

ORGANOLEPTIC EVALUATION OF NUTRITIOUS BISCUITS DEVELOPED FROM AMARANTH SEEDS

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Abstract: Malnutrition is responsible, directly or indirectly, for over half of all childhood deaths. Infants and young children are at increased risk of malnutrition from six months of age onwards, when breast milk alone is no longer sufficient to meet all nutritional requirements and complementary feeding needs to be started. The present study was carried out with objective to formulate and evaluate biscuits prepared by wheat, green gram and amaranth seeds with optimum nutrition and organoleptic attributes. Amaranth contains more than three times the average amount of calcium and is also high in iron, magnesium, phosphorus, and potassium. Whole wheat, whole green gram and amaranth seeds were selected for the preparation of biscuits. The recipe was standardized and subjected to organoleptic evaluation by a panel of semi-trained judges using 9-point Hedonic Scale. The mean score of organoleptic evaluation was **6.91±0.066**. That was revealed that it was **liked moderately** by panel members. Thus, it can be concluded that germinated cereals can be used in combination with legumes for producing complementary foods, which will prove to be of immense benefit especially for young children in developing countries, because of their low cost and ease of preparation.

Keywords: Malnutrition, complementary foods, organoleptic evaluation, low-cost, combination.

Introduction

Infant feeding from birth up to the first years of life influences an individual's whole life. It is common knowledge that breastfeeding is important for optimal infant feeding. Breast milk alone can be used to properly feed infants in the first six months of life, but from then on, complementary feeding is necessary. The nutritional adequacy of complementary foods is essential to the prevention of infant morbidity and mortality, including malnutrition and overweight. The linear growth retardation acquired early on in infancy cannot be easily reversed after the second year of life. In this context, providing infants with optimal feeding should be the key objective of a global strategy to guarantee the nutrition safety of a population. Although health professionals are in charge of promoting it and mothers are responsible for putting it into practice, the final success of this action also depends on the

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definition of appropriate governmental policies and on the participation and support of civil society as a whole.

Reducing childhood malnutrition requires a multi-sectoral approach that includes a variety of interventions to address its major causes. There is increasing evidence for the positive impact of feeding counselling on energy and nutrient intakes and growth in children less than two years of age. To support changes in individual behaviour, supplemental interventions will be needed in many settings to ensure the availability and utilization of adequate micronutrient-rich complementary foods. Given the close link between maternal health and child health outcomes, in particular the contribution of low birth weight to childhood malnutrition, interventions should also address the health and nutrition of mothers.

Complementary feeding is giving infants other foods or fluids than breast milk. Complementary food is any food other than breast milk given in the complementary feeding period. Complementary foods can be especially prepared for the infant or can be the same foods available for family members, modified in order to meet the eating skills and needs of the infant. Complementary foods are often of lesser nutritional quality than breast milk. In addition, they are often given in insufficient amounts and, if given too early or too frequently, they displace breast milk. Gastric capacity limits the amount of food that a young child can consume during each meal. Repeated infections reduce appetite and increase the risk of inadequate intakes. Infants and young children need a caring adult or other responsible person who not only selects and offers appropriate foods but assists and encourages them to consume these foods in sufficient quantity

Characteristics of proper complementary feeding

A proper complementary feeding consists of foods that are rich in energy and in micronutrients (especially iron, zinc, calcium, vitamin A, vitamin C and folates), free of contamination (pathogens, toxins or harmful chemicals), without much salt or spices, easy to eat and easily accepted by the infant, in an appropriate amount, easy to prepare from family foods, and at a cost that is acceptable by most families.

Complementary food containing germinated flour/meal contained higher nutrient levels than those containing non-germinated flour and resulted in enhanced growth and development (Ikujenlola and Fashakin, 2005). For commercial preparation of weaning food, the most commonly adopted methods are roller drying, extrusion cooking and spray drying to a limited extent. However, weaning food can also be made based on some traditional food processing techniques such as malting or sprouting of cereals and legumes, fermentation, popping and

flaking cereals (Malleshi, 1995). Weaning food prepared by malting of cereals promotes low bulk higher calorie and dense supplementary foods (Malleshi and Desikachar, 1988). Malted seeds produce finer flours with diminished starch swelling capacity and reduced gruel viscosities (Griffith and Perez, 1998) Processing techniques known to improve nutritional status of weaning food by decreasing anti nutritional components. Food processing methods to remove and/or degrade phytate (removal of phytate by enzymic degradation, extrusion cooking, roller-drying, soaking, germination, fermentation) have been recommended in order to improve iron absorption. Some of the phytates are water soluble in nature and can be reduced by soaking cereal in water. Bioavailability of iron increased by 62 per cent in green gram, 39 per cent in chickpea and 20 per cent in finger millet with a reduction in tannin content upon germination (Hemalatha and Srinivasan, 2007).

Objective- Considering the above facts, the study was aimed to develop nutritious biscuits from amaranth seeds, germinated wheat and green gram and its organoleptic evaluation.

Material and Methods

The present study was carried out in the Department of Foods and Nutrition, College of Home Science, MPUAT, Udaipur. Preparation and organoleptic evaluation of the developed nutritious biscuits. The materials used and method adopted in the experiments conducted for attainment of various objectives has been elaborated in this section, under the following heads:

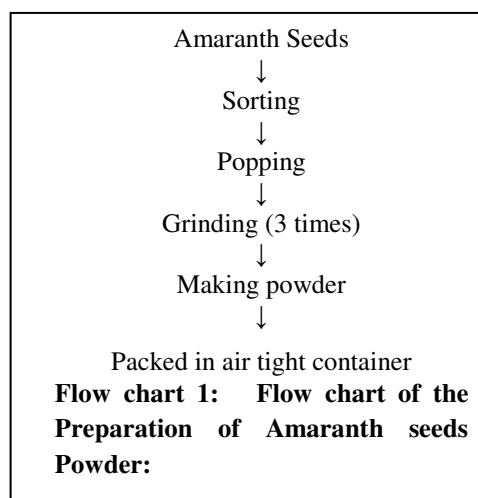
Selection of recipes: Keeping in view the nutritional benefits of wheat, green gram and amaranth seeds for children, it was selected for the development of nutritious biscuits in the present research.

Standardization of recipe

a) **Planning of recipe:** Recipe was selected i.e. biscuit and it was standardized.

b) **Procurement of raw materials:** Wheat, green gram and amaranth seeds were made available by the Foods Lab of Department of Foods and Nutrition, College of Home Science, MPUAT, Udaipur.

c) **Preparation of sample:** Whole wheat and whole green gram was first sorted and cleaned and then washed with water and soaked in water for 8 hours. Excess water was drained; then tied it in a muslin cloth separately to



germinate the sample for 48 hours at room temperature and oven-dried. Amaranth seeds were sorted and popped. The germinated whole wheat whole green gram and popped amaranth seeds were grounded into flour by using the electric grinder.

d) Development of product (Biscuits):

Preparation Time: 20-25 minute, **Baking Time:** 15 minute, **Serving:** 10 pieces

Method-

1. Preheat the oven to 190°C.
2. Cream the butter and small amount of powdered sugar in a bowl.
3. Add egg, a little sugar at a time and continue to cream till all of it is used up.
4. Add the flours (wheat, green gram and amaranth seeds flour) and mix well.
5. Add vanilla essence and mix well and prepare dough.
6. Divide the dough into 10 equal portions and roll into balls and then place the balls on baking tray.
7. Bake for 15 minutes or till light golden brown colour is obtained. Remove from the oven and transfer the biscuits on wire rack to cool.
8. Store in air-tight container.
9. Biscuit recipe was standardized.

Sensory evaluation of developed products: The organoleptic acceptability of biscuits was evaluated by a panel of 10 judges using 9-point Hedonic Scale (Ranganna, 1986). Semi-Trained panel did the evaluation. The panelist was asked to record the level of liking or disliking by giving marks for various characteristics of the products as taste and flavour, texture, colour and appearance and overall acceptability. The samples were rated on 9 point Hedonic Scale for quality attributes according to following grade descriptions and scoring.

Results and Discussion

The developed biscuits were analyzed for organoleptic acceptability. Result has been presented in table 1. Regarding the mean scores of organoleptic evaluation of the developed biscuits, it was observed that the color, flavor and texture of the biscuits lied in the category “liked slightly” i.e. 6.85 ± 0.22 , 6.35 ± 0.36 and 6.475 ± 0.26 , respectively. The mean scores for appearance (7.725 ± 0.17) and mouth feel or taste (7.15 ± 0.26) revealed that the biscuits were “liked moderately”. The mean score of overall acceptability of developed biscuits were 6.91 ± 0.06 , which revealed that it was ‘liked slightly’ by panel members. There are different types of biscuits are prepared and consumed because of its unique taste and nutritional quality. Keeping in view the good sensory nutritional benefits of developed biscuits, it is

suggested mainly for children for their good health and also to adults and old persons because of good sensory and also nutritional quality.

Conclusion

It can be concluded that developed complementary food based on germinated wheat flour, green gram flour and amaranth seeds powder had desirable nutritional quality as well as sensory properties. Hence, it can be recommended that germinated cereals and legumes can be used in combination with other foods for preparing complementary foods, which will prove to be of immense benefit especially for young children in developing countries, because of their low cost and ease of preparation. The development of weaning foods constitutes another important step in improving the nutritional status of young children of developing countries. These prepared weaning foods, which should be manufactured locally and should be marketed through regular commercial channels whenever possible. The local production and distribution to the public of these weaning foods constitute only one element in the control of malnutrition in young children which has long term effects. Provision of weaning foods should not be considered as the complete answer to the problem, but only as one of the many approaches that must be undertaken simultaneously.

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Tables and Figures

Table 1: Recipe for Biscuits (per 100 g):

Ingredients	Amount (in g)
Germinated wheat flour	20
Germinated green gram	10
Amaranth seeds powder	10
Caster sugar	25
Egg	1/2
Butter	20
Vanilla essence	1/4 tsp

Table 2: Nine-point Hedonic Score Graduation Table:

S.No.	Grade	Score
1	Like extremely	9
2	Like very much	8
3	Like moderately	7
4	Like slightly	6
5	Neither like nor dislike	5
6	Dislike slightly	4
7	Dislike moderately	3
8	Dislike very much	2
9	Dislike extremely	1

Table 3: Mean Score of Organoleptic Acceptability of Developed Biscuits

S.No.	Parameters	Study Group Product
1.	Colour	6.85 ± 0.22
2.	Flavour	6.35 ± 0.36
3.	Appearance	7.725 ± 0.17
4.	Texture	6.475 ± 0.26
5.	Mouth feel or Taste	7.15 ± 0.26
6.	Overall Acceptability	6.91 ± 0.066