

NOTE

Extraction, Characterisation and Antimicrobial Activities of Mango Seed Oil

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The oil extracted from the Balamani mango seed kernels is evaluated for oil content, physico-chemical characteristics and fatty acid composition. The number of components present in the oil is found by HPLC and TLC. The oil is found to show antibacterial activity against *Staphylococcus epidermidites* but it induces the growth of the yeast, *Saccharomyces cerevisiae*.

Oil is used for edible and also for other industrial purposes. So, it is necessary to analyse the nature of oil. A search through literature reveals that much less work has been reported on mango seed oil. It was decided to extract oil from a particular species namely 'Balamani variety' and study the nature of the oil obtained from the species.

The oil content of the kernels was determined by Soxhlet apparatus using *n*-hexane as solvent. The mango seeds were decorticated in dry condition and the kernels were separated, dried, powdered and packed in a quantitative filter paper. The filter paper packed powdered mango seeds was taken in the Soxhlet apparatus. Extraction of the oil was done with *n*-hexane as the solvent. The extract containing the oil was distilled off and the oil was dried in vacuum to remove traces of solvent vapour.

Refractive index was determined by using Abbe's refractometer by keeping the prism at room temperature. Other physical and chemical characteristics of this oil were determined by the standard procedures.

A suitable amount of freshly extracted oil was dissolved in known volume of *n*-hexane. An aliquot of this solution was taken in cuvette and scanned from 200 to 400 nm on UV spectrophotometer. Necessary dilution was made before taking the spectrum. Fatty acid methyl ester of the oil was prepared and analysed by HPLC technique using methanol as solvent. Nutrient agar was used for testing the susceptibility of micro-organisms to antibacterial agents using the disc diffusion method.

The oil content in the kernels of mango seeds of Balamani variety was 12.6%. It is compared with some of the conventional oil seeds, viz. groundnut, coconut, sunflower and sesame¹. The results reveal that the seeds cannot be a good source

of oil to be exploited economically. The oil obtained from mango seeds was yellow in colour having a characteristic sweet smell. The characteristics of the oil determined by standard methods are given in Table-1.

The low iodine value (49.7) of the oil indicates the presence of large amount of saturated fat and it cannot be used as a drying oil in the manufacture of paints and varnishes. Reichert-Meissl and Polenske values show the presence of lower volatile fatty acids to a very small extent. The high saponification value (212.8) indicated the presence of low molecular weight triglycerides and hence low molecular weight acids. Percentage free fatty acid indicates that the oil cannot be hydrolysed and oxidised easily by the atmospheric moisture and air. Thus, it can be easily stored for a long time without hydrolysis and oxidation, *i.e.*, it cannot be easily rancidised.

The UV spectrum of the oil shows the following max. values, *viz.*, 224 nm, 281 nm and 315 nm. These absorptions may be due to the diene (18 : 2) (9t, 11t), enediyne (18 : 3) and tetraene (18 : 4) chromophores respectively². However when the methyl ester of the oil was analysed by using HPLC technique for its fatty acid composition (Table-1) it showed that C_{16:0}, C_{18:0}, C_{18:1} and C_{18:2} constituted the major portion of the total fatty acids present in the oil. The levels of stearic acid (30.4%), palmitic acid (22.5%) and oleic acid (23.96%) were highest while the concentration of other unsaturated acids such as linoleic and linolenic acids were 8.53 and 7.50% respectively. It explains the preponderance of the saturated fatty acids in the oil and hence the oil exists in the solid state at room temperature.

TABLE-1
CHARACTERISTICS AND FATTY ACID COMPOSITION OF MANGO SEED OIL

Properties	Values
Yield of oil	12.6%
Refractive index	1.4595
Saponification value	212.8
Iodine value (Wij's method)	49.7
% FFA	1.01
RM	0.9
Polenske	2.1
<i>Fatty acids (%)</i> :	
Myristic acid [14 : 0]	5.6693%
Palmitic acid [16 : 0]	22.4898%
Stearic acid [18 : 0]	30.3974%
Oleic acid [18 : 1]	23.9640%
Linoleic acid [18 : 2]	8.5354%
Linolenic acid [18 : 3]	7.5027%
Arachidic acid [20 : 0]	1.4414%

The values are different from the reports of the earlier workers^{3,4} and it may be due the change in season and the area in which the seeds are collected.

The oil was also tested for its antimicrobial property against *Staphylococcus epidermidites*, *Saccharomyces cerevisiae*, *Bacillus megaterium*, *Salmonella typhi* and *Pseudomonas aeruginosa*. The antibacterial screening tests showed that oil has antibacterial activity only against *Staphylococcus epidermidites* and no effect on *Bacillus megaterium*, *Salmonella typhi* and *Pseudomonas aeruginosa* but it induces the growth of *Saccharomyces cerevisiae*.

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