

SHORT ARTICLE

Organoleptic Study of Deacidified and Deodourised Palm OilUmesh Kapil¹, Deepika Nayar², T D Sharma³^{1,2}Department of Human Nutrition, All India Institute of Medical Sciences, New Delhi-110029 and ³Health & Family Welfare Training Centre, Kangra, Himachal Pradesh

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Corresponding Author

Address for Correspondence: Umesh Kapil, Department of Human Nutrition, AIIMS, New Delhi-110029

E Mail ID: umeshkapil@gmail.com

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Deficiency of vitamin A has long been identified as a serious and preventable nutritional disorder, associated with increased risk of mortality and morbidity amongst children. The present study was conducted with the objectives (i) to perform organoleptic testing of food products cooked in Deacidified and Deodourised Palm oil (DDPO), by sensory evaluation method and (ii) to compare the characteristics of these food products with the same products cooled in routinely used oil. Eleven commonly used weaning food items were prepared with routinely used oil (Group a). The same recipes were also prepared with DDPO (Group B). A food testing panel conducted with sensory evaluation for assessing the acceptability of the various food items. It was observed that with respect to all characteristics there was no significant difference in the recipes made with the two types of oil. Results indicated that DDPO can be used in India for preparation of weaning foods which are routinely given to young children.

Key Words

Deacidified and Deodourised Palm oil; Acceptability; weaning foods; Vitamin A

Introduction

To combat the vitamin A deficiency problem the Government of India, has been implementing a national programme which provides concentrated supplements of vitamin A to children. However this is only a short term solution, which is not sustainable. The long term prevention of vitamin A deficiency is consumption of vitamin A, or pro vitamin A (in form of Beta-carotene) rich foodstuffs.(2)

Major sources of vitamin A in Indian dietaries are yellow fruits and vegetables, green leafy vegetables, milk and it's products, meat and it's products. Crude palm oil is one of the richest source of carotenoids. The total carotenoid content of crude red palm oil is 500mcg/g out of which 310mcg/g is Beta carotene. This is the only vegetable oil with vitamin A activity equivalent to that of cod liver oil and approximately 10 times greater than that of butter.(3)

Government of India has been encouraging the cultivation of oil palm trees.4 Indian oil palm trees

are reported to contain 700ppm of carotene, which compares favorably with varieties grown in Malaysia.5 The Regional Research Laboratory, Trivandrum, India has developed an indigenous technology for the production of edible raw palm oil.(6)

Studies undertaken by National Institute of Nutrition (NIN), Hyderabad have proved the stability of carotenoids of crude red palm oil (CRPO) to heat and oxidation. Palm oil with its moderate linoleic acid content, low levels of linolenic acid and high levels of natural antioxidants (vitamin E) has been found suitable for direct use in most frying applications.7 It has been reported that CRPO is devoid of any mutagens, aflatoxins and nitrosoamines.5,7 Crude palm oil is easily absorbed and is well digested, hence can be readily given to young children as a dietary supplement.8 NIN had also evaluated the foods cooked in CRPO which revealed that CRPO did not have a favourable appearance due to it's red colour, although the food items prepared were fairly accepted. However, CRPO in combination with other

oils yielded better results. Proportion of 6-12% of palm oil blended with any other oil was found palatable and was without any objectionable taste and smell.⁹

Palm Oil Research Institute of Malaysia (PORIM) has recently developed a technology to produce deacidified and deodourised palm oil (DDPO), by refining the crude palm oil, without destroying its vitamin A activity. About 70% of Beta-carotene contents are retained in DDPO after processing.⁷ Palm oil Promotion Council has tried various recipes with DDPO and have reported successful results.^{9,10} The DDPO is being marketed to different countries for routine consumption. Presently DDPO is not available commercially in India, but in the future after the transfer of technology, DDPO can be produced in the country.

Aims & Objectives

1. To perform organoleptic testing of food products cooked in DDPO by sensory evaluation.
2. To compare the characteristics of these food products with the same food products cooked in routinely used oil.

Material and Methods

Eleven commonly utilized weaning foods were prepared using DDPO. A range of sweet and savoury food items were prepared by different methods of cooking such as deep frying, shallow frying, sautéing ([Appendix I](#)). The list of food products that were included in the study were as follows:

1. Deep fried:
 - a. Dal stuffed poori
 - b. Namak para
 - c. Salted Mathri
 - d. Sweet Mathri
2. Shallow fried
 - a. Omlette
 - b. Paratha (Potato stuffed)
 - c. Besan Ladoo
3. Sautéed
 - a. Panjeeri
 - b. Khichri
 - c. Chana Fried

The weaning foods cooked in the routinely used oil were coded as sample A and the same weaning food cooked in DDPO were coded as sample B.

Sensory evaluation was conducted to assess the acceptability of the food items by a food testing panel which comprised of 24 mothers. Members of this panel had similar socio-cultural background and

food habits. They were provided with the criteria for rating the food samples. The members were unaware of the type of oil used for the preparation of sample A and B. Sight taste and flavor test was undertaken to evaluate the product. The characteristics studied were:

(i) Colour, (ii) Appearance, (iii) Taste, (iv) Mouth feel (v) Odour, (vi) Greasiness, (vii) After taste (if any) Hedonic scale was utilized to ascertain the acceptability, and scores given for the above characteristics were poor-1, fair -2, good-3, very good-4, excellent-5.

The scores given by food testing panel for the food items were tabulated to determine the acceptability of DDPO for cooking of the common weaning foods.

Results

The acceptability of various recipes according to different characteristics prepared utilizing routine use oil and DDPO are highlighted in Table 1 and Table 2, respectively. The recipes were graded as (i) highly acceptable, (ii) acceptable and (iii) not acceptable. Results revealed that 59% of the recipes prepared with routine oil were graded acceptable in terms of colour. In terms of mouth feel, 27% of the food items made with DDPO and 28% made with routine oil were found to be highly acceptable. Results also showed that nearly 56% of the food items cooked in DDPO.

Conclusion

It was observed that with respect to all characteristics there was no significant difference in the recipes made with the two types of oil.

The findings of the present study highlight that DDPO can be used in India for the preparation of weaning foods which are commonly given to young children. However, there is a need to assess the feasibility of DDPO in the locally prepared supplementary food provided in the National Supplementary Feeding Programmes in order to benefit millions of beneficiaries with vitamin A.

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Tables

TABLE 1 ACCEPTABILITY OF VARIOUS RECIPES ACCORDING TO THE DIFFERENT CHARACTERISTICS

Organoleptic Characteristics	Food items prepare with routine oil		
	Highly acceptable	Acceptable	Not acceptable
Colour	96 (36.4)	148 (56)	20 (7.6)
Taste	88 (33.3)	140 (53)	36 (13.7)
Appearance	77 (29.2)	167 (63.3)	20 (7.7)
Mouth feel	75 (28.5)	137 (51.8)	52 (19.7)
Odour	73 (27.6)	163 (61.7)	28 (10.7)
Greasiness	79 (29.9)	150 (56.8)	35 (13.3)
After taste	100 (37.8)	132 (50.0)	32 (12.2)

**Figures in parenthesis show percentages*

TABLE 2 ACCEPTABILITY OF VARIOUS RECIPES ACCORDING TO THE DIFFERENT CHARACTERISTICS

Organoleptic Characteristics	Food items prepare with DDPO		
	Highly acceptable	Acceptable	Not acceptable
Colour	79 (29.9)	156 (59.2)	29 (10.9)
Taste	82 (31.4)	147 (55.6)	35 (13.3)
Appearance	74 (28.1)	166 (62.8)	24 (9.1)
Mouthfeel	72 (27.3)	148 (56.0)	44 (16.7)
Odour	70 (26.5)	148 (56.1)	46 (17.4)
Greasiness	76 (28.8)	155 (58.7)	33 (12.51)
After taste	85 (32.2)	147 (55.7)	32 (12.1)

TABLE 3 ACCEPTABILITY OF VARIOUS RECIPES PREPARED WITH RED PALM OIL AND ROUTINE OIL

RECIPE	I			II		
	HA	A	PA	HA	A	PA
Dal Puri	8 (33)	15 (62)	1 (4)	10 (41)	13 (54)	1 (4)
Namak Para	7 (29)	16 (66)	1 (4)	4 (16)	16 (66)	4 (16)
Salted mathri	14 (58)	9 (37)	1 (4)	3 (12)	12 (50)	9 (37)
Paratha (potato)	6 (25)	15 (62)	3 (12)	10 (41)	13 (54)	1 (4)
Suji Halwa	2 (8)	16 (66)	6 (25)	4 (16)	16 (66)	4 (16)
Besan Ladoo	6 (25)	14 (58)	4 (16)	5 (20)	15 (62)	4 (16)
Khichdi	8 (33)	15 (62)	1 (4)	10 (41)	13 (54)	1 (4)
Sweet mathri	17 (70)	7 (29)	0 (0)	3 (12)	18 (75)	3 (12)
Omlette	11 (45)	9 (37)	4 (16)	15 (62)	8 (33)	1 (4)
Panjeeri	1 (4)	11 (45)	12 (50)	5 (20)	13 (54)	6 (25)
Channa fried	2 (8)	20 (83)	2 (8)	7 (29)	16 (66)	1 (4)

I= recipes prepared with routine oil; II = Recipes prepared with palm oil; HA = Highly acceptable; A = Acceptable; PA = Poorly acceptable. Figures in parenthesis show %

Appendix 1

DAL Stuffed Porri: A preparation made of wheat flour, boiled pulse and salt rolled into a thin flat round shape and deep fried.

Namak Para: A savoury made of refined wheat flour which is cut into different shapes (squares, diamonds etc.) and deep fried.

Salted Mathari: A savoury made of refined wheat flour which is rolled into a thick flat round shape and deep fried.

Sweet Mathari: A sweet preparation made of refined wheat flour which is rolled into a thick flat round shape and deep fried.

Paratha (potato stuffed): A preparation made of wheat flour, potato and salt which is rolled into a medium thick flat round shape and shallow fried.

Suji Halwa: A shallow fried semi solid preparation made of roasted semolina and sugar.

Besan Ladoo: A shallow fired sweet preparation made of roasted Bengal gram powder and sugar and made into round balls.

Panjeeri: A sauted sweet preparation made of roasted wheat flour and sugar.

Khichri: A sauted semi solid savoury preparation made with a mixture of rice and pluse generally in the ratio of 4:1