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**Dr. Sarita Srivastava**  
Department of Home Science,  
B.R.A. Bihar University,  
Muzaffarpur, Bihar, India

**Dr. Priyanka Kumari**  
Assistant Professor, Department  
of Home Science, G. B. M.  
College, Magadh University,  
Gaya, Bihar, India.

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## Organoleptic quality of supplementary foods developed from nutricereals and its acceptability by adolescent girls

**Dr. Sarita Srivastava and Dr. Priyanka Kumari**

### Abstract

Adolescent girls form an important vulnerable sector of population that constitute about one-tenth of Indian population. Under-nutrition among adolescents is a serious public health problem, especially in developing countries. Early adolescence is the critical period of rapid physical growth and changes in body composition, physiology and endocrine in the life cycle after the first year. In this context, the present study was taken up among early adolescent girls residing in the urban area of Muzaffarpur District, Bihar, India. Keeping in view the nutritional requirement of Adolescent girls, an impact study of organoleptic quality and acceptability of supplementary foods developed from nutricereals for adolescent girls has been carried out. In case of supplementary food developed from Quality Protein Maize the general score was 7.5 for colour, 8.06 for flavor, 7.3 for taste, 6.90 for texture and 7.03 for general acceptability. The score for general acceptability was 7.8 for supplementary based on quality protein maize. It can be observed that the score for general acceptability was above 7 in quality protein maize based supplementary food that indicates that the product has been liked much by adolescents for whom product has been developed.

**Keywords:** Organoleptic, undernutrition, supplementary, adolescent girls, Morbidity Pattern, acceptability

### Introduction

Sensory analysis is considered one of the main techniques when we want to know the organoleptic qualities of foods [1]. The tester using the senses evaluates the characteristics of food. Nutrition plays a vital role for normal growth and to maintain physical and mental fitness throughout the life [2]. Nutrient deficiencies may contribute to growth retardation indirectly by reducing the intake of other growth limiting factors, such as energy and protein. Also, several micronutrients, including zinc, iron, and vitamin A, are associated with immune function and risk of morbidity, which in turn affect growth [3]. Growth retardation is highly prevalent in developing countries [4]. Inadequate intakes of dietary energy and protein and frequent infections are well-known causes of growth retardation.

Adolescence diets influence, not only the immediate health of children, but may also have an important impact on adult health. The adolescent diet must be adequate to support normal growth and development, and appropriate amounts of minerals are required since a deficient intake of certain minerals can produce diseases and lead to abnormal development [5]. More than half of the preschool children are suffering from anemia. The critical period for developing adolescents malnutrition coincides with the introduction of complementary foods, which are nutritionally inadequate in many developing countries [6].

Adolescent girls form an important vulnerable sector of population that constitute about one-tenth of Indian population. Under-nutrition among adolescents is a serious public health problem, especially in developing countries. Early adolescence is the critical period of rapid physical growth and changes in body composition, physiology and endocrine in the life cycle after the first year.

Nutritional adequacy is one of the key elements for support of growth and maintenance of adolescents. Due to inadequate intake of nutrient in diet like energy, protein, vitamin iron and

### Correspondence

**Dr. Sarita Srivastava**  
Department of Home Science,  
B.R.A. Bihar University,  
Muzaffarpur, Bihar, India

calcium etc. various deficiency disorders occur. India holds 87 per cent of anaemic Adolescents. Prevention and control of iron deficiency required the combined approach of dietary improvement, fortification of a common staple food when feasible and appropriate iron supplements of Adolescent girls [7].

Indians mainly depend on the staple food for their livelihood. Therefore the staple food must be balanced in nutrient content. Maize is one of the staple cereal food in the country which has been improved for quality protein. Keeping in view the nutritional requirement of Adolescent girls, an impact study of organoleptic quality of supplementary foods developed from nutriceals for adolescent girls has been carried out.

### Material and Methods

To carry out the study, the product was developed for supplementation. The stages involved for development of food were:

#### Selection of food materials

Cereals-Quality Protein Maize recently developed with balanced amino acid composition has been chosen for the development of supplementary food. Ragi one of the most common millet in the state has been taken as a rich source of calcium, thus, Quality Protein Maize and Ragi were selected for the development of supplementary food for Adolescent girls.

**Pulses-** Green gram, the most commonly consumed pulse in the state was selected to increase the Protein content of food for Adolescent girls.

**Oil seeds-** Gingelly seeds were selected to further enrich the food with nutrients including essential fatty acids.

**Green Leafy Vegetables** – Amaranthus was selected to enrich the Iron content.

**Sugars** – Jaggery was included for taste.

#### Processing of food materials

Processing methods applied for food materials were soaking, alkali processing, germination and roasting. The different processing methods were applied to different food materials.

**Maize-** Quality Protein Maize was procured from the Department of Plant Breeding, Rajendra Agricultural University, Pusa. After cleaning the maize grains were soaked for 5 minutes in double the amount of one per cent Lime water. Heat treatment was given to it for 30 minutes. Then it was kept overnight. Next morning the grains were washed four times and sun dried. After drying the grains were roasted till the desired flavor was obtained.

**Ragi-** Ragi grains were collected from the farmers. These were first cleaned to remove dust particles and then they were subjected to roasting process. Malting has been done by soaking the Ragi in double the amount of water for 24 hours. Then the soaked Ragi grain were kept on gunny bag and covered with another gunny bag for 24 hours. Water was sprinkled over it and again were covered with gunny bag for 72 hours. After sprouting it was sundried. After drying it was roasted till desirable flavor was obtained.

**Gingelly seeds-** Gingelly seeds were washed, dried and roasted to improve digestibility and palatability.

**Amaranthus-** Amaranthus was cleaned, washed, blanched and dried in the sunlight.

#### Preparation of food for Adolescent girls

Ingredients used for evolving the supplementary food for the Adolescent girls were: Quality Protein Maize, 60g; Green gram: 22.5g; Ragi: 10.5g; Gingelly seeds: 10g; Amaranthus; 5g and Jaggery: 60g.

All the processed ingredients were powdered in a dry grinder and mixed thoroughly. Jaggery syrup was prepared. The powdered mix was added with continuous stirring and then removed from oven. When it was warm it was made into specific shapes.

#### Quantification of Organoleptic testing and acceptability by Hedonic scaling.

The Organoleptic quality of supplementary food based on Quality Protein Maize was determined by the score given for sensory characteristics such as colour, flavor, texture and general acceptability. The most common Hedonic scale also called 9 point hedonic scale was used to determine degree of liking for supplementary food developed.

**Procedure** - Procedure for conducting a scaled acceptability was very simple. 30 panelists (Adolescent girls) were selected are not trained and instructed to perform a comprehensive evaluation (color, flavor, texture, appearance). For samples of each panelist received developed supplementary food ( $\pm 15$  g). The responses were recorded after individual product. Sample was served at a time and response was recorded. The Adolescent girls were selected for testing the organoleptic quality and acceptability of developed Supplementary food study aged between 10-18 years.

**The Organoleptic quality of Quality Protein Maize based supplementary food:** The Organoleptic quality of supplementary food based on Quality Protein Maize was determined by the score given for sensory characteristics such as colour, flavor, texture and general acceptability. The most common Hedonic scale also called 9 point hedonic scale was used to determine degree of liking for supplementary food developed. These have been presented in table 1.

**Table 1:** Score of Sensory characters of Supplementary food Developed from Nutriceals

Sensory Characters of Supplementary food	Score
Colour	7.50
Flavour	8.06
Taste	7.30
Texture	6.90
General Acceptability	7.03

Each value is the mean of 30 observations.

Extremely liked: 9	Disliked: 4
Liked very much: 8	Disliked much: 3
Liked much: 7	Disliked very much: 2
Liked: 6	Extremely disliked: 1
Neither liked nor: 5	Disliked

The phrases for the 9 point hedonic scale for food testing was assigned values from 1 to 9, 1 for dislike extremely and 9 for like extremely [8].

In case of supplementary food developed from Quality Protein Maize the general score was 7.5 for colour, 8.06 for flavor, 7.3 for taste, 6.90 for texture and 7.03 for general acceptability. In supplementary food, the score given for all the characters were above 6, which indicates the likeness of the product. A very good score was observed for flavor (8.06), which indicates the product has been liked very much. The score for texture is nearly 7 which indicates the product has been liked much. Even for colour, taste and general acceptability the sensory score above 7 indicates the product has been liked much. It can be concluded from table 1 that the performance of supplementary food was good for the colour, flavor, taste texture and general acceptability.

#### **The Acceptability of Quality Protein Maize based supplementary food:**

The acceptability of Supplementary food by adolescents has been determined by the acceptance and rejection of the Supplementary food. The score given for general acceptability has been presented in Table II.

**Table 2:** Score of General Acceptability of Supplementary Food Developed from Nutricereals

Acceptability of Supplementary Food	Score
General acceptability	7.80

Each value is the mean of six observations

The score for general acceptability was 7.8 for supplementary based on quality protein maize. It can be observed in Table 2 that the score for general acceptability was above 7 in quality protein maize based supplementary food that indicates that the product has been liked much by adolescents for whom product has been developed.

#### **Summary and conclusion**

The score for general acceptability was 7.8 for supplementary based on quality protein maize. It can be observed that the score for general acceptability was above 7 in quality protein maize based supplementary food that indicates that the product has been liked much by adolescents for whom product has been developed.

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