a glyceride oil, benzyl alcohol and phenyl-1 amino-2 propanol.

4. A composition containing a major proportion of mineral oil, a minor proportion of cottonseed oil, benzyl alcohol and phenyl-1 amino-2 propanol.

5. A composition containing a major proportion of a mineral oil, a minor proportion of a glyceride oil, a small amount of phenyl-1 amino-2 propanol and an oxygen-containing organic blending agent readily soluble in said glyceride oil and which blending agent readily dissolves phenyl-1 amino-2 propanol.

6. A composition containing a major proportion of mineral oil, a minor proportion of a glyceride oil, phenyl-1 amino-2 propanol and a member selected from the group consisting of menthol, thymol and eucalyptol.

7. A composition containing a major proportion of mineral oil, a minor proportion of a glyceride oil, phenyl-1 amino-2 propanol, a mono-oxy derivative of a hydrocarbon having not more than 12 carbon atoms, said mono-oxy derivative of such hydrocarbon dissolving readily in said glyceride oil and also readily dissolving said phenyl-1 amino-2 propanol.

8. A composition containing a major proportion of mineral oil, a minor proportion of a glyceride oil, phenyl-1 amino-2 propanol, a mono-oxy derivative of a hydrocarbon having not more than 12 carbon atoms, said mono-oxy derivative of such hydrocarbon dissolving readily in said glyceride oil and also readily dissolving said phenyl-1 amino-2 propanol, said composition also containing at least one member selected from the group consisting of thymol, menthol and eucalyptol.

9. A composition containing a major proportion of mineral oil, a minor proportion of cottonseed oil, a small amount of phenyl-1 amino-2 propanol and benzyl alcohol, and at least one member selected from the group consisting of menthol, thymol and eucalyptol.

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