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Extraction of Fatty Acids from *Syzygium cumini* Seeds with Different Solvents

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The medicinal applications in various parts of *Syzygium cumini viz.*, antiglycemic, antibacterial and antiinflammatory have been pharmacologically tested. An attempt has been made in this investigation to analyze the seed constituents to possibly give an insight into the constituents that could play a vital role in the medicinal activity. This work is of interest from the fact that the seeds are thrown out as waste. Chemito Model GC-8610 was used to analyze the composition of seed extract for their fatty acid content. It was observed that the percentage of oleic acid was the highest, followed by linoleic. A maximum of 46 components was observed on analysis. However, only about 10-12 components came out to be the major constituents. These studies would be continued further to explore and identify the other constituents for their importance in medicine.

Key Words: *Syzygium cumini*, Soxhlet apparatus, Solvents.

INTRODUCTION

Syzygium cumini or *Eugenia jambolana*, also named Jambolan, Jamun, Jambu, Jambul, Java plum, is a native of India, Burma, Ceylon and Andaman Islands. It is a fast growing tree, the fruits occurring as clusters, (10 to 40 in number), round or oblong, often curved and 0.5-2.0 inches long. It usually turns from green to light magenta, then dark purple or nearly black as it ripens. The pulp is purple or white and juicy. Jambolan has received considerable attention in folk medicine, ayurveda and unani traditional system of medicine as antidiabetic drugs in the pharmaceutical trade[1-4]. Morton *et al*[5] have reported that the seed by nature is astringent, stomachic, carminative, antiscorbutic and diuretic. The powered seeds, the solvents and aqueous extract of seeds, barks, leaves and fruits have been reported to lower blood glucose level in diabetic patients and in experimentally induced diabetic animals[6-9]. Lustosa *et al*[10] have investigated the chemical composition of the Java plum (*Syzygium cumini*) essential oil. Das and Banerjee[11] in their experimental investigation using spectroscopic method

observed the presence of the usual fatty acids. Pratap and Manavalan[12] examined the oils and indicated that epoxy and cyclopropenic fatty acids were absent. Bhatia and Bajaj[13] reported that the seed lowered blood pressure by 34 % and this action is attributed to the ellagic acid content. It has been reported that *Syzygium cumini* seed contains crude protein, 8.5; crude fiber, 16.9; ash, 21.72; Ca^{2+}, 0.41; P, 0.17 % and other components[14].

EXPERIMENTAL

The glass soxhlet extraction unit, distillation apparatus, water bath, hot air oven and electronic balance used were of research standard. Hexane, isopropanol, ethylene dichloride and acetone were obtained from E. Merck; all solvents were of analytical grade. Double distilled water was also used.

Syzygium cumini dried seeds were collected from Kattuppalayam, Erode, India, from a single tree and used for all the experiments. The seeds were washed thoroughly with distilled water, four to five times. They were then dried at room temperature and powdered in a manual grinder. The same stock of *Syzygium cumini* was used throughout the investigations. Samples of seed powder were always stored at 5ºC.

Extraction and analysis of oil: For extraction studies, 30 g of air dried powder of *Syzygium cumini* seeds were placed in the thimble of soxhlet apparatus. Hexane, isopropanol, ethylene dichloride, acetone and distilled water were used one after the other. The resulting extract was then desolventized and the contents expressed in percentage *viz.*, 17.35, 14.75, 09.85, 12.35 and 10.82. The extract was analyzed in Dr. Ceeal Analytical Laboratory, Chennai, using Chemito model GC-8610.

RESULTS AND DISCUSSION

Fig. 1 shows the components that form the major constituents in the seeds. Oleic acid fights Adreno leuko dystrophy. Linolenic acid has diverse applications such as immune stimulation, good vision, cell membranes synthesis, production of hormone containing compounds, *etc.* It also provides protection against the spread of solid-tumour cancers and it safeguards the function of heart by fighting against cardiovascular disease and heart attacks. Docosahexaenoic acid and eicosapentaenoic acids play a major role in fighting the dreaded Alzheimer's disease and in reducing the risk of heart disease. Erucic and palmitic acids play a vital role in the maintenance of good health and glowing skin. Arachidic (Arachidonic) acid is good for heart. Utilization of Lauric acid in pharmaceutical industry is a well-known evidence for its good antimicrobial properties. Thus, this investigation gains importance from the standpoint of health and welfare of man.

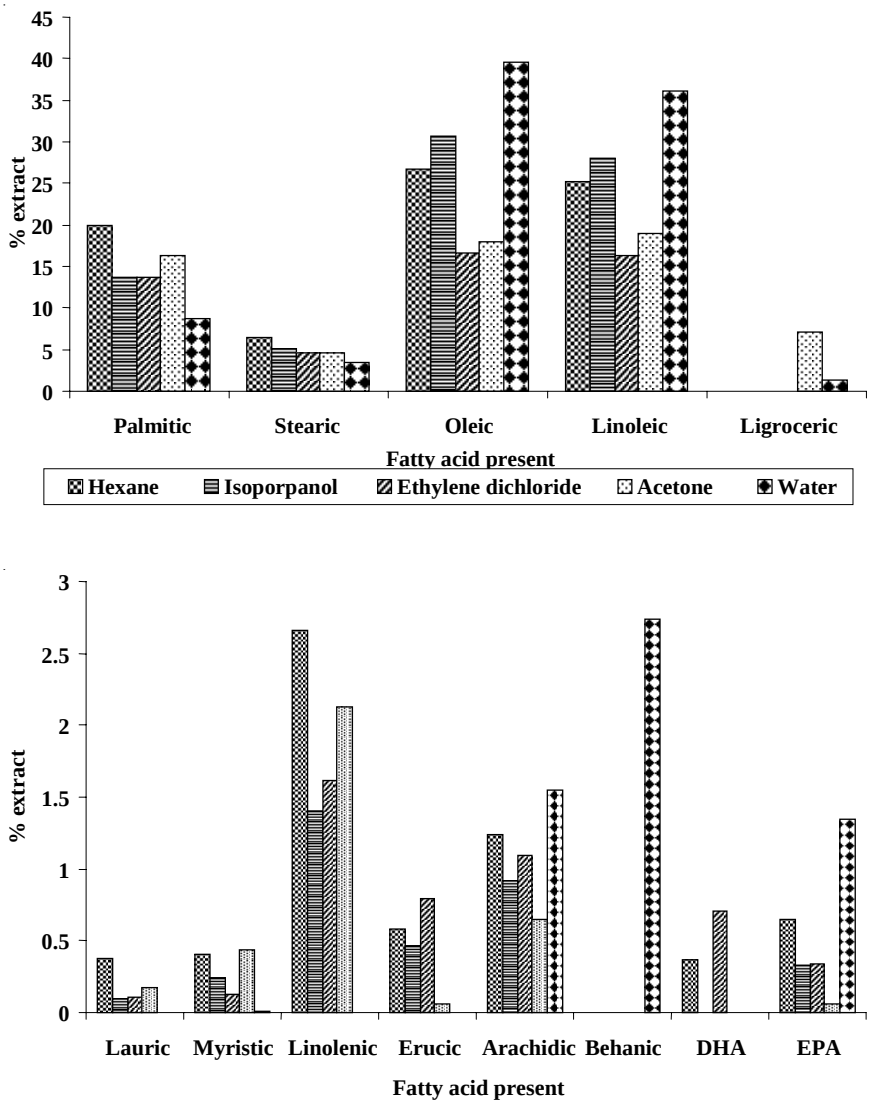

Fig. 1. Seed extraction studies

The amount of the various fatty acids present in *Syzygium cumini* seed extract is shown in Table-1. It is observed that the percentage of oleic acid is the highest with all solvents followed by linoleic acid. The studies would be continued further to explore the other constituents present. The solvents covering a wide spectrum, namely, ketones, chlorinated compounds, alcohols and water have been used. Depending on the demand for a specific component, the choice of solvents can be made based on effectiveness coupled with economic considerations.

TABLE-1
PERCENTAGE EXTRACTION OF FATTY ACIDS

Fatty acids	Percentage Extraction				
	Hexane	Isopropanol	Ethylene dichloride	Acetone	Water
Lauric	00.3801	00.1022	00.1139	00.1674	---
Myristic	00.4103	00.2423	00.1392	00.4420	00.0108
Palmitic	19.9898	13.7396	13.6791	16.2849	08.7622
Stearic	06.3888	05.1474	04.5914	04.6322	03.4774
Oleic	26.7760	30.6520	16.6778	18.4376	39.5843
Linoleic	25.2322	28.0836	16.2474	19.0351	36.0687
Linolenic	02.6577	01.4011	01.6244	02.1320	---
Erucic	00.5833	00.4607	00.7874	00.5169	---
Arachidic	01.2359	00.9185	01.0889	00.6479	01.5469
Behenic	---	---	---	---	02.7369
Lignoceric	---	---	---	07.0782	01.2556
Docosahexaenoic (DHA)	00.3715	---	00.7057	---	---
Eicosapentaenoic (EPA)	00.6535	00.3266	00.3417	00.0551	01.3498

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