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## Utilization of coarse grains and millet in preparation of ready to eat snack (Cookies)

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**Abstract**

Ready-to-eat (RTE) foods are foods intended to be consumed as they are. These foods do not require additional cooking and are usually stored in refrigeration or at room temperature. So, the main aim of this study is to make cookies more nutritious by incorporating alternative ingredients like wheat flour, pearl millet flour, oats flour and coriander and fenugreek leaves powder. The present study was under taken with the following objectives – to develop ready to eat snacks with incorporation of coarse grains and millet, as well as to assess the sensory quality of the prepared value added snack, and to determine the nutrient content and cost of the prepared snack. The prepared product was cookies with incorporation level of wheat flour, pearl millet, oats and green leaf powder (coriander and fenugreek leaf). The leaf powder was dehydrated and chemical analysis were done by using AOAC 1990 standard procedure for vitamin, iron, total carotene. Sensory evaluation of prepared products was done by using 9 points Hedonic scale. On the basis of sensory evaluation by 9 points Hedonic Scale it was observed that 60 percent wheat flour, 20 percent pearl millet, 15 percent oats and 5 percent green leaf powder (coriander and fenugreek leaf) (T<sub>3</sub>) was most acceptable in almost all the parameters like colour, texture, taste, flavour and overall acceptability. Nutrient analysis indicates that highest carbohydrate was found in T<sub>1</sub> (28.086g), protein T<sub>2</sub> (3.805g), Calcium T<sub>1</sub> (14.81mg), fibre T<sub>3</sub> (0.617g), thiamine T<sub>1</sub> (0.068mg), riboflavin T<sub>1</sub> (0.028mg), niacin T<sub>1</sub> (0.671mg), energy T<sub>1</sub> (58.57kcal). Cost of the prepared products per 100g of raw ingredients for cookies was between Rs 26.62- 29.

**Keywords:** Cookies, sensory evaluation, nutrient analysis, cost of the product

**1. Introduction**

Ready-to-eat (RTE) foods are foods intended to be consumed as they are. These foods do not require additional cooking and are usually stored in refrigeration or at room. "Ready-to-eat food" means food that is in a form that is edible without additional preparation [1] RTE foods processors are using natural and organic ingredients, adding new flavour texture, appearance, advertising, a reduction in traditional cooking, fragmentation of family Other factors positively influencing Ready to Eat food demand are rising income level, influence of western countries, more global trade, travelling, convenience in preparation due to lack of time and cost effectiveness.

Pearl millet grain is the staple diet for farm households in the world's poorest countries and among the poorest people. These are especially beneficial to vegetarians who depend on plant food for their protein nourishment. It is reported that cardiovascular diseases, duodenal ulcers and hyperglycemia occurs rarely in regular millet eaters. Oats are generally regarded as a minor cereal crop when considered in terms of grain produced annually, or areas shown for production. Oats have been linked to the health claims attributed to the use of β-glucans and are valuable sources of β -glucans. Oat has recently attracted its research and commercial attention mainly due to its high nutritional value. Oats is a good source of antioxidant vitamin E (tocols) 11, phytic acid, phenolic acid and avenantramides. Oat is well accepted in human nutrition and it is an excellent source of different β-glucan, arabinoxylans and cellulose [2] Oats are mainly eaten as porridge, as an ingredient in breakfast cereals and in baked goods.

**2. Materials and methods**

**2.1 Development of value added snack:** Millets and coarse grains (Oats, Pearl millet and wheat) were utilized in the preparation of snack product like "Cookies" The basic standardised recipe was followed and served as control (T<sub>0</sub>) three treatments i.e incorporated of coarse grains and millets on different levels was refer as T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> respectively of the products.

**2.2 Preparation of leaf powder-**

- Wash the green leafy vegetables i.e coriander and fenugreek leaves.
- Blanch for 3 min with water containing 2% salt & 10% citric acid.

- Drain out with excess water and spread on flat aluminium tray.
- Dry it at 60- 65° for 15 hours and dehydrates till the moisture becomes 6-8%.
- And then grind into powder [3]

**2.3 Experimental design:** The basic recipes were standardized and served as control T<sub>0</sub>, three treatments i.e. incorporation of pearl millet flour, oats and green leaf powder (coriander & fenugreek leaves) at different levels with wheat flour were referred to as T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> respectively for cookies.

**Three treatments were prepared as follows:**

**T<sub>0</sub> (control):** Served as control standardized recipe was followed to prepared cookies.

**T<sub>1</sub>:** 15% pearl millet, 10% Oat and 5% leaf powder were incorporated in 70% of wheat flour.

**T<sub>2</sub>:** 15% of pearl millet, 15% Oats and 5% leaf powder were incorporated in 65% of wheat flour.

**T<sub>3</sub>:** 20% of pearl millet, 15% Oats and 5% leaf powder were incorporated with 60% of wheat flour.

**2.4 Sensory evaluation:** The products on the day of manufacture were evaluated organoleptically by a panel of five judges selected with the help of score cards based on the '9' points Hedonic scale. The products were judge for the qualities such as Colour, Appearance, Texture, Taste & Flavour and Overall acceptability [4].

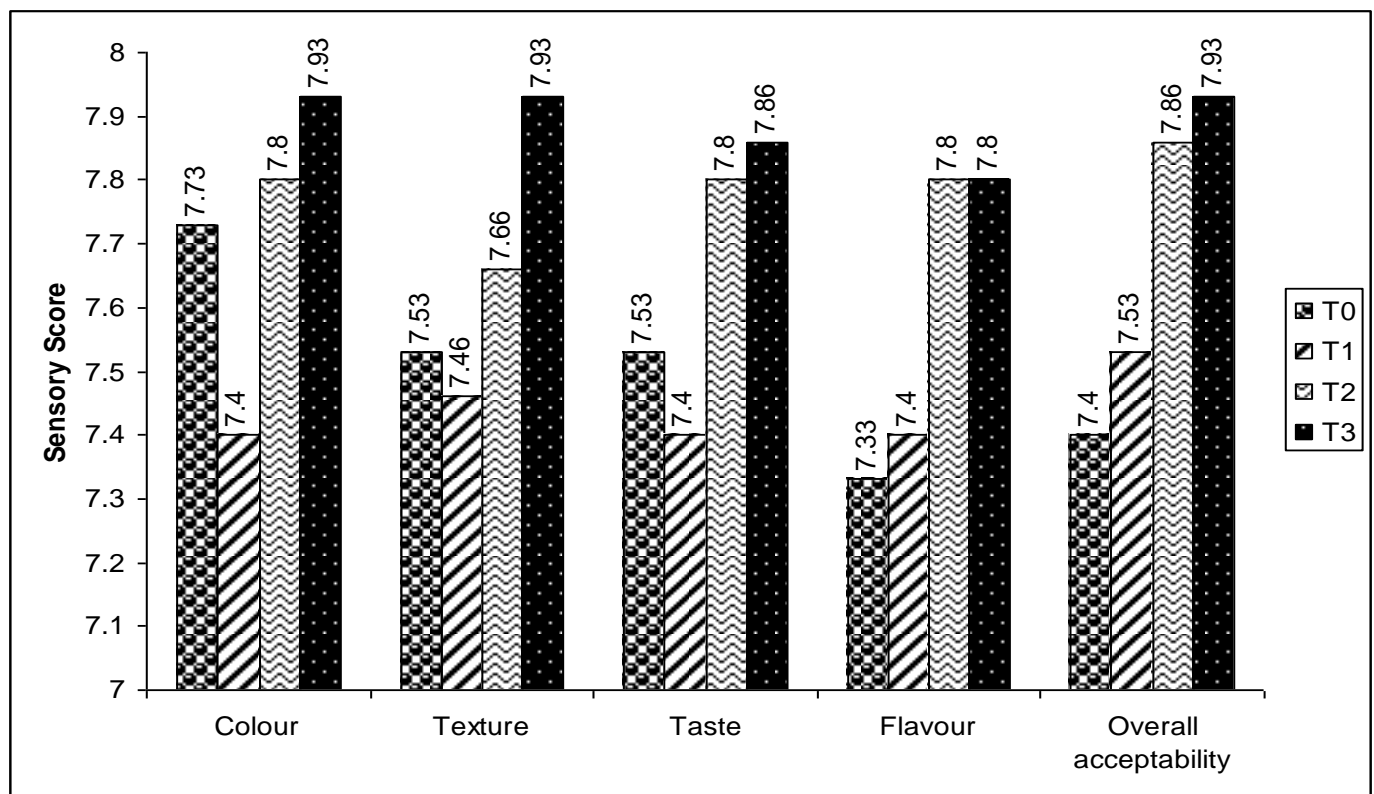
**2.5 Determination of nutritive value of prepared products-** The nutritive value of the prepared products was calculated from the book of Nutritive Value of Indian Food by [5]

**2.6 Cost of prepared products:** The cost of the products was calculated on the basis of price of raw ingredients at rupees/kg.

**2.7 Statistical analysis:** The data obtained was statistically analyzed by using analysis of variance technique two way classification. Significant difference between the treatment was determined by using CD test [6].

### 3. Results and discussion

#### 3.1 Average sensory scores of cookies prepared by incorporation of pearl millet, oats and green leaf powder (coriander & fenugreek leaf).



The mean sensory scores of cookies in relation to colour indicates that T<sub>3</sub> at the ratio of 60:20:15:5 of wheat flour + pearl millet + oats + green leaf powder had the highest score 7.93, texture indicates that T<sub>3</sub> at the ratio of 60:20:15:5 of wheat flour + pearl millet + oats + green leaf powder had the highest score 7.93, taste indicates that T<sub>3</sub> at the ratio of 60:20:15:5 of wheat flour + pearl millet + oats + green leaf powder had the highest score 7.86, flavour indicates that T<sub>3</sub> at the ratio of 60:20:15:5 of wheat flour + pearl millet + oats + green leaf powder has the highest score 7.8 and overall acceptability indicates that T<sub>3</sub> had the highest score 7.93.

#### 3.2 Nutritional composition of cookies in control and treated sample of cookies per 100g.

Nutrients	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Energy (kcal)	68.2	58.57	55.16	57.42
Protein (g)	1.53	2.424	3.805	2.64
Carbohydrate(g)	20.56	23.08	19.06	20
Fat (g)	6.77	6.312	6.371	6.40
Fibre (g)	0.24	0.533	0.294	0.617
Calcium (mg)	12.24	14.81	14.415	13.925
Thiamine (mg)	0.066	0.068	0.063	0.058
Riboflavin (mg)	0.05	0.023	0.022	0.021
Niacin (mg)	0.86	0.671	0.61	0.58

T<sub>1</sub> (58.57kcal), was high in content of energy (kcal) followed by T<sub>3</sub> (57.42kcal), T<sub>2</sub> (55.16kcal), and then T<sub>0</sub> (1.53g), T<sub>2</sub> (3.805g) was high in content of protein followed by T<sub>3</sub> (2.64g), T<sub>1</sub> (2.424g), and then T<sub>0</sub> (20.56g), T<sub>1</sub> (23.086g) was high in content of carbohydrate followed by T<sub>3</sub> (20g), T<sub>2</sub> (19.06g), and then T<sub>0</sub> (6.77g), T<sub>3</sub>(6.40g) was high in content of fat followed by T<sub>2</sub> (6.371g), T<sub>1</sub> (6.312g), and then T<sub>0</sub> (0.24g), T<sub>3</sub> (0.617g) was high in content of fibre followed by T<sub>1</sub> (0.533g), T<sub>2</sub>(0.294g), and then T<sub>0</sub> (12.24mg), T<sub>1</sub> (14.81mg) was high in content of calcium followed by T<sub>2</sub> (14.415mg), T<sub>3</sub> (13.925mg) T<sub>0</sub> (0.066mg), T<sub>1</sub> (0.068mg) was high in content of thiamine followed by T<sub>2</sub> (0.063mg), T<sub>3</sub> (0.058mg) and then T<sub>0</sub> (0.05mg), T<sub>1</sub> (0.023mg) was high in content of riboflavin followed by T<sub>2</sub> (0.022mg), T<sub>1</sub> (0.021mg) and then T<sub>0</sub> (0.86mg), T<sub>1</sub> (0.0671mg) was high in niacin content followed by T<sub>2</sub> (0.61mg), T<sub>3</sub>(0.587mg).

### 3.3 Cost of the prepared products ready to eat snack namely cookies

The total cost of cookies per 100g for treatment T<sub>0</sub> is Rs. 26.62, T<sub>1</sub> is Rs. 27.87, T<sub>2</sub> is Rs. 28.44 and T<sub>3</sub> is Rs.28.45 It is therefore concluded that the treatment T<sub>0</sub> (wheat flour and no pearl millet + oats + green leaf powder) has the lowest cost and T<sub>3</sub> (wheat flour + pearl millet + oats + green leaf powder) has the highest cost.

### 4. Conclusion

On the basis of finding it is concluded that in utilization of ready to eat snack by incorporation of pearl millet, oats and green leafy powder (Coriander and fenugreek leaves) cookies it was found that in sensory evaluation 60 percent of wheat flour, 20 percent pearl millet, 15 percent oats and 5 percent green leaf powder was most acceptable for cookies. Nutrient analysis indicates that highest carbohydrate was found in T<sub>1</sub> (28.086g), protein T<sub>2</sub> (3.805g), Calcium T<sub>1</sub> (14.81mg), fibre T<sub>3</sub> (0.617g). Cost of the prepared cookies per 100g of raw ingredients is Rs 29.

### 5. Recommendation

*Bajra* and *Oats* are nutritious, being a good source of complex carbohydrate, calcium, iron and high in dietary fibre. Thus, development of *bajra* and *Oats* flour incorporated in ready to eat snack increases their nutritive value and functional properties. This is good for therapeutic purposes and can be included in the diets of people with various degenerative diseases like diabetes, constipation, osteoporosis and heart diseases. It is recommended to be included in the diet of all age group for its benefits.

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