

Potentiality and Prospects for Rice Bran and Rice Bran oil in Tamil Nadu

P. PILLAIYAR¹

The demand for domestic oil always outstrips the supply and consequently the problem remains to be tackled from different angles. At no time the Plan targets for oilseeds had been achieved; this is mainly because of growing of oil seeds at low levels of managements and primarily in unirrigated areas. The present situation in domestic oil front, the requirements by 1983-84 and the ways and means of finding alternate sources of edible oil without much pressure on cultivated land for Tamil Nadu have been indicated. Of the non-traditional domestic oil resources, the oil present in rice bran can to a large extent be utilised for edible purposes. A potential of 5.4 lakh tonnes of rice bran and 1.1 lakh tonnes of rice bran oil in Tamil Nadu by 1983-84 has been identified. The strategy for producing more rice bran oil in Tamil Nadu has also been indicated.

Oils and fats have a significant role in human nutrition. Next to foodgrains, oilseeds constitute the second major agricultural crop in terms of tonnage and value in our Country; but its production remained more or less stagnant and plan targets had never been achieved in Tamil Nadu too, a deficit situation prevails in edible oil position. The oilseeds production which was of the order of 8.17 lakh tonnes in 1950-51 reached the level of 11.23 lakh tonnes in 1960-61, representing an average compound growth rate of 3.0% per annum but declined during the next decade with a production of 10.40 lakh tonnes in 1970-71. Though the State Planning Commission has projected the production of oilseeds in Tamil Nadu to be 17.60 lakh tonnes for 1978-79 (Anon; 1974), it is difficult to realise a production of even 14 lakh tonnes, as this crop is still being grown, by and large, at low levels of management and

primarily in unirrigated areas. Groundnut and gingelly put together occupy about 92% of total oilseeds produced in this State. In Tamil Nadu, the irrigated area under this crop is less than 20% of the total area covered with oil seeds. (Table I). Because of the erratic behaviour of monsoons and damages caused by unseasonal rains at times, the oilseeds production in this State is only marginal with shortfalls on many occasions and the same trend will be felt in the years to come.

Demand for Oil

The demand for vegetable oil for direct consumption and industrial uses in Tamil Nadu is 2,15,005 tonnes in 1973-74, 3,19,225 tonnes in 1978-79 and 5,31,932 tonnes in 1983-84; (Anon, 1974); but this projection is not a realistic one. These figures have been derived by taking the per capita requir-

1. Paddy Processing Research Centre, Tiruvarur-610 108, Tamil Nadu.

ments of vegetable oil as 3.905, 5.227 and 7.926 kg per annum for these years; but the minimum nutritional requirement as specified by the Indian Council of Medical Research is about 20 kg per capita per annum. At present, we are regressing away from the minimum standards and the extent of such regression is bound to be more among poorer sections. By 1983-84, as per projections, this State will have a population of 537 lakhs and the vegetable oil requirement by that time would soar upto 10.64,000 tonnes.

Deficit Situation and Alternate Source: Even if the projected production for 1983-84 is somehow or other realised - a thing which is rather difficult to achieve - there will be a shortfall of nearly 4.5 lakh tonnes in vegetable oil. Apart from this, there is also an urgent need to build a sizable buffer stock of oilseeds and oils to reduce the impact of the wide fluctuations in oilseeds production from year to year. To supplement the various efforts in finding out alternate additional sources of edible oil, suitable technologies have been evolved for utilising the oil present in food, fruit and fibre crops. Of these, oil present in rice bran provides better source for augmenting the edible oil needs.

Rice Bran Oil:

Rice bran oil is a high class edible oil containing predominantly the unsaturated acids like oleic and linoleic acids. Its low linolenic acid content makes the rice bran oil superior to other edible oils (Pillaiyar, 1979). Even though the linoleic acid content of rice bran oil is

one half of that in safflower oil and considerably lower than that in sunflower, cottonseed, soybean, sesamum and corn oils its effect in lowering of cholesterol level is comparatively higher (Goenka, 1977). Smoke-, flash- and fire-points are comparable to those of other high-quality edible oils (Loeb *et. al.*, 1949).

Potentiality of Bran and Rice Bran Oil:

Tamil Nadu at present produces about 85 lakh tonnes of paddy. Out of this, 5% is utilized for seed and other purposes and the remaining quantity goes for consumption after milling. Paddy is milled in different types of mills fitted with hullers, under run disc shellers and rubber roll shellers having abrasive and friction type polishers. Though the quantity of bran removed from rice during milling varies from mill to mill, the *true bran* removal on the basis of paddy is of the order of about 5% only. This bran contains about 20% oil while milling Paddy under raw and 25% under parboiled condition (Pillaiyar 1978). But during commercial milling practices, considerable amount of impurities such as husk, sand particles and to some extent, brokens mix with bran and thereby the oil content is considerably reduced and because of this, the huller-bran normally contains 4 to 6% oil the sheller-bran 8 to 12% oil and the modern rice mill bran 20 to 25% oil, (Pillayar, 1979). The potentiality of bran in Tamil Nadu for the years from 1973-74 to 1977-78 and 1983-84 has been calculated based on the above indications. By taking into

account the average oil content of bran to be 20%, the potentiality of rice bran oil for these years has also been indicated in Table II. By 1983-84, Tamil Nadu will be having a potential of 5,42,350 tonnes of true bran and from this 1,08,470 tonnes of rice bran oil can be extracted.

Present Situation :

As against this enormous hidden wealth, a meagre quantity of about 3000 tonnes of rice bran oil alone is produced per annum from the seven solvent extraction plants situated in Ranipet, Sevoor, Attur, Omalur, Kaldipet, Tiruvarur and Sembanarkoil of this State. This is due to the non-availability of adequate quantity of quality bran, and because of this, most of the solvent plants are working at less than 50% of their capacities. Quality bran can be produced only in mills adopting improved milling techniques. Most of the rice mills in this State are of huller types and quality bran cannot be produced in these units. In Tamil Nadu, there are 14,286 huller mills, 176 sheller mills and about 60 modern rice mills (including modernised mills). By installing rubber roll sheller, pre-cleaner and paddy separator, the existing huller mills can be modernised to produce quality bran (Pillaiyar *et. al.*, 1977). However, the pace of modernisation of rice mills is at very low level in this State.

Production of Edible Grade Rice Bran Oil :

Only about 100 tonnes of this quality oil was produced so far in this

State. But in the entire Country, out of 80,000 tonnes of rice bran oil produced, about 6000 tonnes is of edible grade. This low ebb of production of edible grade rice bran oil is due to the time lag between the production of bran and its extraction. Bran should be extracted for oil within a few hours of its production in case of raw rice bran and within one or two days in case of parboiled rice bran; lest, the free fatty acid content will increase rendering the oil unsuitable for edible purposes. By installing either a steam heated (Rao *et. al.*, 1978) or hot air stabiliser (Pillaiyar *et. al.*, 1978) the bran can be stabilized and such a quality bran ensures continuous production of edible grade rice bran oil.

Extraction and Refining of Rice Bran Oil:

As in the case of other oleaginous materials, rice bran cannot easily be expelled to release its entire oil and hence solvent extraction process is mostly adopted for extracting oil from it (Pillaiyar, 1980) In Tamil Nadu. It is extracted in batch and continuous extraction plants using *n*-hexane as a solvent. The extracted oil, if it contains more than 10% FFA is utilised mostly for soap manufacture. On the other hand, oil with less than 10% FFA is refined and used as such for consumption or in the manufacture of *vanaspati*.

Strategy for Producing More Rice Bran Oil in Tamil Nadu:

There is at present a potential of about 4 lakh tonnes of rice bran in this State and this would increase to 5.5

lakh tonnes by 1983-84. This would mean an oil equivalent of 0.8. to 1.1 lakh tonnes. Even assuming that atleast 75% of this hidden source could be mopped up, an additional quantity of about 80,000 tonnes of oil to the edible oil resources of this State can easily be made available by a) modernising all the rice mills, b) stabilising the entire bran at the site of production, c) diverting the entire bran for oil extraction and feeding the cattle with deoiled meal only and d) fixing reasonable prices for stabilised and unstabilised bran based on the market rate for oil and deoiled meal. The State can establish a separate wing to organise the production of oil from non-traditional sources and to act as liaison between the rice millers and solvent extractors and arrange for the technology transfer from different institutions to these sectors.

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TABLE I Area irrigated to total area under principal oil seeds (Groundnut and gingelly) in Tamil Nadu
(in '000 Hectares)

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76
Total cropped area*	1118	1252	1190	1267	1079	1033
Area under irrigation*	195	226	193	286	184	174
Extent of irrigated area to total cropped area (%)	17.4	18.1	16.2	22.6	17.1	16.8

TABLE II Potentiality of Rice bran and Rice bran oil in Tamil Nadu
(in '000 tonnes)

Year	Paddy* production	For seed and other purposes	Millable paddy	Potentiality of	
				Bran	Oil
1973-74	8296	414.8	7881.2	394.1	78.8
1974-75	5335	266.8	5068.3	253.4	50.7
1975-76	7765	388.3	7376.8	368.8	73.8
1976-77	6291	314.6	6976.5	298.8	59.8
1977-78	5515	425.8	8089.8	404.5	80.9
1983-84	11418□	570.9	10847.1	542.4	108.5

* In Paddy tonne;

Source: Season and crop reports, Government of Tamil Nadu

□ From the perspective plan for Tamil Nadu-1974-84, State Planning Commission, Madras