United States Patent [19]

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[54] **PROCESS FOR THE PURIFICATION OF COAL TAR**

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[51] **Int. Cl.**[2] **A61K 31/00;** A61L 13/00

[58] **Field of Search** 424/167

[56] **References Cited**

UNITED STATES PATENTS

2,000,117	5/1935	Aschheim	424/167
3,071,510	1/1963	Wershaw	424/167

FOREIGN PATENTS OR APPLICATIONS

375,363	6/1932	United Kingdom	424/167

OTHER PUBLICATIONS

The Pharmacopeia of the U.S.A., 16th Revision, Oct. 1960, p. 167.

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[57] **ABSTRACT**

A process is disclosed for the purification of coal tar. This process comprises the extraction of commercially available coal tar with a solvent system boiling at or below 80°C and comprising a fluorocarbon or a hydrocarbon or a mixture of these where the kauri-butanol number of the resulting system has a value of less than 75 and recovering the coal tar extract by filtration and evaporation of the volatile solvent system. The coal tar extract thus obtained is dermatologically more acceptable and clinically more effective than known coal tar extracts or preparations and can be incorporated into many dermatologically acceptable vehicles.

1 Claim, No Drawings

PROCESS FOR THE PURIFICATION OF COAL TAR

The present invention is concerned with a novel process for the purification of coal tar to obtain a product which has all the desirable therapeutic properties of coal tar but without the staining and irritating properties.

The present invention also embraces within its scope the purified coal tar as well as compositions containing the same.

The therapeutic use of coal tar is well recognized; for example, the U. s. Pharmacopeia contains a monograph for this product. Commercially, coal tar is obtained as a by-product during the destructive distillation of bituminous coal. It occurs as a black viscous liquid having a characteristic naphthalene-like odor. When coal tar is incorporated into dermatologically acceptable vehicles such as ointments, lotions or solutions, it is useful in the treatment of a variety of chronic skin diseases such as psoriasis and chronic eczema. Because of its characteristic irritation index and because coal tar forms a dark stain, these properties render coal tar less desirable for application to the skin.

Accordingly, a primary object of the invention is to provide an improved process for extracting from coal tar the dermatologically active fractions to form a product without the staining and irritating properties of untreated coal tar.

Another object of this invention is to provide a process for preparing a coal tar extract which is therapeutically potent and can be incorporated into dermatologically acceptable dosage forms.

Yet another object of this invention is to provide dosage forms incorporating the purified coal tar of this invention.

A further object of this invention is to provide a process whereby crude coal tar can be readily purified.

Other objects and advantages of this invention will become more apparent from the following detailed description.

According to the present invention, crude coal tar is treated with a solvent system comprising a fluorocarbon or a hydrocarbon or a mixture of these solvents where the kauributanol number of the solvent systems employed has a value of less than 75 followed by filtration of the insoluble residue of pitch. The desired coal tar fraction remains in the solvent system and is recovered by evaporation of the filtrate. Thus, for example, in a typical practice of this invention, a fluorocarbon is added to crude coal tar in the desired proportion and the mixture is agitated to facilitate the soluble constituents in crude coal tar going into solution into the fluorocarbon. The insoluble pitch residue is removed by filtration and the volatile fluorocarbon filtrate is allowed to evaporate leaving the desired coal tar extract as the residue.

Generally speaking, for each 100 parts of crude coal tar about 200 to 400 parts of the fluorocarbon, hydrocarbon or mixture employed as the solvent system is added for the extraction step. This process may be repeated in order to achieve a more complete extraction. The product thus obtained exhibits all the desirable therapeutic properties of coal tar but is less irritating and staining upon contact with the skin.

Among the fluorocarbons and hydrocarbons that can be used to advantage as the solvent system are those having a kauri-butanol value of less than 75. Blends of fluorocarbons and hydrocarbons having higher kauri-butanol values may also be used if they are blended so that the resultant solvent system has a kauri-butanol value of less than 75.

Examples of fluorocarbons having kauri-butanol values of less than 75 include C Cl_3F , C Cl_2F_2, C ClF_2-C ClF_2, C Cl_2 FC ClF_2 and C H ClF_2.

Useful hydrocarbons include propane, isobutane, n-butane, pentane and n-hexane. The temperature employed to effect the extraction process varies depending on the solvent system employed but is generally from about 20° to 30°C. The solvent system should evaporate at a temperature no higher than 80°C.

In order further to illustrate this invention the following examples are given.

EXAMPLE 1

Into a vessel is charged 100 grams of crude coal tar and 400 grams of C Cl_3F. The mixture is agitated for 10 minutes at 20°C. The C Cl_3F-coal tar solution is decanted and filtered. The process is repeated two times and the resulting filtrates are combined. The C Cl_3F is allowed to evaporate leaving the desired coal tar extract. The resulting extract is a reddishbrown clear solution.

EXAMPLE 2

Into a vessel is charged 100 grams of crude coal tar and 400 grams of C ClF_2-C ClF_2. The mixture is treated as in Example 1 and the resulting coal tar extract obtained on evaporation of the solvent is pale yellow in color.

The coal tar extracts obtained may be employed to form ointments and a shampoo as described in the examples of U. S. Pat. No. 3,766,052.

The "kauri-butanol" number of a homogeneous or heterogeneous solvent system is defined as the amount of the solvent which can be added to a standard kauri gum solution in butanol to produce a definite turbidity as compared with the amount of pure benzene used in a similar titration and arbitrarily taken as 100 per cent standard. See Scheflan et al, The Handbook of Solvents; D. Van Nostrand, 1953, p. 31 and footnotes.

I claim:

1. A process for the purification of coal tar which comprises mixing coal tar with a non-polar volatile solvent system having a kauri-butanol value of less than 75 and a boiling point no higher than 80°C. comprising a fluorocarbon of the group consisting of trichlorofluoromethane, dichlorodifluoromethane, 1,2-dichloro-1,1,2,2-tetrafluoroethane, 1,1,2-trichloro-1,2,2-trifluoroethane and difluorochloromethane, and mixtures thereof with n-butane, isobutane, propane, pentane and n-hexane, separating the supernatant liquid and evaporating the solvent to recover the desired coal tar fraction.

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