Madras agric. J. 68 (2) : 77–81, February 1981

Contents and Oil Constants of Vegetable oils from Unconventional Sources

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Almost all the wild plant species are capable of producing oils, which can be used in the manufacture of perfumery, cosmetics and medicine. The oils may be volatile substances of vegetable origin with a distinctive odour or flavour. The utility of these vegetable oils should be explored, after knowing their economic concentration in plants and after eliminating the toxic principles present, if any. This paper deals with the oil contents of different plant species which are unconventional sources of oil.

INTRODUCTION

In recent times there is a great demand for vegetable oils for human consumption as well as for industrial purposes and the supplies from conventional sources such as oilseeds are not able to meet the demand. Hence, if unconventional sources of vegetable oil such as seeds of wild or avenue trees and weed plants can be identified and their quality assessed, the supply of vegetable oil can be greatly augmented. Even if the oil from these unconventional sources are fit only for industrial use, considerable quantities of edible oil, which are now being used in industry, can be released for human consumption.

MATERIAL AND METHODS

The seeds of unconventional plant species were collected and ground well in a grinder without the loss of any traces of oil. Then the oil was extracted using the extractant petroleum ether in a Soxhlet apparatus.

After the completion of extraction, the contents were evaporated and thereby the ether was separated from oil. Then the flasks were cooled and weighed till constant weight was attained.

Oil constants such as saponification value, iodine number and acid value of these oils were estimated following the method ascribed by Chopra and Kanwar (1976). Then the data were tabulated and statistically analysed following completely randomized design (CRD).

RESULTS AND DISCUSSION

Oil content

The oil from twelve varieties of unconventional plant species was extracted and the values for oil content

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are listed in Table 1 in descending order of magnitude.

Among the oilseed species taken for the study, *Pongamia glabra* and *Azadirachta indica* seemed to possess similar oil yield potentials, 46.3 percent and 46.1 percent, respectively, but they were significantly superior to the oilseed species *Melia azadirachta* and *Argemone mexicana* 38.45 percent and 37.5 percent, respectively which registered the same oil yield. *Cassia fistula* recorded significantly higher oil content than *Acacia marginata* which in turn registered significantly higher oil content than *Prosopis juliflora*. The oilseed species *Prosopis juliflora* recorded 17.25 percent of oil content but it has disagreeable odour. The remaining oilseed species taken for the study exhibited economically less amount of oil content.

Saponification value (Table 1)

Azadirachta indica registered highest saponification value of 196.75 and was significantly superior to the oilseeds species *Argemone mexicana and Melia azadirachta* which recorded similar saponification value. The oilseed species *Lawsonia inermis, Pongamia glabra, Acacia marginata* and *Cassia fistula* seemed to possess similar saponification value. *Prosopis juliflora* recorded 179.1 mg of saponification value but was significantly superior to the oilseed species viz., *Delonix regia* and *Caesalpinia coriaria* which recorded the same saponification value.

Ionine number (Table 1)

Argemone mexicana recorded significantly higher iodine value (121.5), followed by *Pongamia glabra* (90.95) *Acacia marginata* and *Cassia fistula*. The oilseed species *Azadirachta indica Caesalpinia coriaria* and *Enterolobium saman* exhibited the same iodine value, but had significantly higher values than *Prosopis juliflora*. *Melia azadirachta* recorded significantly higher iodine than the *Delonix regia* and *Lawsonia inermis*.

Acid value (Table 1)

Argemone mexicana and *Azadirachta indica* possess similar acid value but were significantly superior to *Melia azadirachta, Acacia marginata* and *Enterolobium saman* which recorded statistically similar acid values. They recorded significantly higher acid values than the oilseed species *Lawsonia inermis, Prosopis juliflora* and *Caesalpinia coriaria*. *Pongamia glabra* recorded minimum acid value.

Utility of unconventional oils

The oils of *Argemone mexicana* and *Azadirachta indica* are used in medicine and as illuminants. *Argemone mexicana* oil can be used in the paint industry. *Azadirachta indica* oil can be used mainly in the manufacturing of soaps. *Pongamia glabra* oil can be used in the tanning industry, soaps and candle manufacturing. The oil can also be used as a lubricant for heavy lathes, chains, bearing of small gas engines, enclosed gears and heavy engines. It has also been tried as a fuel in diesel engines and for illumination purposes and in medicine. The cake after expression of oil is used as livestock feed. It is also used in paints and adhesives. The

oil cake of Azadirachta *indica* is mixed with urea for the slow release of nitrogen. The cake of Argemone *mexicana* can be utilized as a nitrogen fertilizer.

Summary

Pongamia glabra, Azadirachta *indica*, *Melia* azadirachta, Argemone *mexicana* and *Prosopis juliflora* registered economically higher oil content. Some of these unconventional oil sources possess very hard seed coat which cannot be easily removed. Azadirachta *indica* recorded highest saponification value. Argemone *mexicana* and *Melia* azadirachta exihibited similar saponification values. Argemone *mexicana* registered highest iodine value followed by *Pongamia glabra* and Acacia *marginata*. Argemone *mexicana* and Azadirachta indica possess higher acid values than the other oilseed species taken for the study.

The exploitation of oils from unconventional sources is one of the means to overcome the recent energy crisis in the industrial sector. The oil content and oil constants of some unconvetional sources were studied and utility of some of the varieties are enumerated. The other aspects of the study are under investigation.

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TABLE 1 Oil content and oil constants of the unconventional oil sources (Mean values)

Oilseed spsces	Vernacular names	Oil content (%)	Saponification value	Iodine number	Acid value (%)
Pongamia glabra	Pongam	46.30	182.75	90.95	6 50
Azadirachta indica	Vepa	46.10	196.75	70.05	12.10
Melia azadirachta	Malai Vembu	38 45	190.10	68 60	11.75
Argemone mexicana	Kudiyoetti	37.50	192.70	121.50	12.40
Cassia fistula	Konnei	23.50	181.20	71.75	7.60
Acacia marginata	–	22.40	182.65	74.80	10.30
Prosopis juliflora	–	17.25	179.10	69.75	8.55
Lawsonia inermis	Maruthani	8.60	184 20	65.60	9.25
Enterolobium saman	Thungumoonji	8 50	177 10	70.00	10.10
Caeselpinia coriaria	Tividivi	7.20	170 20	70.05	8.20
Delonix regia	Mayarum	7 20	170.50	67.50	7.20
Albizzia lebbek	Vagei	4.45	–	–	–
Statistical Analysis					
'F' Test		**	**	**	**
S.E.		0.3106	1.1148	0·5715	0.1438
C.D.		0.9571	3,4699	0.1809	0.4476

BAR CHARTS

Oil content

1 2, 3 4, 5, 6, 7, 8 9, 10 11, 12

Saponification value

2, 4 3, 8 1 6 5 7 9, 11 10

Iodine number

4, 1, 6, 5, 2 10 9, 7, 3, 11, 8

Acid value

4 2, 3, 6 9, 8, 7 10 5 11, 1