

## UNITED STATES PATENT OFFICE

2,070,318

## MANUFACTURE OF ALCOHOLS

Reginald John Rosser and Herbert Swann,  
Manchester, England, assignors to Imperial  
Chemical Industries Limited, a corporation of  
Great Britain

No Drawing. Application September 23, 1935,  
Serial No. 41,808. In Great Britain September  
28, 1934

4 Claims. (Cl. 260—156)

This invention relates to the manufacture of long chain aliphatic alcohols from fatty oils, fats, and waxes, and particularly to a process wherein fat or wax is reduced by treatment with an alkali metal, e. g. sodium, and an alcohol. By fatty oils and fats we mean the glycerol esters of the higher fatty acids (saturated and unsaturated; see Holde, Kohlenwasserstoffole und Fette, 6th Edition, Berlin, 1924, pp. 598-611). By waxes we means the esters of mono- or dihydric alcohols with high fatty acids (Holde, loc. cit. page 742).

That primary alcohols may be obtained from the alkyl esters of the corresponding acids by reduction with sodium and anhydrous alcohol such as ethyl or amyl alcohol is well known (see, e. g. Bouveault and Blanc, British specification No. 14758/03). The reaction has also been carried out in a medium comprising an inert compound such as toluene or xylene (Levene and Allen, J. Biol. Chem. 1916, 27, 435).

It has been observed that the ester tends to suffer hydrolysis, and thus escape reduction. To overcome this it has been proposed to reduce under pressure.

We have now found that when the same long chain aliphatic alcohol as is produced as reduction product is used as reagent improved yields are obtained, and the invention consists in a reduction by alkali metal and alcohol of fatty oils or waxes wherein the alcohol corresponding to the fatty acid of the fatty oil or wax is used as the reagent.

Thus, in reducing spermaceti (chiefly cetyl palmitate), crude cetyl alcohol, (which is the alcohol obtained by the reduction of cetyl palmitate) is used as the reagent for interaction with the alkali metal.

A further advantage of our new process is that the necessity of separating and recovering a different alcohol is avoided and hence there is a considerable simplification and economy of time and labour.

The invention is illustrated but not limited by the following examples in which the parts are by weight.

*Example 1*

120 parts of spermaceti, 121 parts of dry cetyl alcohol (which may be the crude product from previous reduction of spermaceti), 390 parts of xylene and 23 parts of sodium are heated at 100-102° C. for 15 hours with efficient stirring under

a reflux condenser. The air in the vessel is then displaced by nitrogen and to the creamy mass is slowly added with stirring 400 parts of water. The mixture is boiled and allowed to settle. The lower aqueous layer is then removed and the xylene and cetyl alcohol mixture, which forms the upper oily layer, is subjected to steam distillation. The xylene passes over first with steam. Later, using superheated steam cetyl alcohol distills. This solidifies on cooling and is separated. The weight of cetyl alcohol obtained is 217.8 parts gross. This is 96.8 parts net, i. e. 80% of theory calculated on the weight of spermaceti used.

*Example 2*

53.2 parts of coconut oil, 93 parts of dodecyl alcohol and 160 parts of xylene are dissolved together and added gradually during two hours to a stirred suspension of 22.5 parts of sodium in 230 parts of xylene already heated to 100-102° C. in a vessel fitted with a reflux condenser. The reaction mixture is then worked up as in Example 1.

We claim:

1. A process for the production of a high molecular weight aliphatic alcohol by reduction of an ester of a high molecular weight aliphatic organic acid comprising reacting said ester with alkali metal and a hydrolytic alcohol, said hydrolytic alcohol being identical with the alcohol produced by the said reduction of said ester and corresponding to the acid constituent of said ester.

2. A process for the production of a long chain aliphatic alcohol by reduction of an ester of a long chain fatty acid comprising reacting said ester with alkali metal and a hydrolytic alcohol, said hydrolytic alcohol being identical with the alcohol produced by the said reduction of said ester and corresponding to the acid constituent of said ester.

3. A process for the production of a high molecular weight alcohol comprising reacting an ester of a high molecular weight acid with alkali metal and a high molecular weight alcohol, said alcohol corresponding to the acid constituent of said ester.

4. A process for the production of cetyl alcohol comprising reacting cetyl palmitate with alkali metal and cetyl alcohol.

REGINALD JOHN ROSSER.  
HERBERT SWANN.