

Formulation of Supplementary Mix Using Minor Millet and Its Sensory Evaluation

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ABSTRACT

Infancy is a period of rapid growth. Therefore, the energy requirement per kg body weight is higher than the adults. After birth, exclusive breast feeding is recommended for at least 4-6 months. After six months the body needs increases, supplementary nutrition should be start. Supplementary mixes available in market and provided through various schemes are mostly cereal based. However, millets possess equal calorific value to cereals with higher mineral content. Hence, the present study was attempted to formulate supplementary mix using finger millet, pearl millet and soybean. Sensory evaluation was carried out by nine-point Hedonic rating scale to derive best accepted supplementary mix.

Keywords: Cereal, Millets, Supplementary mix

INTRODUCTION

Infancy is the time of most rapid growth, next to foetal period. During infancy period, energy requirements are higher i.e. 108 Kcal/kg body weight till six months of age as compared to adult i.e. 40Kcal/kg body weight. Exclusive breast feeding for 4-5 months is necessary for the best growth of the infant but breast milk alone is no longer sufficient to meet its nutritional requirements, when the child reach to 6 months of age. Prolonged breast feeding without complementary feeding is key contributory factor for malnutrition among young children. Therefore, supplementation has to be implemented after four to six months to overcome malnutrition and related complications. Several types of supplementary foods are being marketed in India which are nutritionally well balanced but are quite expensive and cannot be afforded by middle and lower income groups. So, the middle upper class parents of urban areas give their babies' same food which is given to adults and most economical option for lower income group parents is supplementary food given to the children under Integrated Child Development Schemes (ICDS). Numerous supplementary mixes are developed by National Institute of Nutrition (NIN) and Central Food Technological Research

Institute (CFTRI) by using cereals, pulsed, nuts and fortified with vitamins and minerals. However, calorific value of millets is almost equal to the commonly used cereals; use of millets in developing supplementary mix is not popular. In terms of mineral content of millets, they are miles ahead of rice and wheat. Finger millet has thirty times more Calcium than rice while every other millet has at least twice the amount of Calcium compared to rice. Therefore, the use of millets in supplementary food can be a good solution for the malnutrition especially in combating the deficiency of essential minerals. Looking to that, the present study was planned with following objectives.

OBJECTIVES

- (i) To formulate supplementary mix using Pearl millet, Finger millet and Soybean.
- (ii) To conduct the sensory evaluation for its acceptability

METHODOLOGY

Pearl millet, finger millet, Soybean, Sugar and Milk powder were procured from the local market of Anand. Pearl millet, Finger millet and soybean were cleaned manually.

After cleaning millets were soaked overnight separately. Extra water was drained, placed in muslin cloth and kept for 48 hours for germination at ambient temperature (Fasasiolufunmilayo, 2009 and Bernard *et al*, 2010). Germinated millets were dried in tray dryer at 60° C and milled to obtain flour. Soybean was soaked overnight, pressure cooked to remove anti nutritional factor and the unpleasant flavor of soy. Water was drained and boiled soybean was dehuled, dried at 60° C and milled to obtain fine flour (Sharma *et al*, 2013).

Table 1 : Combinations for formulating supplementary mixes

Treatment I	Pearl Millets	Finger Millet	Soya Flour
TS1	45	45	10
TS2	40	40	20
TS3	35	35	30
TS4	30	30	40
TS5	25	25	50
Treatment II	Pearl Millets	Finger Millet	Soya Flour
TF1	45	10	45
TF2	40	20	40
TF3	35	30	35
TF4	30	40	30
TF5	25	50	25
Treatment III	Pearl Millets	Finger Millet	Soya Flour
TP1	10	45	45
TP2	20	40	40
TP3	30	35	35
TP4	40	30	30
TP5	50	25	25
Note : In each combination 40gm sugar and 10gm Milk powder was added			

Supplementary mixes were prepared by using various combinations of pre-processed dried flours of Pearl millet, Finger millet, and Soybean (Table No. 1). To that, 40gm of sugar and 10 gm of whole milk powder were mixed. Mixes were kept in plastic Zip pouch until evaluated for sensory characteristics. For the sensory evaluation, 25gm of powder was added in 150ml of water and cooked for 3 minutes after mix get boiled. Boiled mix was immediately served to the sensory evaluators. Sensory evaluation of all combinations of supplementary mix was carried out by using nine-point Hedonic rating scale through semi- trained panel of 10 judges in 3 replications. Judging panel consist of staff members and students of polytechnic in Food Science and Home Economics.

RESULTS AND DISCUSSION

Finger millet, pearl millet and soybean were major ingredients in formulating various combinations of supplementary mixed. In each combination 10gm of milk powder and 40gm of powdered sugar were added to enhance nutritional value and acceptability of mix as well. The sensory characteristics of the formulated mixes revealed that the mean score values for various attributes viz: appearance, aroma, color, taste, flavor, consistency and over all acceptability was highest for TS₃ in treatment-I which was consisting of Pearl millet: Finger millet: Soybean in the ratio of 35:35:30. That was also significantly highest than the control. Whereas in treatment-II and treatment-III, TF₂ and TP₃ scored the highest score respectively. TF₂ of treatment -II supplementary mix was consisting of millets and soybean in the ratio of 40:20:40 (Pearl millet: Finger millet: Soybean). TP₃ of treatment -II supplementary mix was consisting of millets and soybean in the ratio of 30:35:35 (Pearl millet: Finger millet: Soybean). These three combinations were subjected to further sensory evaluation to get final supplementary mix.

Among three combinations of three treatments (Table 2) FT₂ scored the highest sensory score which was prepared by using 40:20:40 (Pearl millet: Finger millet: Soybean).

Table 2 : Average Sensory Scores of the best accepted (one from each treatment) supplementary mixes

Characteristic Treatment	Appearance	Color	Aroma	Taste	Flavor	Consistency	Over all Acceptability
TS3	6.53 ^a ±0.20	6.28 ^a +0.25	6.43 ^b ±0.26	6.65 ^b ±0.35	6.60 ^b ±0.23	6.73 ^b ±0.27	6.92 ^b ±0.23
TF2	6.47 ^a ±0.19	6.57 ^a +0.20	6.52 ^b ±0.23	7.37 ^{bc} ±0.18	7.07 ^{bc} ±0.15	6.90 ^b ±0.21	7.13 ^{bc} ±0.17
TP3	6.68 ^a ±0.19	6.52 ^a +0.24	6.83 ^b ±0.18	7.63 ^c ±0.18	7.30 ^c ±0.14	7.05 ^b ±0.22	7.62 ^c ±0.17
Control	5.98 ^a ±0.39	6.12 ^a +0.35	4.80 ^a ±0.31	3.87 ^a ±0.30	4.30 ^a ±0.30	5.62 ^a ±0.37	4.98 ^a ±0.29
'F' Value	1.37	0.61	13.29	42.82	39.98	5.58	27.55

Values are Mean ± SEM scores of a hedonic rating scale test by panel of 10 judges × 3 replication
Means bearing the same superscript within the column do not differ significantly (p≤0.05)

CONCLUSION

Supplementary mix prepared using finger millet, pearl millet and soybean, was well accepted based on their sensory characteristics. Milk powder added in the supplementary mix enhanced nutritional value as compared to control. That was useful to eliminate the milk addition at the time of preparing supplementary mix while given to children. Millet base supplementary mix can be recommended especially where millets are staple food i.e. South Gujarat and North Gujarat. Developed supplementary mix can be studied further for its nutritional composition and storage study and recommended to community

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