



FOOD AND NUTRITION NEWS

Andhra Pradesh Agricultural University

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FOCUS

Nutritional Importance of Red Palm Oil

The magnitude of imbalance in the nutritional well being of diverse population in developing countries is eternal, and continually demands answers from the science of Food and Nutrition. Undernutrition, especially with respect to micro-nutrients, is a problem that persists in developing countries inspite of rapid leaps and bounds in the production of food grains and food availability. Tackling the problem of micronutrient malnutrition involves making use of all available natural resources which are abundant in vitamins and minerals.

The population of India continues to suffer from micronutrient deficiency on a national scale. Ironically, India can boast of having a wide variety of inexpensive, nutritionally rich foods, being the second largest producer of vegetables and the third largest producer of fruits in the world. Apart from these conventional foods, there is also a need to simultaneously exploit unconven-

tional food sources due to the ever expanding population and their increasing needs for combating micro-nutrient deficiencies.

Among the variety of unconventional foods available in India, Red Palm Oil (RPO) extracted from the mesocarp of the Oil Palm fruit has been creating excitement among nutritionists due to its excellent nutritional value. Apart from being a source of energy like any other edible oil, it is one of the richest natural sources of two important vitamins, namely, β -carotene and Vitamin E. β -carotene is the most active precursor of Vitamin A in the biological system, hence RPO can serve as an excellent vehicle for combating Vitamin A deficiency. In addition, both carotenes and Vitamin E are powerful antioxidants which have also been implicated in keeping the dreadful malaise - Cancer - at bay. *RPO contains 500-700 μ g/g of carotenes and 1000 μ g/g of tocopherols and tocotrienols (Vitamin E).*

Oil Palm in India

Oil palm cultivation was taken up in India to bridge the demand - supply gap of edible oils as it has a high yield of 4-5 tonnes of oil per hectare. The potential for its cultivation in India is 7.0 lakh hectares. To date, an area of 8800 hectares in Andhra Pradesh, 3600 hectares in Tamil Nadu and 3000 hectares in Kerala, have been planted with Oil Palms. If the entire potential were to be utilized it would be possible to yield 6.75 lakh tonnes of Red Palm oil by 2007 A.D, making a tremendous impact on the vegetable oil production in India.

Considering its excellent nutritional value, it is important that RPO be utilized as an edible oil as such, rather than subjecting it to refining. Refined, bleached and deodourised palmolein Oil (RBDPO) which India is currently importing from Malaysia and distributing through Public Distribution System (PDS), is devoid of caro-

tenes, as they are bleached and removed during the refining process. *The Indian produce of RPO need not be subjected to refining and diverted to the urban consumer market, as there is no dearth of other super-refined, crystal clear vegetable oils for catering to the needs of the sophisticated urban palate.* The entire produce of approximately one million tons of RPO per year would theoretically yield around 400-500 tonnes of carotenoids annually. If it were to be made available to the large section of vulnerable vitamin A deficient population belonging to the lower income groups, the whole problem of vitamin A malnutrition would cease to exist.

Is it safe to consume unrefined RPO?

RPO has hitherto been used as an edible oil only in some West African Countries. It will be a novel experience for the Indian population to consume a dark orange coloured edible oil with a strong fruity odour.

Experimental evidence indicates that RPO is a safe edible oil. Animals fed RPO exhibited no abnormalities in growth, reproductive performance and organ weights, no histopathological abnormalities or teratogenicity. These observations were made in three generations of albino rats continuously fed RPO, and were comparable to groundnut oil (GNO) and RBDPO fed animals.

Repeatedly heated oils, especially those rich in hydrocarbon compounds like carotenoids, may tend to form oxidised compounds which might create harm to the biological system. Nevertheless, RPO heated for 6, 12, 18, and 24 hrs, as well as food products prepared with RPO, did not produce any mutagenicity in the Ames bacterial system, further indicating its safety for human consumption.

RPO and Cardiovascular risk

Palm oil has recently come under criticism in the developed countries as an unsafe, cholesterol raising edible oil, because of its high saturated fatty acid (SFA) content of around 50%. However, what has not been highlighted is the fact that it also contains about 40% of mono unsaturated fatty acids (MUFA), which have neutral effects on serum lipids, as well as 10% of polyunsaturated fatty acids (PUFA) which are known for their cholesterol lowering properties. Moreover, ample evidence has cropped up all over the world to establish it as hypocholesterolemic and antithrombotic. In addition, Palm oil is one of the richest natural sources of tocotrienols, which are unsaturated analogs of tocopherols, and are known to have an inhibiting effect on cholesterol biosynthesis.

Studies in experimental animals have indicated that RPO and RBDPO reduce the level of the enzyme 3-hydroxy, 3-methyl, glutaryl CoA reductase (HMG-CoA reductase) in hepatic cell microsomes. This is the rate-limiting enzyme in endogenous cholesterol synthesis. *Consequently, RPO and RBDPO fed rats exhibited lower levels of total serum cholesterol, triglycerides, LDL-Cholesterol and higher levels of HDL-cholesterol in comparison with GNO fed animals. This pattern indicates a favourable lipid profile with reduced risk of cardiovascular disease.*

Culinary aspects of RPO

RPO blends well with Indian curries, pickles and other preparations, and has been found to be acceptable as a cooking oil due to its natural colouring matter. It imparts the colour of turmeric to food preparations.

Carotene content of food products prepared with RPO was found to be stable, retaining around 70-90% in a range of Indian preparations. However, it is not advisable for deep fat frying as carotenes are degraded upon continuous heating, forming an undesirable dark brown colour.

RPO and Vitamin A status

Long term strategy to improve vitamin A status of population should depend on the use of natural food sources of carotenes. Since RPO contains 500-700µg/g of carotenes, its distribution would serve as an ideal prophylactic approach in combating vitamin A deficiency. The current practice of administration of massive doses of synthetic vitamin A palmitate in six-monthly doses to children between 1-5 years, cannot be used exclusively as a long term measure due to various limitations and logistic problems.

A study was conducted in two groups of school children having initially low serum vitamin A levels to evaluate the efficacy of RPO in improving vitamin A status. Each group was supplemented with either 600µg of vitamin A drops daily or 2400µg of β-carotene from an RPO snack (Suji halwa) as per the RDA. In both groups, serum vitamin 'A' levels increased two-fold from basal levels. When the efficacy of daily RPO supplementation was compared with massive doses of synthetic Vitamin A in another group of pre-school children, it was found to be equally efficient in maintaining adequate serum Vitamin A levels. Morbidity pattern also reduced in comparison with children who received massive doses.

RPO was also found to have a protective effect similar to massive dose group of children, by building up liver stores and maintaining adequate status for six months. One month daily supplementation of 2400µg β-carotene from an RPO snack sufficed to maintain normal levels even six months after supplementation ceased. *Hence, periodic bouts of RPO feeding will sufficiently maintain adequate vitamin A nutritional status by keeping the liver well stocked with Vitamin A, without the need for continuous inclusion in the diet.*

RPO as an anti-carcinogen

Carotenoids in RPO can also serve as powerful antioxidants and anticancer agents. Some activating and detoxify-

ing enzymes involved in metabolism of harmful compounds have been studied in RPO fed animals and compared with GNO and RBDPO controls. Enzymes of Phase I like Aminopyrine N-demethylase, Ethoxyresorufin-o-deethylase, and total cytochrome P-450 which activate and metabolize harmful drugs and carcinogens, remained uninduced on RPO feeding. However, the two Phase II detoxifying enzymes, glutathione-S-transferase and uridine diphosphoglucuronyl-transferase were significantly induced in RPO fed animals, in comparison with GNO and RBDPO fed rats.

Reduced glutathione content was also higher in RPO fed rats. Glu-

tathione conjugates with carcinogens and inactivates them, hence increased levels, of both glutathione and the phase II enzymes, affords protection from chemical carcinogenesis. RPO carotenes were also found to reduce the number of tumours in Benzo- (a) pyrene fed animals in another study.

Hence, keeping in view the myriad beneficial effects of RPO, efforts of nutritionists should be directed towards popularisation of its use in daily cooking, as well as preventing its diversion for production of vanaspathi and RBDPO for the overfed urban consumer.

ANNOUNCEMENT

A short course on RECENT DEVELOPMENTS IN THERAPEUTIC NUTRITION is to be held from 1st to 20th February 1996, by the Centre of Advanced Studies, Department of Foods & Nutrition, Postgraduate and Research Centre, College of Home Science A.P. Agricultural University, Hyderabad. Free boarding and Lodging will be provided. Nominations from State Agricultural University teachers may be sent to :

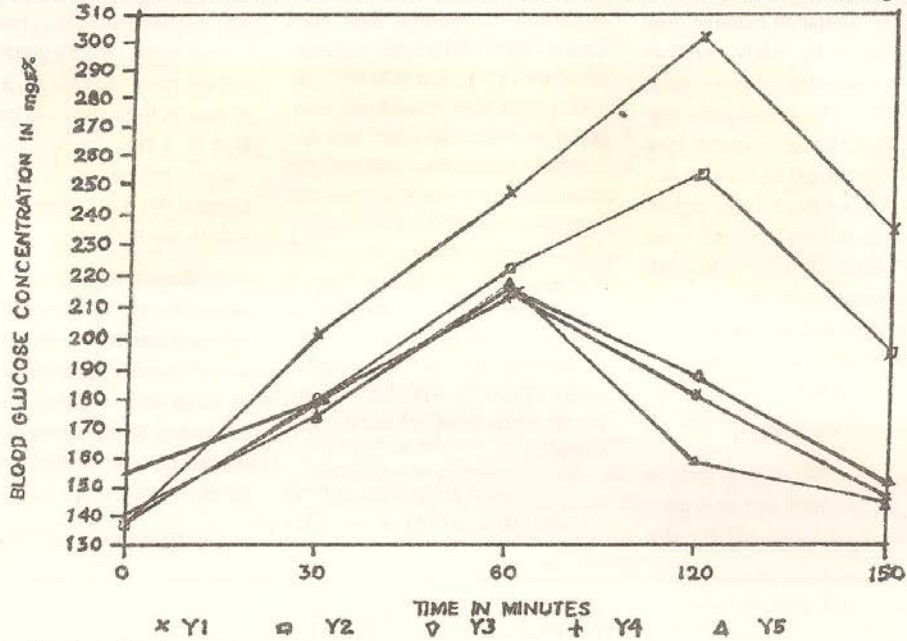
The Director,
Centre of Advanced Studies,
Postgraduate and Research Centre
A.P. Agricultural University
Rajendranagar, 500 030.

Last date for receipt of Nominations : 15-1-1996

Where the mind is without fear
and the head held high
Where words come out from the depth of truth
where tireless striving stretches its arms
towards perfection

- Tagore

VEGETABLE FIBRE AND POST PRANDIAL BLOOD GLUCOSE IN NIDDM SUBJECTS



Y1 = G.T.T. Y2 = Control Diet Y3 = 75g Fibre level Ponnaganni diet Y4 = 75g Fibre level Colocasia leaves diet
 Y5 = 50 g Fibre level Bittergourd diet Y6 = 25g Fibre level Bittergourd diet

Effect of fibre from three commonly consumed vegetables like Ponnaganni, colocasia leaves and bitter gourd, on post prandial glycaemia in Non-insulin dependent diabetes mellitus subjects (NIDDM) revealed that 75g of vegetable fibre significantly reduces blood glucose levels. 25g of bittergourd fibre was equally effective as 75g of Colocasia leaves and Ponnaganni fibre in producing this effect, indicating that bitter principles in bitter gourd may also have a role to play in glucose metabolism.

Source : Sreedevi B and Anurag Chaturvedi, Plant Foods for Human Nutrition 44:71, 1993.

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