# Varietal Variations in Content, Characteristics and Composition of Mango Seeds and Fat1

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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 × 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

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

Variety         Fault         Seed in seed in seed of moisture         Feed processed in seed of moisture         Application of the seed processed in seed processed in seed of the seed processed in seed processed in seed processed in seed of the seed processed in seed processe				Kernel		Kerne	nel		Fat	Fat characteristics		Fatty acid	Fatty acid composition (area %) <sup>C</sup>	1 (area %) <sup>C</sup>	
The control of the co	Variety	Fruit (g)a	Seed (%)a	in seed (%)a	Moisture (%)a	Fat (%)b	Protein (%)b	Ash (%)	AV	Unsaponifiable matter (%)	16:0	18:0	18:1	18:2	20:0
984         6         77         84         70         118         51         25         94         44	Afonsod	209	12	85	39	11.2	4.0	1.9	2.3	2.2	8	49	40	2	1
mr         350         8         73         70         70         70         120         41         11         18         34         45	Ali pasand	303	9	42	36	8.4	7.0	1.8	5.2	2.5	6	44	41	īV	-
max         550         NA         77         440         1102         73         116         334         113         7         440         1102         73         116         334         113         7         440         1102         113         113         7         440         1102         113         113         7         440         1103	Andrews	384	0	83	99	7.0	7.0	2.2	4.1	1.1	18	34	43	4	****
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## 1450   8   74   74   74   75   75   75   75   75	Baramasi ,	100	16	81	54	7.3	8.0	5.6	3.8	1.2	10	34	49	ŗC	7
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455     11     67     56     9.5     5.3     1.9     5.6     1.0     8     40     46       184     19     73     48     5.3     6.7     2.3     8.0     2.3     9     35     49       182     7     7     48     7.3     2.0     5.0     1.1     7     48     40       185     10     64     52     6.5     7.0     6.7     2.5     8     42     42       4     70     64     52     7.0     6.7     2.7     2.9     3.2     8     32     47       4     70     39     8.7     6.6     2.1     6.9     3.6     9     43     42       750     5     68     63     5.8     2.5     5.2     2.6     11     27     55       468     8     83     61     11.3     5.7     1.1     5.1     1.8     14     34     39     1	Parasapalli	102	15	80	43	7.8	6.8	2.5	7.1	2.2	11	32	46	<b>∞</b>	m
184     19     73     48     5.3     6.7     2.3     8.0     2.3     9     35     49       182     7     77     34     8.8     7.3     2.0     5.0     1.1     7     48     40       182     7     77     34     8.8     7.3     2.0     5.0     1.1     7     48     40       46     5     7     6     5     7.0     6.7     2.7     2.9     3.2     8     42     42       4     7     39     8.7     6.6     2.1     6.9     3.6     9     43     42       7     5     68     63     5.8     2.5     5.2     2.6     11     27     55       468     8     8     61     11.3     5.7     1.1     5.1     1.8     14     34     39     1	Pedda rasalud	455	11	29	26	9.5	5.3	1.9	5.6	1.0	œ	40	46	32	-
182     7     77     34     8.8     7.3     2.0     5.0     1.1     7     48     40       usberi     185     10     64     52     6.5     7.0     2.5     4.8     2.6     8     42     42       d     215     14     70     39     8.7     6.6     2.1     6.9     3.6     9     43     42       750     5     68     63     5.6     5.8     2.5     5.2     2.6     11     27     55       468     8     83     61     11.3     5.7     1.1     5.1     1.8     14     34     39     1	Raj langra	184	19	73	48	5.3	6.7	2.3	8.0	2.3	٥	35	49	ĸ	7
185     10     64     52     6.5     7.0     2.5     4.8     2.6     8     42     42       usberi     354     8     73     50     7.0     6.7     2.7     2.9     3.2     8     3.2     47       d     215     14     70     39     8.7     6.6     2.1     6.9     3.6     9     43     42       750     5     68     63     5.6     5.8     2.5     5.5     11     27     55       468     8     83     61     11.3     5.7     1.1     5.1     1.8     14     34     39     1	Romania	182	7	11	34	<b>α</b>	7.3	2.0	5.0	1.1	7	48	40	7	-
usben 354 8 75 50 7.0 6.7 2.7 2.9 3.2 8 32 47 d 215 14 70 39 8.7 6.6 2.1 6.9 3.6 9 43 42 750 5 68 63 5.6 5.8 2.5 5.2 2.6 11 27 55 468 8 83 61 11.3 5.7 1.1 5.1 1.8 14 34 39 1	Royal special	185	10 °	49	52	6.5	7.0	2.5	8.4	2.6	<b>∞</b> (	45	45	9	7
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750 5 08 05 5.0 5.8 2.5 5.2 2.0 11 27 55 1468 8 83 61 11.3 5.7 1.1 5.1 1.8 14 34 39 1	Suvarna rekba	215	4.	2 (	3,0	× 1	0.0	2.1	٠	3.6	ς, <del>;</del>	£ 4 6	4.2	4 1	⊶ (
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	Totalani	ô	0	6	10	6.11		1.1	7.7	1.0	+	to	86	71	-

<sup>a</sup>As-is basis.

bDry basis.

cAlso 17:0, trace-2%.
dCultivated on large scale.