ON THE CHEMICAL COMPOSITION OF MANGO KERNEL FAT (*MANGIFERA INDICA* L.)

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ABSTRACT

Physico-chemical characteristics of mango kernel fat were determined. The fatty acid composition of the kernal fat was estimated by gas liquid chrcmatography. The fat, having a melting point of 34° C, contained stearic acid and oleic acid as major components along with smaller proportions of linoleic and linolenic acids. The fat has the typical characteristics of a vegetable butter.

INTRODUCTION

THE mango kernel fat containing 6–12% fat and highly enriched with starch has been suggested for livestock feeding[1]. Earlier investigations on kernel fat related essentially to its physico-chemical characteristics without any detailed information on its composition[2, 3]. The present report deals with the fatty acid composition of kernel fat determined by gas liquid chromatography and the comparative aspects of the composition of this fat with that of commonly occurring vegetable butter.

EXPERIMENTAL

Kernels obtained from sun dried seeds of ripe mango (var. Alphonso) were dried in an oven at 60° C to a moisture level of 8–10%, and were pulverized in a laboratory grinder. The fat was extracted in batches in a soxlet apparatus using petroleum ether (b.p. 60–80° C) and the solvent was then removed in a flash evaporator. The fat thus obtained was dried under vacuum to a constant weight.

Melting point, saponification value, iodine value (Wijs' method), acid value and non-saponifiables were determined according to the standard procedure[4].

Thin-layer chromatographic (TLC) separation of kernel fat was carried out on a silica gel plate using petroleum ether; diethyl ether: acetic acid (90 : 10 : 1 v/v) and the spots were detected by spraying the plate with 50% sulphuric acid[5]. The components of kernel fat were identified by comparing the Rf values of authentic samples of mono-, di- and tripalmitin and oleic acid (Sigma Chemicals, USA). The kernel fat was saponified with 1N alcoholic KOH, non-saponifiables were removed[4], and the fatty acids were recovered by acidification of the soap solution with 1N H_2SO_4 followed by extraction with diethyl ether and finally methylated with diazomethane[5]. The fatty acid methyl esters were analysed by gas liquid chromatography (GLC) using a BARC Model gas chromatograph equipped with a flame ionisation detector and a stainless steel column 0·25 in O.D. × 6 ft.), which was packed with 20% ethylene glycol succinate (Applied Science Lab, State College, PA) on 60/80 mesh chromosorb P. The oven and the detector temperature was maintained at 185° C with a nitrogen flow of 25 ml/min. The fatty acids were identified by comparing the retention time of authentic reference samples (Sigma Chemicals, USA). Gas chromatographic peak areas were determined by multiplying peak height by peak width at half height. Further, a portion of the methyl ester of the fatty acids of kernel fat was dissolved in aldehyde-free methanol and hydrogenated completely with sufficient amount of platinum oxide as a catalyst at room temperature in a microhydrogenation apparatus. The resulting methyl ester of the fatty acids was studied by GLC as mentioned above.

RESULTS AND DISCUSSION

The extracted mango kernel fat having feeble nutty odor was practically colourless and solidified to a white granular mass during slow cooling. Its physico-chemical characteristics along with that of cacao and shea butter are presented in Table I. The melting point of kernel fat had unique resemblence with that of cacao butter, while the non-saponifiable content was comparable with that of shea butter (Table I) TLC investigation of kernel fat revealed that it was

TABLE I

Physico-chemical characteristics of mango kernel fat, cacao butter and shea butter

Characteristics	Kernel fat	Cacao butter[a]	Shea butter[a]
Fat content of kernel	10·7*	53·4	52·1
Melting point ° C	33·5–34	34·34	38·0–39·5
Iodine value	51·2	36·1	64·2
Acid value	6·8	1·8	13·4
Saponification value	190·4	190·6–195·8	179·6–190·0
Unsaponifiable matter (%)	7·3	0·1–0·3	7·3–9·0

* Fat contents are average values for five different batches of mango kernel ranging from 9·8 to 11·7. All the other values are average values of three different determinations differing not more than 5%.

[a] See Ref. 6.

TABLE II

Fatty acid composition of mango kernel fat, cacao butter and shea butter

Sample	Component fatty acids (% of total)							
	Myristic	Palmitic	Palmitoleic	Stearic	Oleic	Linoleic	Linolenic	Arachidic
Mango Kernel fat*	0·2±0·26	7·2±0·89	Nil	38·6±1·14	43·4±1·09	6·0±0·65	1·4±0·85	3·2±0·44
Cacao butter[a]	0·2	26·8	0·3	36·1	31·9	3·2	1·2	..
Shea butter[a]	Nil	4·8	Nil	45·9	40·8	6·9	1·6	..

* Mean value ± Standard deviation [a] See Ref. 6.

essentially composed of triglycerides, along with minor proportions of mono- and diglycerides, free fatty acids, steroids and hydrocarbons.

Table II summarizes the fatty acid composition of kernel fat along with that of cacao and shea butter. Besides, the occurrence of arachidic acid in mango kernel, the fatty acid composition of this fat was comparable with that of cacao and shea butter. Stearic and oleic acids contributed to about 82% of the total fatty acids of mango kernel fat. The presence of linolenic acid in kernel fat was confirmed by GLC resolution of the complete hydrogenated esters, where the corresponding augmentation of the stearate peak was observed. Relatively low content of polyunsaturated fatty acids coupled with enriched oleic and stearic acid possibly characterises the consistancy of mango kernel fat with the commonly occurring vegetable butter or tallow fat, and thus it could be of importance in confectionary industry. It is interesting to note that palmitoleic acid, which was earlier found to be a major constituent, of mango pulp fat[5] was absent in the kernel fat.

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DIFFERENTIAL EFFECTS OF AMINOGLYCOSIDE ANTIBIOTICS ON THE *IN VITRO* DNA SYNTHESIS

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ABSTRACT

Neomycin, Streptomycin and Kanamycin, the three well-known aminoglycoside antibiotics have been found to inhibit the *in vitro* DNA dependent DNA synthesis by the purified *E. coli* DNA polymerase I. Of the three, Neomycin is the most potent inhibitor for DNA polymerase activity. These three antibiotics also show similar differential effects on terminal deoxynucleotidyl transferase, a DNA polymerizing enzyme which requires only an oligonucleotide primer for non-specific DNA chain elongation. This pronounced inhibitory effect of Neomycin may be due to its stronger binding affinity towards DNA.

INTRODUCTION

THE aminoglycoside antibiotics have a broad antibacterial spectrum, including many gram-positive as well as most gram-negative organisms. The antibiotics streptomycin, neomycin, kanamycin produced by Streptomyces have been shown to cause misreading in protein synthesis both *in vivo* and *in vitro*[1, 2]. It is now well established that different aminoglycoside antibiotics induce different specific type of ambiguity[1]. Again, these antibiotics have a very strong affinity for