

Preparation and nutrient analysis of low cost supplementary recipe for children 2.5-3 years

PREETI RATHI AND RENU MOGRA

Nutritional status in children is most vulnerable during the weaning stages when both macro and micro nutrients may be insufficient to maintain growth and development. The pattern of supplementary feeding during the first year of life is increasingly recognized as important determinants of malnutrition. The presented study on development of low cost nutritive supplementary food for children 2.5-3 years' was conducted leading the objective to fulfill the nutritional requirement of children in early years of life as it is the growing period of physical as well as mental development of children. The main point to be considered while planning is that one serving should fulfill 1/6 nutritional requirement. The nutrient comparison between calculated value (A) and analyzed value (B) of the recipe showed that analyzed value of moisture, protein, fat were 6.038, 5.01g, 10.2g, respectively. The carbohydrate and energy content were 30.56 g, 228.04 kcal, respectively. Nutrition composition of recipe (B) showed that the analyzed value of moisture, protein, fat were 6.1, 9.19g, 11.2g, respectively. The carbohydrate and energy content were 37.69g, 220.92 kcal, respectively. Both planned recipes were low cost as the price for one serving was less than Rs. 5/-. The nutrient analysis shows that recipes were having a good amount of nutrients specially energy protein, fat which are essential for growth and development of children.

Key Words : Nutrient analysis, Low cost supplementary recipe, Carbohydrate, Energy content

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INTRODUCTION

A dietary supplement, also known as food supplement or nutritional supplement, is a preparation intended to supplement the diet and provide nutrients, such as vitamins, minerals, fiber, fatty acids, or amino acids, that may be missing or may not be consumed in sufficient quantities in a person's diet. Some countries define dietary supplements as foods, while in others they are defined as drugs or natural health products. Study on age of infant age at time of introducing supplementary foods and age of the mother, adolescent mothers added cereal significantly earlier ($P \leq 0001$), but there was no significant difference by age of mother. Mehta *et al.* (2008) conducted a prospective study about

introducing solid foods early (3 to 4 months) and later (6 months) and the use of commercial foods *versus* parents' choices of solid foods for their infant. There were no significant differences in body composition or anthropometric measurements associated with earlier or later introduction of foods or with commercial foods *versus* parent's choice of solid foods. In a study by Bruin *et al.* (2008) a comparison of energy utilization and growth in exclusively breast-fed and formula-fed infants (≥ 4 months) showed no significant difference by mode of feeding with respect to length, weight and head circumference of infants in the first year of life. Findings of several investigators indicate that some mothers add supplementary foods earlier than the recommended four to six months. Therefore, an attempt has been made to prepare and standardize the recipe and to analyze its nutrient content.

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METHODOLOGY

Weaning is a process by which foods other than breast milk are introduced gradually into the baby's diet, first to replace it and adopt the child to the adult diet (WHO, 1981). Considering supplementary feeding the recipe was planned that was simply

homemade preparation and was low in cost. For this purpose a total of eight recipes were planned and cost of ingredients was calculated through market price survey. There were following two recipes which were low cost selected for standardization.

Ingredient	Amount
Wheat flour	25g
Besan	15g
Tomato	10g
Spinach	15g
Onion	5g
Oil	10g

- Vegetable chilla
- Bread pizza

Vegetables were washed and chopped. All the ingredients were mixed and a batter of pouring consistency was prepared. A table spoon full batter was poured on hot griddle and spread evenly. Chilla was roasted till golden brown by applying oil.



Ingredient	Amount
Bread	40g
Capsicum	10g
Cauliflower	10g
Onion	10g
Ground nut	5g
Tomato	10g
Coriander leave	10g
Butter	10g
Spinach	10g
Cheese	5g

Vegetables were washed and chopped. All the ingredients were mixed and applied butter on each bread slice, topped with vegetables and placed the bread slices on it carefully, covered with cheese and cooked till cheese melted. The flame or oven was kept very low to prevent bread from charring.



Standardization of recipe:

The amount of ingredients per serving was standardized considering the nutritional requirement in such a way that the recipe should provide 1/6 of requirement of nutrients. It was also standardized in term of sensory qualities.

Nutritional requirement /day:

ICMR recommended the following nutritional requirement /day for children 1-3 years.

The nutrient composition of recipe (1 serving) was calculated with the standard value in 'Nutritive value of Indian foods' (Gopalan *et al.*, 2001) and it was considered that the amount of ingredients in one serving should fulfill 1/6 nutritional requirement. Cost per serving was also calculated by market price survey of the ingredients. Amount of ingredients per serving was standardized according to one meal size of the child.

Nutrient	Per day requirement	1/6 req
Energy (Kcal/day)	1240	206
Protein (gm/day)	22	3.6
Fat (gm/day)	25	4.16
Calcium (mg/day)	400	66.6
Iron (mg/day)	12	2
Retinol (μ g/day)	400	66.6
β -Carotene (μ g/day)	1600	266.6
Thiamin (mg/day)	0.6	0.1
Riboflavin (mg/day)	0.7	0.116
Niacin (mg/day)	8	1.3
Pyridoxin (mg/day)	0.9	0.15
Ascorbic acid (mg/day)	40	6.66
Folic acid (μ g/day)	30	5
Vitamin B12 (μ g/day)	0.2-1.0	0.16

Table D. Nutrient calculation of vegetable chilla

Ingredient	Amount	Cost	Energy (Kcal)	Protein (g)	Fat (g/day)	Iron (mg)	Fibre g	Calcium (mg/day)	β-Carotene (µg/day)
Wheat flour	25g	0.375	85.25	3.025	0.425	1.225	0.475	12	7.25
Besan	15g	0.6	54	2.5	0.795	0.69	0.975	30.3	28.35
Tomato	10g	0.2	2	0.09	0.02	0.064	0.08	4.8	35.1
Spinach	15g	0.16	3.9	0.3	0.105	0.17	0.09	10.95	837
Onion	5g	0.07	2.95	0.09	0.005	0.06	0.03	2	0.75
Oil	10g	0.65	90	-	10	-	-	-	250
Total		2.05	238.05	6.005	11.34	2.204	1.65	60.05	1158.4

Table E. Nutrient calculation of bread pizza

Ingredient	Amount	Cost	Energy (Kcal)	Protein (g)	Fat (g/day)	Iron (mg)	Fibre g	Calcium (mg/day)	β-Carotene (µg/day)
Bread	40g	0.8	98	3.12	0.28	0.44	-	0.4	-
Capsicum	10g	0.15	2.4	0.13	0.03	0.056	0.5	1	427
Cauliflower	10g	0.15	3	0.26	0.04	0.123	0.12	3.3	3
Onion	10g	0.14	1.9	0.18	0.01	0.12	0.06	4	1.5
Ground nut	5g	0.125	28.35	1.265	2.005	0.125	1.005	4.5	1.85
Tomato	10g	0.20	2	0.09	0.02	0.064	0.08	4.8	35.1
Coriander leave	10g	0.15	4.4	3.3	0.06	0.142	0.12	18.4	691.8
Butter	10g	1.25	72.9	-	8.1	-	-	-	320
Spinach	10g	0.12	2.6	0.2	0.07	0.435	0.06	7.3	558
Cheese	5g	0.35	17.4	1.205	1.255	0.105	-	39.5	13.65
Total		3.43	232.9	9.75	11.86	1.987	1.945	83.2	2051.9

Nutrient analysis:

The products developed were analyzed for proximate composition as moisture, fat, protein, fiber and ash content (AOAC, 1980). Carbohydrate and calorie content were determined by calculation method. All analysis was done in triplicate using standard procedure. The fiber content was estimated by acid alkali digestion method as suggested by Chopra and Kanwar (1978).

Cost:

The above table shows the nutritional requirements for children between 2.5-3 years. The table also provides the cost calculated per serving which was less than Rs.5/-.

OBSERVATIONS AND ASSESSMENT

The present study on development of low cost nutritive supplementary food for children 2.5-3 years' was conducted leading the objective to fulfill the nutritional requirement of children in early years of life as it is the growing period of physical as well as mental development of children. The main point to be considered while planning is that one serving should fulfill 1/6 nutritional requirement and the result shows the nutrient content of one serving of the recipe as compared to

Table 1. Nutrient composition of vvegetable chilla as compared to calculated value

Name of the nutrient	Calculated value	Analyzed value
Moisture	7.78	6.038
Protein (g)	6.005	5.01
Fat (g)	11.34	10.2
Ash(g)	11	10
Fiber (g)	1.65	1.2
Carbohydrate	34.36	30.56
Energy (kcal)	239	229

Table 2. Nutrient composition of bread pizza as compared to calculated value

Name of the nutrient	Calculated value	Analyzed value
Moisture	7.6	6.1
Protein (g)	9.75	9.19
Fat (g)	11.86	11.6
Ash(g)	11.46	10.4
Fiber (g)	1.94	1.12
Carbohydrate	40.1	37.69
Energy (kcal)	232.9	220.92

Table 3. Nutrient composition of analyzed recipe as compared to calculated value

Name of the nutrient	Vegetable chilla		Bread pizza	
	Calculated value	Analyzed value	Calculated value	Analyzed value
Moisture	7.78	6.038	7.6	6.1
Protein (g)	6.005	5.01	9.75	9.19
Fat (g)	11.34	10.2	11.86	11.6
Ash (g)	11	10	11.46	10.4
Fiber (g)	1.65	1.2	1.94	1.12
Carbohydrate	34.36	30.56	40.1	37.69
Energy (kcal)	238.05	228.04	232.9	220.92

calculated. The nutrient analysis of food is an important part of quality assurance. Low cost recipes were analyzed for moisture, protein, fat, fiber, carbohydrate and energy content and the results are presented per 100 g cooked wt basis.

The analyzed value of moisture, protein, fat was 6.038, 5.01g, 10.2g, respectively. The carbohydrate and energy content were 30.56 g, 229 kcal, respectively. The recipes were a good source of energy, protein, ash and carbohydrate.

The analyzed value of moisture, protein, fat was 6.1, 9.19g, 11.2 g, respectively. The carbohydrate and energy content were 37.69g, 220.92 kcal, respectively.

Conclusion:

In India, steps taken for the protection and promotion of the practice of breast-feeding have been effective and breast feeding is almost universal. However, the message that exclusive breast feeding up to six months and gradual introduction of semisolids after that age are critical for the prevention of under-nutrition in infancy has not been as effectively communicated.

The present study can be concluded in following points:

- Both planned recipes were low cost as the price for one serving was less than Rs.5/-.

- The nutrient analysis shows that recipes were having a good amount of nutrients specially energy protein, ash and carbohydrate which are essential for growth and development of children.

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