

Short Communication

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RAPID METHOD FOR THE ESTERIFICATION OF FATTY ACIDS AT ROOM TEMPERATURE

Extension of the Method to Other Fatty Acids

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The usual methods for preparation of methyl ester from free fatty acids are: Heating with methanolic hydrochloric acid or methanolic boron trihalide¹ or reacting with sodium methoxide² or diazomethane³ or with a mixture of 2,2-dimethoxy propane-methanol hydrochloric acid.⁴ There is a possibility of decomposition of fatty acids or loss of polyunsaturated fatty acids during the course of these esterifications.⁵⁻⁸

Methyl esters of 2-hydroxy acids are formed at room temperature when copper chelates of 2-hydroxy fatty acids are dissolved in anhydrous methanolic hydrochloric acid.⁹ This observation was extended for the esterification of non-hydroxy fatty acids under similar mild conditions. The authors¹⁰ applied the method to stearic and lignoceric fatty acids. In this communication the procedure for esterification has been successfully applied to the further lower fatty acids, namely: palmitic, myristic, lauric, capric, caprylic and fatty acids from the cotton seed, harmful seed and san seed oils. The reagents required for this procedure are easily available than those for most of the other methods. They are unlike boron-trihalides, diazomethane and dimethoxypropane relatively stable and non-toxic.

Experimental Procedure

Fatty acids were esterified¹⁰ at room temperature (30°C) in the presence of chloroform, 20mM cupric acetate and 0.5N hydrochloric acid in methanol. The degree of esterification was determined by infrared spectroscopy.

Results and Discussion

In any oils, fats Laboratory, esterification is a very common reaction. It has already been pointed out that

previous methods involve refluxing for a period of two to three hours. The present method is much simpler and time saving particularly for lipid and food analytical laboratories where a large number of samples are esterified daily. The results are compiled in Table 1. It can be seen that the yields are comparable with the usual known methods and the new rapid method of M. Hoshi.¹⁰

TABLE 1. ESTERIFICATION OF FATTY ACIDS.

Name of the fatty acids	Reaction time (min)	Percentage recovery of the methyl esters	
		This method ¹⁰	Conventional method
Palmitic acid	30	85.4	88.6
Myristic acid	30	97.3	95.2
Lauric acid	30	99.3	93.6
Capric acid	30	81.7	87.5
Caprylic acid	30	85.2	83.4
<i>Fatty acids from</i>			
Cotton seed oil	30	92.0	89.0
Harmal seed oil	30	89.0	84.6
San seed oil	30	83.5	86.2

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