

# Studies on the development of carrot- brahmi biscuits

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**Abstract**— Biscuits are very popular bakery product which is consumed on large scale in rural as well as urban areas. It is especially liked by children so a good source to provide nutritional and medicinal properties of various natural food such as carrot and brahmi. Carrots are excellent source of dietary fibres. The known phyto- nutrient in carrot is lycopene, antioxidant, alpha, beta, gamma carotenes, zeaxanthin, xanthophylls. Brahmi helps in improving mental performance and increasing learning capacity. It is helpful for increasing mental concentration level. It is also very effective in depression related problems. Brahmi is useful for improving mental clarity, confidence and memory recall. Hence in the present investigation carrot powder is prepared and efforts are made to develop a biscuits by incorporation of carrot and brahmi powder. Three samples are prepared of biscuit by replacing maida with 20% carrot powder and 0.5%, 1% and 1.5% brahmi powder. Overall acceptability of these samples 6% to 8.2%.

**Key words:** Carrot powder, Brahmi powder, Biscuits

## INTRODUCTION

Biscuits are very popular bakery product which is consumed on large scale in rural as well as urban areas. It is especially liked by children so it can be a good source to provide nutritional and medicinal properties of various natural food such as carrot and brahmi. The carrot (*Daucus carota*) belongs to family Apiaceae is a root vegetable. It is good source of thiamine, niacin, vitamin B6, protein. Carrots are excellent source of dietary fibres. The known phyto- nutrient in carrot is lycopene, antioxidant, alpha, beta, gamma carotenes, zeaxanthin, xanthophylls (Edwards, 1986). Carrot is the richest source of  $\beta$ carotene, iron, pectin, dietary fibres, complex carbohydrates and various minerals. Carrot could be consumed raw or in processed form or can be fortified in a variety of food products (Lee et al., 2003). Carrots have been reported to have diuretic, nitrogen balancing properties and are effective in elimination of uric acid. The presence of high concentration of carotenoids especially beta carotene account for biological and medicinal properties of carrot. It has been reported reduced risk of cancer of lung, cervix, oesophagus and stomach (Deshpande et al., 1995).

Brahmi (*Bacopa monnieri*) belongs to family Scrophulariaceae. It helps in improving mental performance and increasing learning capacity. It is helpful for increasing mental concentration level. It has good effects on patients suffering from insomnia. It is also very effective in depression related problems. It helps in rejuvenating lost energies and makes to feel good and relaxed. It helps in maintain blood pressure to the normal level. Brahmi is useful for improving mental clarity, confidence and memory recall. So it has been widely used by students (Sharma, 1987).

Hence the present investigation was undertaken to develop the innovative bakery product by incorporating health benefits of carrots and brahmi and to study their organoleptic acceptability.

## METHODOLOGY

### **Ingredients:**

Carrot is purchased from local market and dried to prepare carrot powder. Brahmi powder is directly procured from market. The ingredients used in biscuit were refined wheat flour i.e. maida, salt, sugar baking powder, margarine, milk powder are purchased from local market.

### **Packaging Material:**

Polyethylene bags were used to pack biscuit samples.

### **Equipments:**

Equipment such as grinder, dough kneader, cutter, baking oven, and slicer were used for making carrot paste and biscuit.

### **Methods:**

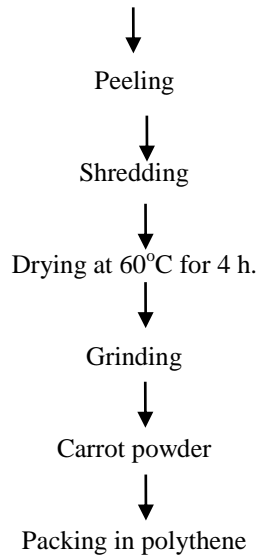
#### **Preparation of carrot powder:**

Good quality carrot were selected from market. They were cleaned with water to remove any adhering soil, dirt and dust. Peeling of carrot is carried out. Then these were shredded and dried at 60°C for 4 hr. Dried shreds are ground to get powder.

Selection of good quality carrot

Selection of good quality carrot





**Fig 1: Flowchart of preparation of carrot powder**

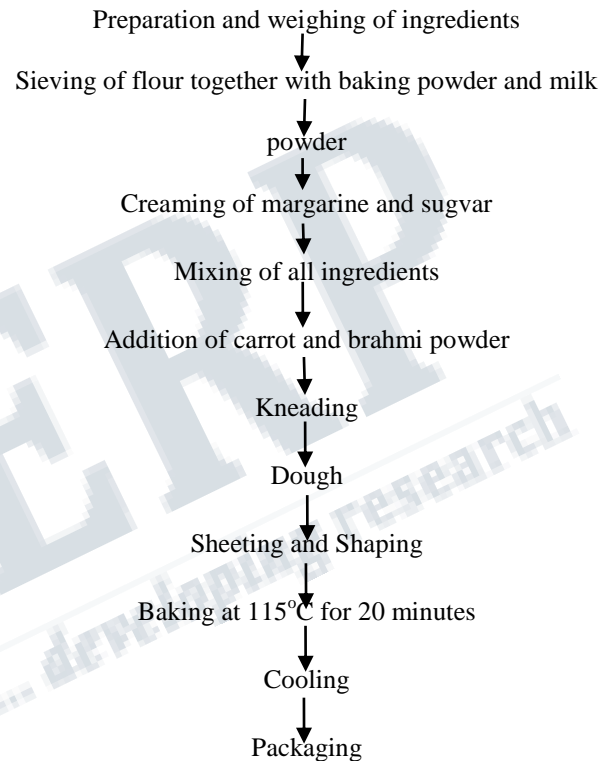
**Preparation of biscuits:**

Biscuits were prepared by using the method given by Khetarpaul (2005). All the ingredients such as carrot, brahmi, wheat flour, sugar, margarine, baking powder, milk powder were weighed according to its recipe as shown in table no.1. Dry ingredients were sieved to remove any impurity. Margarine and sugar were creamed together then all ingredients along with brahmi and carrot powder were added. Dough was prepared by kneading. Then dough was rolled to form sheet and cut into desired size and shape. Then baking of mould pieces was carried out at 115oC for 20 minutes. After baking pieces were allowed to cool and packed. Three types of biscuits were prepared by replacing refined wheat flour with 20% carrot and 0.5%, 1%, 1.5% brahmi powder . Other ingredients added are sugar (25%), margarine(40%), baking powder(0.5%), milk powder(1%).

**Table No. 1: Recipe for preparation of biscuit samples**

Ingredient	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
Wheat Flour (g)	100	79.5	79	78.5
Carrot Powder (g)	-	20	20	20
Brahmi Powder (g)	-	0.5	1	1.5
Sugar (g)	25	25	25	25

Margarine (g)	40	40	40	40
Baking Powder (g)	0.5	0.5	0.5	0.5
Milk powder (g)	1	1	1	1



**Fig 2: Flowchart of carrot brahmi biscuit**

**Determination of physical properties:**

**Length and diameter**

Length and diameter of randomly selected 10 carrots were measured by using vernier caliper and average value was recorded.

**Edible index**

Edible index of garlic, chilli and ginger were calculated. Edible index is the ratio of edible part (W<sub>2</sub>) to total weight (W<sub>1</sub>) multiplied by 100.

$$\text{Edible Index (\%)} = \frac{W_2}{W_1} \times 100$$

**Waste index**

Waste index of garlic, chilli and ginger were calculated. Waste index is the ratio of waste part ( $W_2$ ) to total weight ( $W_1$ ) multiplied by 100.

$$\text{Waste Index (\%)} = \frac{W_2}{W_1} \times 100$$

**Determination of chemical composition:**

**Determination of moisture**

The moisture content was determined by AOAC (1990). The sample of 5gm (fresh) were cut and dried in an oven at 100oC to constant weight. After cooling in the desiccators, the sample was weighed again. The loss in weight was recorded as moisture content.

$$\text{Moisture (\%)} = \frac{W_1 - W_2}{W_1} \times 100$$

Where,

$W_1$  = Weight of wet sample  
 $W_2$  = Weight of dry sample

**Determination of fat:**

Fat was estimated by using Soxhlet apparatus method given in Ranganna (2005).

$$\text{Crude Fat (\%)} = \frac{\text{Weight of ether soluble material}}{\text{Weight of sample}} \times 100$$

**Determination of protein content**

The protein content was estimated by using micro-kjeldahl method (Ranganna, 2005).

$$\text{Nitrogen (\%)} = \frac{(\text{Sample titre} - \text{Blank titre}) \times \text{Normality of HCL} \times 14 \times 100}{\text{Weight of sample} \times 1000}$$

$$\text{Protein content (\%)} = \text{Nitrogen (\%)} \times 6.25$$

**Determination of carbohydrate**

For determination of carbohydrate Anthrone method was used (Ranganna, 2005).

**Determination of total ash**

Total ash content of sample (fresh) was estimated by using direct-heating method of muffle furnace (Ranganna, 2005).

Weight of ash

$$\text{Ash (\%)} = \frac{\text{Weight of ash}}{\text{Weight of sample}} \times 100$$

**Determination of crude fibre content:**

**Organoleptic evaluation:**

The organoleptic evaluation in respect of colour, flavor, texture, taste & overall acceptability was evaluated by semi-trained judges using nine point hedonic scales. (Amerine et al., 1965). The sample of biscuits scored more was analyzed for chemical parameters.

**RESULT AND DISSCUSSION**

**Physico-chemical properties of carrot**

The data on physic-chemical composition of carrot presented in table 2. The physical properties of carrot indicates average weight was 750 gm , average diameter 5 cm, average length 12 cm. The chemical composition of carrot obtained on analysis were 80.5% moisture, 10.7% carbohydrate, 1.92% fat, 1.5% protein, 1.33% fibre and 0.9% ash content.

**Table 2: Physico-chemical properties of carrot**

Parameter	Value
Average weight	750g
Average diameter	5 cm
Average length	12 cm
Colour	Orange
Moisture	80.5%
Carbohydrate	10.7%
Fat	1.92%
Protein	1.5%
Fibre	1.33%
Ash	0.9%

\*Each value is average of three determination

**Chemical composition of carrot powder**

Chemical composition of fresh carrot was determined. It is represented in Table 3. Data indicates that the moisture content of carrot powder was 9.18%, ash 6.1% whereas the protein content was 5.15% and fat was about 2.03%. The crude fibre content found was high i.e. 21.34%.

**Table 3: Chemical composition of carrot powder**

Parameter	Value
Moisture	9.18%
Ash	6.1%
Protein	5.15%
Fat	2.03%
Crude fibre	21.34%

\*Each value is average of three determination

**Sensory evaluation of biscuits:**

The biscuits prepared by using 20% carrot powder and 0.5%, 1%, 1.5% brahmi powder. The control sample was also prepared without any replacement of refined wheat flour. These samples were evaluated for sensory properties by using 9 – point hedonic scale by 10 panel members and results are tabulated in table 4.. The results showed that S2 had good colour among experimental samples. Texture and taste scores of S2 better than other two samples. Overall acceptability of S2 is superior than S1 and S3. The organoleptic score of biscuit containing 20% carrot powder and 1% brahmi powder was more among all the level of incorporation of brahmi powder (0.5% and 1.5%).

**Table 4: Sensory evaluation of prepared biscuit samples**

Sample	Colour	Texture	Taste	Flavour	Overall acceptability
S <sub>0</sub>	8.9	7.2	8	8.4	8
S <sub>1</sub>	6.8	7	6	6	6.7
S <sub>2</sub>	7.6	8.2	9	7	8.2
S <sub>3</sub>	6	7	7.4	6.2	6

\*Each value is average of ten observations.

**Chemical analysis of biscuit samples**

Chemical analysis of prepared biscuit samples were performed. Results obtained were recorded in table 5. Moisture content was highest in S3. Protein content is in range of 4.53% to 6.82%. Crude fibre content is in range of 0.52% to 1.91% incorporation of carrot powder and brahmi powder. Carbohydrate content of prepared samples is varied

from 60.61% to 65.15%. Fat and ash content varied from 21.05 % to 22.78% and 0.79% to 1.81% respectively.

**Table 5: Chemical composition of prepared biscuit samples**

Sr.No	Parameters	S0	S1	S2	S3
1	Moisture (%)	2.73	3.12	3.18	3.21
2	Protein (%)	6.82	4.53	4.57	4.64
3	Crude Fibre (%)	0.52	1.32	1.58	1.91
4	Carbohydrate (%)	65.15	62.23	61.05	60.61
5	Fat (%)	22.78	21.97	21.54	21.05
6	Ash (%)	0.79	1.61	1.75	1.81

Each value is average of three determinations.

### CONCLUSION

An investigation was undertaken to study effect of incorporation of carrot and brahmi powder in biscuit. Three types of biscuits were prepared by replacing refined wheat flour with 20% carrot powder and 0.5%, 1%, 1.5% brahmi powder. The sensory score of biscuit prepared by 20% carrot powder and 1% brahmi powder was found to be rated high as compared to the other levels of carrot and brahmi powder. Hence, it is concluded that the biscuit prepared by using 20% carrot powder and 1% brahmi powder was found to be more acceptable without affecting the sensory attributes.

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