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## SCIENCE NEWS

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### NEW TECHNOLOGIES FOR AUGMENTING EDIBLE OIL SUPPLIES

The Technology Mission on Oil-seeds of the Government of India strongly believes that, apart from implementing measures to increase the production of oil-seeds in the country, there is scope for an increment in the availability of edible oils from the already known sources through the relevant innovative technologies, waiting to be exploited.

The second Micromission on Oil-seeds mainly deals with the post-harvest and processing technology under the leadership of the Council of Scientific and Industrial Research (CSIR), New Delhi. It aims at (i) developing a modern integrated processing technology for: major oil-seeds, minor and unconventional oil-bearing materials for edible use; (ii) more efficient recovery of oils from oil-bearing materials—improvements in ghanis and expeller units; (iii) upgradation of oils to edible grade, and (iv) upgradation of oil cakes and extractions. In the field of handling, storage and processing, the CSIR and its constituent laboratories, especially, the Central Food Technological Research Institute (CFTRI) Mysore; the Regional Research Laboratories at Hyderabad, Jammu and Trivandrum; the Central Mechanical Engineering Research Institute, Durgapur, and the Structural Engineering Research Centre (SERC), Ghaziabad, would provide modern technology to evolve standard designs for storage in extending shelf-life and new processing techniques to improve the efficiency of oil extraction and for better utilization of oil-seed meals to produce a variety of highly nutritious and delicious value-added products.

About the post-harvest technology, the authorities of the Technology Mission on Oil-seeds remarked that the CFTRI has moved swiftly to develop more efficient sunflower and mustard processing technologies and innovative and better rice bran stabilization techniques. Presently, the country is losing 5 lakh tonnes of oil of the value of Rs. 1,200 crores, which could be almost eliminated by more efficient handling, storage and processing. CFTRI, based on its research experience, has adopted an integrated approach, involving proper storing, cleaning, sorting, size-grading, dehulling and decuticling of most oil-seeds so as to eliminate the unwanted materials and to produce higher yields of good quality oil and edible grade cake suitable for food uses. The

technologists have been convinced that the emerging new technologies will hold the key for augmenting edible oil supplies in the country.

The sunflower seed, the newly emerging oil treasure of India, is becoming popular in the country, although its share in the total oil supplies is presently estimated at 2–3%. Its oil is of good quality and is fit for deep fat frying. Removal of husk from the seeds improves both the quality of oil and the cake. The presence of chlorogenic acid which imparts dark colour to the cake is an important technological problem with sunflower seed. The technology developed by the CSIR laboratories has successfully solved this problem. Oil obtained from the new technology is low in free fatty acids and wax, and has an attractive bright yellow colour with pleasant flavour. The oil is superior in quality to the traditionally processed material. It is possible to achieve a 3% increase in the yield of oil from sunflower seeds dehulled before oil extraction, apart from getting superior quality protein-rich cake which can be used for human consumption after suitable processing. Pre-processing equipment for sunflower dehulling, namely, grader, sheller and air-classifier have been specially designed and three large-scale trials were conducted. The knowhow for beneficiation of sunflower seed developed by CFTRI has already been released to more than six entrepreneurs.

Production of better quality mustard/rape oil and cake is yet another successful venture of CFTRI under the National Mission Programme for increasing edible oil supplies. Ghani-mill oil mustard oil is generally preferred to expeller oil because of the pungency and flavour in the former. The presence of glucosinolates, an anti-nutritional constituent in the seed, low-levels of isothiocyanates responsible for pungency in the expeller oil and 12% residual oil in the cake are the technological snags associated with the processing of mustard/rape-seeds. An integrated process for oil extraction with desirable colour, flavour and pungency from mustard seeds has been demonstrated at CFTRI. This process yields an edible quality cake free from glucosinolates and also bitterness. It is bland and contains good quality protein nutritionally comparable to milk protein.

Rice bran—a by-product of rice milling industry—has 20% oil. It has the promise of considerably swelling the edible oil pool of our country, with a potential of 6 lakh tonnes of oil. The technological stumbling blocks preventing the utilization of oil for edible purposes are many: Firstly, the high free fatty acid content of the oil. This can be minimized by controlling the lipase activity in bran immediately after milling. This process is called stabilization. Secondly, rice bran oil with a high wax content needs to be removed to render the oil fit for culinary use.

The main problem associated with the availability of bran suitable for oil extraction is related to the huller mills which process 40% of paddy produced in the country. CFTRI researches have led to the development of a double pass system and a double huller processing for yielding good quality bran suitable for solvent extraction. Low cost modification of the existing huller mills has been demonstrated.

A breakthrough research conducted at CFTRI has enabled a simplified acid stabilization process of rice bran in addition to the thermal stabilization technique developed earlier to inactivate lipase, a fat-splitting enzyme, to prevent development of free fatty acid which renders the oil unsuitable for edible purposes. Rice bran stabilizers of variable capacities have been developed with built-in safety, simplicity and cost effectiveness to match the efficiency of the CFTRI process. Rice bran stabilization units have been installed at five rice mills in Miryalguda/Mehaboobnagar, an important rice-producing town near Hyderabad and at four rice mills of Food Corporation of India in Tamil Nadu. The rice milling industry has shown its appreciation for the equipment and also conveyed its acceptance.

Rice bran, thus stabilized, is not vulnerable to insect attack. Plant and machinery do not suffer corrosion (contrary to popular belief) according to data from trials carried out by the Institute Scientists. Actually, the corrosion of equipment caused by inherent FFA in conventional oil extraction operation is comparatively higher. Inter-lab studies involving the Central Electrochemical Research Institute, Karaikudi, and the National Metallurgical Laboratory, Jamshedpur, are in progress.

Pelletization trials of chemically stabilized bran have been found to pelletize as easily as raw bran, without any alteration in the commercially processing conditions.

A process for dewaxing of crude rice bran oil with surfactant treatment has been developed and the

scale-up data have been generated.

A test-kit containing reagents to conduct simple and quick tests to check the free fatty acid content level in rice bran and oil has been designed and fabricated at the CFTRI. The test-kit can be used with ease and efficacy by bran suppliers, oil traders and housewives. Tests can be conducted even by unskilled labourers with minimum guidance. The test-kit is made available to the interested parties against payment.

The CFTRI technologies have been made possible to avail toxin-free groundnut oil which is widely sought and produced in the country. Mouldy and fungal contaminated kernels which are normally crushed along with good seeds, affect the quality of both the oil and the cake. CFTRI has developed simple methods for detoxification of commercial unrefined oil, using special filter pads in oil-seeds crushing units and exposing to sunlight at the home level. Chemical treatment of the cake using ammonia or hydrogen peroxide will decrease the aflatoxin content to within permissible limits. The Institute has also demonstrated a preventive method for controlling *Aspergillus flavus* organisms producing aflatoxin by fumigation technique and improved storage systems. The Institute has developed inexpensive and nutritious products based on edible quality groundnut meal.

Soybean, an oil-seed, gradually gaining importance in India, has 20% oil and 40% protein, nearly twice as much protein as in pulses. Currently, the material is being used as a source of edible oil and as such, it is being solvent-extracted and the meal is exported as animal feed. The CFTRI's approach for utilizing soybean is as a pulse extender. An integrated method for producing soybean dal free from beany odour and anti-nutritional factors has been developed by CFTRI. Recipes for utilizing full fat, medium fat and defatted soya flour of edible grade in several traditional Indian foods have been worked out.

Thus, CFTRI has given a new touch to the oil-seeds for their exploitation as not only the source of edible oils but also as sources of high protein foods and many high value products creating new and wider markets for the byproducts of oil industries.

Demonstration of all these proven technologies is being conducted at the Expo and Workshop on Technology of Oil-seeds organised at CFTRI, at the instance of the Technology Mission on Oil-seeds held on 27 and 28 October 1988. (Central Food Technological Research Institute News Services, Mysore 570 013.)