

# Incorporation of carrot powder with refined wheat flour for the preparation of bread and its evaluation

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■ **ABSTRACT** : Carrot is one of the important root vegetables rich in bioactive compounds like carotenoids and dietary fibres with appreciable levels of several other functional components having significant health-promoting properties. Bread is major fermented and baked food products commonly consumed by large number of people. Carrots are nutritionally rich because it contains large amount of essential nutrients, which are helpful in growth, development and beneficial for preventing diseases. Incorporation of carrot powder with refined flour in bread increase the several nutrients; vitamins, especially vitamin A ( $\beta$ -carotene), fibre and minerals. Carrots offer an effective way to produce value added products. The objectives of incorporation of carrot powder with refined flour is to make low cost food and consumed by large no of people and also easily available and have many health benefits. In present study, a systematic approach was followed to develop and standardize the process for the preparation of carrot products. Sun drying method was selected to prepare carrot powder (for drying). Carrot powder incorporated food products was in percentage 10 per cent, 20 per cent and 30 per cent in refined flour 90 per cent, 80 per cent and 70 per cent making total percentage 100 per cent of each product and evaluated for sensory characteristics using nine point hedonic scale and numerical scoring method and crude fibre were also analysed.

■ **KEY WORDS** : Fermented, Baked, Carrot powder, Hedonic scale

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Carrot is the excellent source of a carotene and other vitamins. The carrot is utilized as raw, cooked vegetable, sweet meats or as juice and beverages. Carrot (*Daucus carota* L.) is one of the important nutritious root vegetables. It is richest source of  $\beta$ -carotene precursor of vitamin A. Fresh carrot on an average contains (g/100g) 86 per cent moisture, 0.9g protein, 0.2 g fat, 1.1g total minerals, 1.2g crude fibre, 10.6 g carbohydrates, 48 kcal energy, 1890 $\mu$ g  $\beta$ -carotene, 0.08  $\mu$ g calcium, 0.5  $\mu$ g phosphorus and 0.001  $\mu$ g iron (Gopalan *et al.*, 2007). Bakery product bread is fast and convenient food based on wheat. There are many varieties of bakery products depending upon the local demand like rusk, cookie, whole flour bread, brown bread, bread fortified with vitamins and minerals, milk bread and bread for diabetic patients. Its consumption is more in cities and towns where industrial working group population

is more (Kumar and Kumar, 2011). Bakery products consumption is increasing day by day and these are being increasingly used for various feeding programs for children managed by voluntary agencies and State Departments of Health. Bread, which constitute an important item of bakery industry have now become a common item of consumption among all classes of people as breakfast and snacks. In recent years the consumption of carrot and its related products has increased steadily due to the recognition of antioxidant and anticancer activities of  $\beta$ -carotene in carrot, which is also a precursor of vitamin A. Carotenoids are important micronutrients for human health (Castermiller and West, 1998). Carrot powder and refined wheat flour bread one by-product of carrot. Dried carrot powder were incorporated with refined wheat flour at different percentage for the development of bread at the depending upon local demand.

Its consumption is more in cities and towns where industrial working group population is more. Incorporation of carrot powder with the refined wheat flour in different quantities will improve nutrient quality of cereal based products without causing significant deference in the acceptability of the developed product. It was observed at nine point hedonic scale (Srilakshmi, 2009) with different attributes and also crude fibre evaluation were done (AOAC, 2006).

The present study was carried out to find out the effect of addition of different proportion of carrot powder in refined wheat flour on characteristics texture, colour, mouth feel, flavour and overall acceptability and crude fibre of the developed product bread.

**RESEARCH METHODS**

*Preparation of bread:*

Sample were prepared, using straight dough method (Srilakshmi, 2009), for making bread. Ingredients were used in preparation of bread refined wheat flour, carrot powder, sugar, salt, yeast and fat (vanaspati ghee). Four dough were prepared with the incorporation of refined wheat flour and carrot powder in the ratio 100g wheat flour (control), 90:10 (refined wheat flour and carrot powder), 80:20 (refined wheat flour and carrot powder) and 70:30 (refined wheat flour and carrot powder). These each samples were prepared at amount 100g. Carrot powder were prepared by the sun drying method for the 8-9 hours and powder was prepared by the use of grinder.

The bread dough was prepared after sieving the refined wheat flour and carrot powder. The carrot powder bread dough was fermented with the help of yeast at the 27°C for 1-2 hour. After that the dough was kneaded by hand to remove gas (knock back) allowed to rise again till the bulk was double. Dough was placed into the mould and again was allowed to prove at a 38-48°C for 45-60 min and baked at 220°C for 25-30 minutes. The bread after cooling at room temperature was cut, packed and evaluated for all different quality parameters.

*Analysis of sensory characteristics:*

Sensory characteristics of bread were evaluated for its different sensory attributes by a group of 5- 10 panellists. Sensory attributes like appearance and colour, texture, odour, flavour taste (mouthfeel) and overall acceptability for all

bread samples were assessed using nine point hedonic scale was in following sequence: like extremely-9, like very much-8, like moderately-7, like slightly-6, neither like nor dislike-5, dislike slightly-4, dislike moderately-3, dislike very much-2, dislike extremely-1 (Indian standard, 1971).

*Statistical analysis:*

The mean scores were analysed using student t test (Fishur's t test) method, the organoleptic evaluation of different attributes of samples was done by the statistical method:

$$t\text{-test} = \frac{\bar{x} - \bar{y}}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

where,

$$\bar{x} = \frac{\sum xi}{N} = \text{Mean of first sample}$$

$$S = \frac{1}{n_1+n_2-2} \sqrt{\sum (x_i - \bar{x})^2 + \sum (y_i - \bar{y})^2}$$

**Nutrient analysis:**

Crude fibre of incorporated bread was analysed by crude fibre estimation method.

$$\text{Crude fibre per cent by wt} = \frac{(w_1 - w_2) \times 100}{w}$$

where,

W<sub>1</sub> = Weight in gram of gooch crucible and contents before ashing.

W<sub>2</sub> = Weight in gram of gooch crucible containing asbestos and ash.

W = Weight in gram of the dried material taken for the test.

**RESEARCH FINDINGS AND DISCUSSION**

The results of the present study as well as relevant discussions have been presented under following sub heads:

**Mean organoleptic scores on nine point hedonic scale of the carrot powder bread:**

Table 1 shows mean organoleptic scores for incorporated product (Bread) in different proportion of carrot powder with refined wheat flour. A critical study of

Table : Mean organoleptic scores on nine point hedonic scale of product							
Product		Mean of organoleptic attributes given by ten judges					
Product (Bread)	Samples	Colour	Flavour	Texture	Softness	Mouthfeel	Overall acceptability
	Sample-A	7.9	7.5	8	7.7	7.8	7.8
	Sample-B	7.9	8.5	8.4	8.3	8.1	8.7
	Sample-C	7	8.3	7.3	7.8	6.9	8.6
	Sample-D	7.6	7.7	7.3	6.7	6.6	8.5

data show that overall acceptability of sample B of product was greater than other samples (Bread). All organoleptic attributes were high except colour (equal) of sample B rather than sample A (control) which included 10 per cent of carrot powder with 90 per cent wheat flour.

This Table 2 shows that t-calculated value of samples SB, SC and SD were greater than t-tabulated value but sample B was greater in comparison to other samples. Therefore, Null hypothesis was rejected. It proved that there was significant different between sample B and other samples.

**Table 2 : t- tabulated and t- calculated value for organoleptic attributes overall acceptability of product**

Product (Bread)	Values for overall acceptability organoleptic attribute			
	Samples	Mean value	t- calculated	t- tabulated
SA (Control)		7.8	-	2.1 at 5% level of significance
SB		8.7	2.69	
SC		8.6	2.57	
SD		8.5	2.34	and 18 d.f.

Here only selected sample B and control sample A were analysed. Result shows that the incorporated bread samples included higher amount of fibre rather than the control sample and also included addition of carrot powder which increased fibre content (Table 3).

**Table 3: showing the crude fibre content in bread**

Sr. No.	Product	Sample	Result	Unit
1.	Product (Bread)	Sample A	0.80	g/100g
		Sample B	3.85	g/100g

**Conclusion:**

It was observed that the average score for sensory was from fair to very good. This signifies that carrot powder may be used as a source of dietary fibre and vitamin in refined wheat flour based bread. Incorporated carrot powder with refined wheat flour can be used to improve the nutrient composition of bread hence, the nutritional status of consumers without affecting consumer acceptability.

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**REFERENCES**

AOAC (2006). Specification for weat Atta / I.S.I handbook of food.

**Castermiller, J.J.M. and West, C.E.** (1998). Bioavailability and bioconversion of carotenoids. *Ann. Rev. Nutr.*, **18**:19–38.

**Gopalan, C. Ramasastry, B.V. and Balasubramanian, S.C.** (2007). Nutritive value of Indian foods. Hyderabad: National Institute of Nutrition : 50.

**Kumar, Navneet and Kumar, Kshitij** (2011). Development of carrot pomace and wheat flour based cookies. *J. Pure & Appl. Sci. & Technol.*, **1** : 4-10. Analysis Ref : I.S 1155 ( Part IV) – 1984 page 115).

**Srilakshmi, B.** (2009). *Cereal and cereal products: Food science*: New age international (P.) limited, publishers, chapt, **2**:26-62.

**Srilakshmi, B.** (2009). *Evaluation of food quality : Food science*, New age international (P.) limited, publishers, chapt.13:286-309.

