♣ Varietal Variations in Content, Characteristics and Composition of Mango Seeds and Fat[1]

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ABSTRACT

Wide variations were found in the content, characteristics and composition of seed and fat of 43 varieties of mango (*Mangifera indica*) fruit. The seed in fruit amounted to 3-25% and kernel in seed 54-85% on an as-is basis. The contents of fat, protein and ash in kernel ranged 3.7-12.6, 4.0-8.1 and 1.0-3.7 (% on dry basis), respectively. Acid value of fat varied from 2.1 to 8.8 and unsaponifiables from 1.0 to 5.3%. The ranges for fatty acids, as determined by gas chromatography, were: 16:0, 3-18; 17:0, traces-2.0; 18:0, 24-57; 18:1, 34-56; 18:2, 1-13 and 20:0, traces-4 (area %).

INTRODUCTION

The fat from mango (*Mangifera indica* L.) fruit kernel has received attention in recent years as a cocoa butter substitute or extender for use in soap-making (1,2). Mango kernel meal is used in feeds. Mango fruit is produced in India to the extent of about 9 million tonnes, accounting for 70% of the world's production (1,3). Potential for production of mango kernel fat in India is estimated at ca. 30,000 tonne/yr (1). Numerous varieties of mango are recorded, but only about 30 varieties are commercially cultivated. Investigations on a few varieties have revealed variations in content and composition of the seed and fat (1,4-6). Such variations could affect the economics of production and utility pattern of the fat and deoiled kernel meal. In the present investigation, 43 varieties of mango fruit of India were studied for variations in content, characteristics and composition of seed and fat.

MATERIALS AND METHODS

Forty-three varieties of mango fruits were collected from the Fruit Research Station, Sangareddy, Andhra Pradesh, India. After weighing the fruit, skin and pulp were removed. The seed (stone) and kernel were separated and weighed. The moisture content of the crushed kernels was determined. The oil content of the dried kernels was determined by extraction with *n*-hexane in a Soxhlet apparatus. Protein and ash contents of the defatted kernel meal and characteristics of the fat were determined according to AOCS methods (7).

Fatty acids, free of unsaponifiable matter, were obtained and esterified with methanol using 2% sulfuric acid. The fatty acid composition was determined using an F&M 1608 gas chromatograph fitted with a hydrogen flame detector. A stainless steel column (2.4 m x 6 mm) packed with 15% EGSS-X on Chromosorb-P (100-120 mesh) and maintained at 195 C was used. The flow rate of carrier gas, nitrogen, was 40 mL/min. The composition (area %) was determined from peak areas obtained by multiplying peak height with width as half-height.

RESULTS AND DISCUSSION

The data on variations in content, characteristics and composition of 43 mango fruit varieties were obtained from pooled samples of four fruits of each variety from the same tree and are given in Table 1. The fruit weighed from 100 to 1070 g and all except for six fell within the range of 150-550 g. The seed content varied from 3 to 25%. The kernel content in seed ranged from 54 to 85%. The fat content in kernel on dry basis ranged from 3.7 to 12.6%. No relationship was found between fruit weight and seed content; but the higher the fruit weight, the lower the kernel content. No definite relationship was found between kernel content in seed and fat content in kernel. The acid value varied from 2.1 to 8.8 and unsaponifiables from 1.0 to 5.3%.

The 16:0 content was lowest (3%) in *Bobbili panasa* and highest (18%) in *Andrews*, while it ranged from 6 to 14% in other varieties. The 18:0 content was highest (57%) in *Badami* and lowest (24%) in *Himayath* while it varied from 26 to 49% in other varieties. The 18:1 content was highest (56%) in *Dil pasand* and lowest (34%) in *Badami*, and varied from 38 to 55% in other varieties. The 18:2 content was highest (13%) in *Himayath* and lowest (1%) in *Badami*, while it ranged from 2 to 12% in other varieties. The 20:0 content varied from trace to 4%. The occurrence of 17:0 (trace to 2%) as a component fatty acid in the mango fat was indicated by comparison with standard methyl heptadecanoate.

The protein and ash contents in kernel varied from 4.0 to 8.1 and 1.0 to 3.7%, respectively, showing that there are no appreciable variations with variety unlike in fat content, characteristics and composition.

The observations made in this study are useful in commercial processing of mango fruits and utilization of mango kernel fat and meal.

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(See Table I, following)

TABLE I

Varietal Variations in Content, Characteristics and Composition of Mango Seeds and Fat

Variety	Fruit (g)[a]	Seed (%)[a]	Kernel in seed (%)[a]	Moisture (%)[a]	Fat (%)[b]	Protein (%)[b]	Ash (%)[b]	AV	Unsaponifiable matter (%)	16:0	18:0	18:1	18:2	20:0
Afonso[d]	209	12	85	39	11.2	4.0	1.9	2.3	2.2	8	49	40	2	1
Ali pasand	303	6	79	36	8.4	7.0	1.8	5.2	2.5	9	44	41	5	1
Andrews	384	9	83	66	7.0	7.0	2.2	4.1	1.1	18	34	43	4	1
Azamus-E-samar	550	8	77	40	10.2	7.3	1.6	3.4	1.3	7	49	39	4	1
Badami[d]	363	10	71	34	11.1	6.0	1.0	6.2	2.2	6	57	34	1	1
Baramasi	100	16	81	54	7.3	8.0	2.6	3.8	1.2	10	34	49	5	1
Benisham[d]	430	8	73	60	7.1	7.1	1.7	4.5	2.4	13	30	52	5	2
Black Andrews	242	14	54	73	3.7	6.0	3.7	4.0	1.5	11	29	48	8	Tr
Bobbili panasa	180	14	73	71	7.9	6.5	1.5	2.1	1.3	3	40	51	4	4
Bombay peda	263	9	74	49	7.0	6.6	2.5	5.9	4.8	8	40	45	5	1
Dil pasand	281	8	70	72	5.1	6.1	2.6	6.0	2.3	9	26	56	6	3
Dusheri[d]	200	8	69	49	6.8	7.6	2.5	8.8	2.1	12	39	43	4	2
Elephant head	530	12	60	49	8.9	6.6	2.6	4.8	1.1	8	36	49	6	1
Fernandis	250	15	79	40	12.6	6.2	2.1	6.0	3.5	10	36	49	4	2
Gummadi ganneru	520	4	59	66	4.9	6.8	2.1	8.0	—	12	34	44	8	1
Hamlett	907	8	79	67	5.9	7.4	1.1	3.5	1.6	11	44	41	3	Tr
Himayath[d]	332	5	79	52	5.9	7.5	1.9	5.0	1.3	11	24	50	13	3
Hur	350	15	79	59	5.7	7.4	2.4	4.0	2.8	8	31	48	10	3
Hyder saheb	258	25	71	41	9.2	5.8	2.0	2.9	3.4	7	42	44	4	1
Jalal	380	9	79	70	3.7	7.4	2.9	3.8	3.2	10	34	45	10	2
Jehangir[d]	355	13	83	86	10.6	7.1	1.8	5.9	1.1	11	47	34	6	1
Kalapahad	158	9	69	36	10.6	6.3	1.5	3.9	1.0	10	44	41	2	2
Kolamka goa	323	15	82	66	4.7	8.1	2.5	2.4	2.1	12	28	53	6	2
KO7	251	8	84	61	6.0	7.3	1.8	5.9	4.8	10	31	49	8	1
KO8	305	12	72	46	6.7	7.5	1.8	3.9	2.6	10	34	44	10	4
Langra[d]	145	9	70	63	7.0	6.9	2.2	3.2	3.0	7	41	44	4	2
Lobera	430	7	76	49	11.9	6.3	2.0	5.2	3.0	7	45	43	3	1
Malgoad	410	13	80	44	5.8	7.1	1.9	5.2	1.8	11	32	49	7	2
Mamoranjam	231	5	74	45	8.9	6.2	2.1	3.8	4.5	10	34	52	3	1
Mebmood[d]	508	11	80	48	6.0	6.7	2.4	4.0	4.4	8	35	51	4	2
Neelam[d]	225	3	61	45	9.9	7.0	1.3	4.3	1.3	10	40	44	4	1
Pahelwan	1070	14	77	53	8.5	6.1	1.1	3.7	2.3	10	35	50	3	2
Pairi	183	12	80	33	10.5	6.9	1.1	4.5	1.8	10	47	38	4	1
Pancha varnam	298	15	80	45	10.8	5.7	2.3	7.2	5.3	7	44	46	2	1
Parasapalli	102	11	67	43	7.8	6.8	2.5	7.1	2.2	11	32	46	8	3
Pedda rasalu[d]	455	19	73	56	9.5	5.3	1.9	5.6	1.0	8	40	46	5	1
Raj langra	184	7	77	48	5.3	6.7	2.3	8.0	2.3	9	35	49	5	2
Romani[d]	182	10	64	34	8.8	7.3	2.0	5.0	1.1	7	48	40	2	1
Royal special	185	8	73	52	6.5	7.0	2.5	4.8	2.6	8	42	42	6	2
Samarbehist dasheri	354	14	70	50	7.0	6.7	2.7	2.9	3.2	8	32	47	9	2
Suvarna rekha[d]	215	5	68	39	8.7	6.6	2.1	6.9	3.6	9	43	42	4	1
Tanneru sora	750	8	83	63	5.6	5.8	2.5	5.2	2.6	11	27	55	5	2
Totapuri[d]	468	8	83	61	11.3	5.7	1.1	5.1	1.8	14	34	39	12	1

[a]As-is basis.
[b]Dry basis.
[c]Also 17:0, trace-2%.
[d]Cultivated on large scale.