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☘Relationship Between Titer and Fatty Acid Composition of Beef Tallow

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ABSTRACT

The effect of titer increase on the composition of 60 samples of Uruguayan beef tallow was studied. The results demonstrate that the titer depends fundamentally on the stearic/oleic ratio.

The effect of the composition of binary and ternary fatty acid mixtures on the titer and the melting point has been reported by several researchers (1-7). From the publications, we may conclude that melting and solidification phenomena are complicated and unpredictable. As beef tallow contains different kinds of fatty acids, no relation would be expected between composition and titer; nevertheless this is not so.

TABLE I

Titers and Fatty Acid Distribution for Uruguayan Beef Tallows

	Maximum value	Minimum value
Titer (C)	47.6	37.3
Myristic (%)	5.5	0.8
Palmitic (%)	30.4	20.2
Palmitoleic (%)	10.1	2.8
Stearic (%)	34.3	9.3
Oleic (%)	51.8	31.6
Linoleic (%)	3.8	0.6

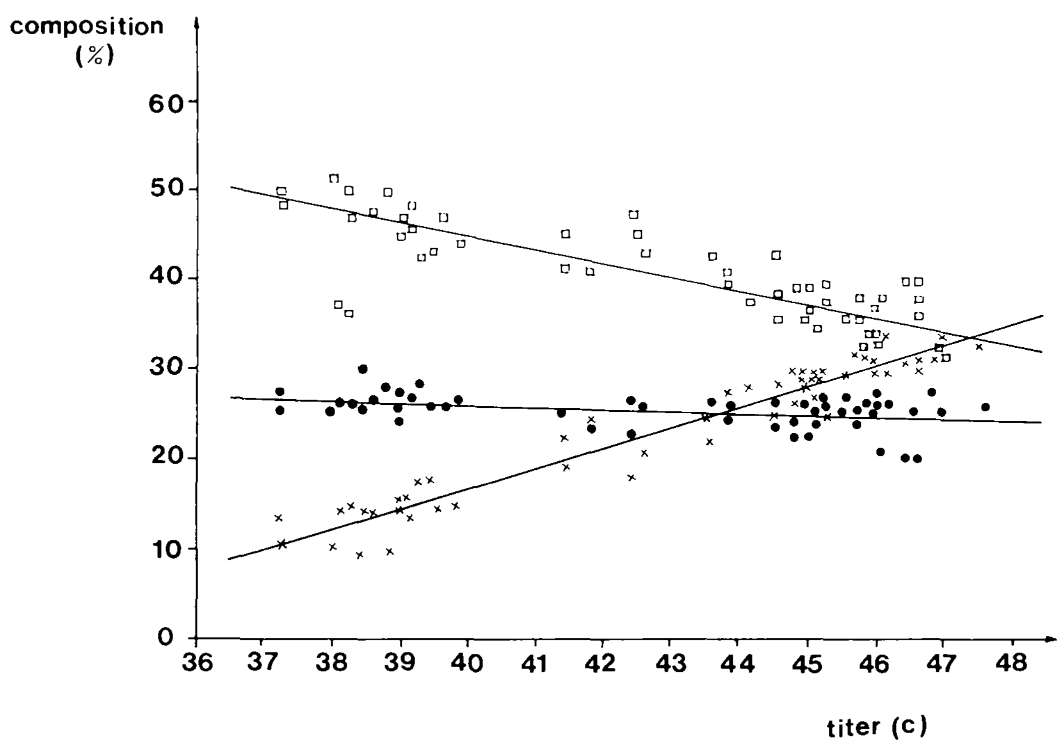

FIG. 1. Effect of titer increase on the composition of beef tallow. X = stearic acid; □ = oleic acid; ● =palmitic acid.

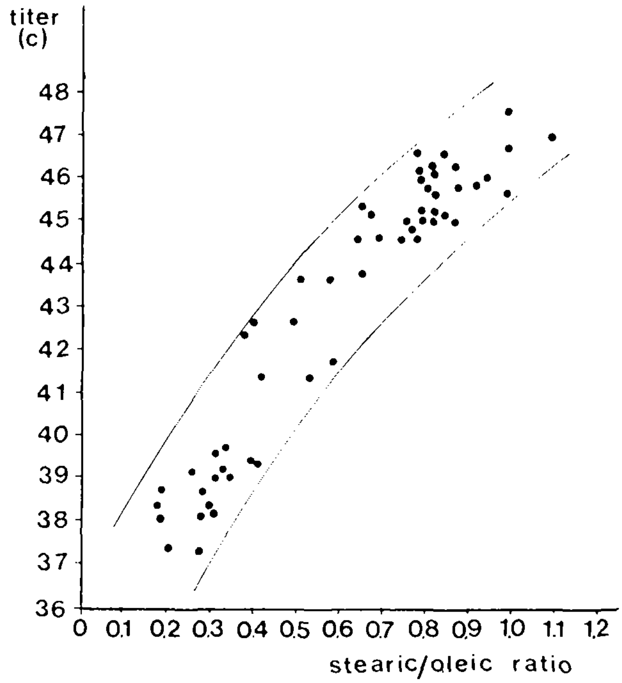

FIG. 2. Effect of stearic/oleic ratio on the titer of beef tallow.

Titers and percentages of the main fatty acids of 60 Uruguayan commercial beef tallows are summarised in Table I. Titers were determined with a method similar to AOCS method Cc 12-59. Fatty acid composition was determined by gas liquid chromatography as their methyl esters on SP-2330 10% (AOCS method Ce 2-66 and Ce 1-62).

Linear relationships were found. The straight line equations were obtained by means of the least squares approximation:

Myristic (%) = -0.03 (titer) + 4.1
Palmitic (%) = -0.20 (titer) + 34.3
Palmitoleic (%) = -0.54 (titer) + 28.2
Stearic (%) = 2.30 (titer) − 75.5
Oleic (%) = -1.53 (titer) + 107.0
Linoleic (%) = 0.03 (titer) + 0.6

Little change is found in the myristic, palmitoleic and linoleic percentages as the titer varies. The values for palmitic, stearic and oleic acids are plotted in Figure 1.

A progressive increase was found in titer with an increase in the stearic/oleic ratio (Fig. 2).

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Nutritional and Toxicological Evaluation of Mango Kernel Oil

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ABSTRACT

Mango-kernel fat is a solid fat at room temperature and has a melting point of ca. 35 C. The fat was analyzed for its physico-chemical properties. It is rich in equal amounts of stearic and oleic acids (42%). Nutritional and toxicological evaluation of this fat was carried out by multigeneration breeding studies in weanling albino rats, feeding them mango-kernel fat or groundnut oil (GNO) at a 10% level in a 20% protein diet that was adequate in vitamins and minerals. The feed-efficiency ratio and growth rate of rats fed mango-kernel fat were comparable with the control group. Studies of calcium, phosphorous and nitrogen balance showed that the retention of these nutrients was not adversely affected by the mango-fat intake. The apparent digestibility of mango fat was comparable with GNO when fed to rats. Toxicological evaluation of the fat showed a comparable reproductive performance with the GNO-fed animals. Liver serum total cholesterol, triglycerides and total lipids were found to be within normal levels. The organ weights of the various tissues of the animals of both groups in the last generation were comparable. Histopathological studies of various organs revealed no abnormalities. These studies indicate that mango-kernel fat can substitute for any solid fat without adverse effect.

INTRODUCTION

In India, interest in developing new sources of oils and fats has grown. The main reason is the acute shortage of traditional edible oils. Hence, a large variety of unconventional oils, obtained from widely grown plants, were screened to find out whether they were usable for edible purposes. Studies on *H. Sabdariffa* oil and *cleome viscosa* oil have been reported (1) from these laboratories.

Cocoa-butter fat, which is not produced in India, is much valued for its use in the confectionery and bakery industries. Cocoa-butter fat is a unique, naturally occurring fat and has a chemical composition of monounsaturated glycerides (MU) and diunsaturated glycerides (DU) with palmito-oleo-stearin as a dominant glyceride (2). It is solid at room temperature and has a melting point of ca. 36 C. These physical and chemical properties are essential for a fat used in the confectionery or bakery industry. In certain countries, such as Malayasia, a cocoa-butter substitute named "Coberine" is prepared from palm oil by suitable