

## MANGO SEED KERNELS AS FOOD

*Interim Report by Dr. B. P. Pal, Director, Indian  
Agricultural Research Institute, Pusa.*

Mango seed kernels have long been used as food in certain parts of India, particularly in times of scarcity. Flour made from the kernels of ripe mango seeds when dried is made into chapaties in the North Western Provinces. The kernels are also sometimes roasted or boiled and eaten. (The Dictionary of Economic Products in India by G. Watts. Vol. V, p. 155, 1889).

The practice of using mango seed kernels for food is also common among the inhabitants of the Fund Hills. A method of processing the flour is followed here. The process consists chiefly of water extraction of tannin which is responsible for making the kernel stringent. The flour is ultimately dried and eaten in a variety of ways. One way is to make it into cakes put between green leaves and to bake lightly in the fire. (E. G. Wilkins, Indian Farming, 3, 636, 1942).

A sample of the mango kernel flour, prepared as mentioned above, was analysed by Sykroyd for food value. The results are given below:—

Moisture.	...	8.74	%
Protein	...	5.56	%
Ether extract	...	16.13	%
Mineral matter	...	0.35	%
Carbohydrate	...	69.22	%
Calcium (Ca)	...	0.09	%
Phosphorous (P)	...	0.02	%
Iron (Fe)	...	6.49	mg.

The same flour was also examined for the presence of any toxic substance. No poisonous substance was found either in this flour or in the untreated mango seed kernels. The extract made from the powder of the untreated mango seed kernels, however, gave all reactions for tannins, while the flour prepared by the above process gave negative results for tannins. Tannins are known to be non-toxic and suitable for use in the elementary canal (E. G. Wilkins, Indian Farming, 3, 636, 1942.)

Work on the chemical composition and feeding value of mango seed kernel was also carried out by Kehar and Chanda. They crushed the kernels lightly and placed before country bullocks which after two to three weeks acquired a taste for them. The chemical composition and feeding values as reported by these authors are given below. (Kehar and Chanda, Ind. J. Vet. Sci. & Animl. Husb. 15, 280, 1945).

### CHEMICAL COMPOSITION OF MANGO SEED KERNEL

Crude Protein.	...	...	8.50	%
Ether extract.	...	...	8.85	%
Fibre.	...	...	2.81	%
Nitrogen-free extract.	...	...	74.49	%
Total ash.	...	...	5.35	%
Calcium (Ca).	...	...	0.190	%
Phosphorus (P)	...	...	0.298	%

### Digestible nutrients of mango-seed kernel as compared with those of other grains and seeds.

	Digestible protein.	Starch equivalent.	Total digestible nutrients.
Barley.	7.4	84.6	86.0
Maize.	8.2	93.3	94.3
Oats.	7.8	73.4	78.5
Corn*	3.6	...	74.2
Rye*	7.1	...	87.0
Oats.*	7.0	...	72.2
Mango seed Kernel	6.1	67.5	70.0

It appears that the digestible protein obtained from mango-seed kernel is only slightly poorer than that in oats and barley, while in total digestible nutrients and starch equivalent the kernel compares satisfactorily with corn and oats. (Kehar and Chanda, Ind. J. Vet. Sci. and Animl. Husb. 15, 280, 1945).

In order to investigate the possibility of human consumption of mango seed kernel flour, its supplementary value was found out by partial and total replacement of wheat and maize from the stock diet by using rats as experimental animals. Observations were made to find out the effect on growth and reproduction of rats over a period of three generations. The biological values of protein showed no declination

\* American figures.

When mango seed kernel flour replaced 60 p. c. of the wheat or maize quota in the stock diets. The difference was however found to be significant when the wheat or maize was totally replaced by mango seed kernel flour. (Kehar & Chanda, *Current Science*, 15, 48, 1946).

Seed kernels of two varieties of mangoes are being analysed in this laboratory for their food value. None of these varieties is fully ripe and mature. It is not known if the chemical composition of seed kernel differs in different varieties, and at different stages of maturity. The protein content of two varieties is given below. Analysis for carbohydrate, fat, mineral matter, vitamins and digestibility is being continued with different varieties of mangoes and at different stages of maturity.

#### Protein content on dry basis.

Bombay variety.	5.12 %
Madras variety.	5.41 %

From the data given above, mango-seed kernel appears to be a good supplementary source of protein and carbohydrate. One of the objections for its use as human food may be the presence of an astringent principle which on the other hand can be removed by suitable processing. The various methods of processing followed in different parts of India consist chiefly of washing with water or boiling the kernel.

#### MEDICINAL PROPERTIES OF MANGO SEEDS

The seed is sweet, sour, acrid, cures vomiting, dysentery, burning in the region of the heart. The oil from the seeds is acrid, sweet, bitter, cures stomatitis and "Vat" (Ayurveda).

The seed is astringent to the bowels and used in chronic diarrhoea, cooling, aphrodisiac ; a good collyrium (Yunani).

The unripe fruit is said to be useful in ophthalmia and eruptions and the seeds in asthma.

The bark and the kernel are known as astringent and used in haemorrhage, diarrhoea and other discharges. The decoction of kernel either alone or in combination with bel and ginger, is generally prescribed in diarrhoea. The kernel is also described as an anthelmintic and containing a large quantity of gallic acid, highly useful in bleeding piles and menorrhagia.

(From Medicinal plants of India by Kirtikar & Basu).

## SECOND INTERIM REPORT

(Analysis of mango-seed kernel. Results expressed on dry basis). Analysis done in February, 51.)

	<i>Bombay variety.</i>	<i>Madras variety.</i>
Crude Protein	5.12 <sup>0</sup> / <sub>100</sub>	5.41 <sup>0</sup> / <sub>100</sub>
Ether extract	8.25 <sup>0</sup> / <sub>100</sub>	7.10 <sup>0</sup> / <sub>100</sub>
Crude Fibre	2.69 <sup>0</sup> / <sub>100</sub>	2.76 <sup>0</sup> / <sub>100</sub>
Ash	2.78 <sup>0</sup> / <sub>100</sub>	2.93 <sup>0</sup> / <sub>100</sub>
Soluble carbohydrates (by difference)	81.16 <sup>0</sup> / <sub>100</sub>	81.80 <sup>0</sup> / <sub>100</sub>
Sand & insolubles	0.03 <sup>0</sup> / <sub>100</sub>	0.035 <sup>0</sup> / <sub>100</sub>
Ca	0.11 <sup>0</sup> / <sub>100</sub>	0.134 <sup>0</sup> / <sub>100</sub>
P	0.2 <sup>0</sup> / <sub>100</sub>	0.195 <sup>0</sup> / <sub>100</sub>
Vitamin C	7.6 mg. per 100 g.	7.6 mg. per 100 g..

The seeds were not mature and water content of Bombay and Madras variety was found to be 60.8<sup>0</sup>/<sub>100</sub> and 65.1<sup>0</sup>/<sub>100</sub> respectively.

Sd/- S. P. RAYCHAUDHURI.

24.2.51

Head of the Division of Chemistry.