



Original Research Article

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Assessment of Supplementation of Soy-Poha Ladoo for Prevention of Malnutrition in Rural Area of Ratlam District, India

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The food and nutrition security of the population has been the matter of concern world over. Problem in attaining food and nutrition security is prominent particularly in developing world. Protein calories malnutrition is major nutritional problem of the world. To treat malnutrition among the pre-school children the formulation of locally based protein rich product is must hence attempt was made to formulate soy based food product such as soy-poha ladoo. Krishi Vigyan Kendra Ratlam conduct a study during 2015-16 to 2017-18 on assessment of supplementation of soy-poha Ladoo to assess the effectiveness of protein and iron supplementation for improving protein energy malnutrition (PEM) on health of pre-school children in rural area of Ratlam district of MP. This product was evaluated for its major nutrient content like carbohydrate, energy, protein and fat. The 40 malnourished pre-school children of five anganwadies were selected by conducting camp are classified as two groups. In the present study soy-poha ladoo recorded highest height (88.9 cm), weight (13.95 Kg) and BMI (15.69) indicates positive effect of supplementation of locally available protein and iron rich food source like soybean and poha.

Introduction

Soybean has been identified as a low cost nutrition rich food raw material which has potential to help enhance the food availability with nutrition. The soybean has been honoured as a food raw material for incorporation in the diet of nutritionally poor segment. The fact that properly processed soybean also extends health benefits to consumers; it serves as a boon to the consumers in improving the health.

Children between one and five years of age remain at significant risk of under nutrition.

They are still growing rapidly but have not fully developed independent feeding skills in the earlier years of this era; they remain totally dependent on an adult. Sometimes growth failure may occur even in the presence of normal meal patterns because the energy density of the diet is inadequate. The nutritional problems which manifest as a result of malnutrition prior to and during the infancy and early childhood has an impact on health, general growth and development of children (Sarada and Mrudula, 2016).

According to Ghosh *et al.*, (2006) nutritional problems like protein energy malnutrition,

anemia and vitamin – A deficiency continue to plague a large proportion of Indian children. The diets and nutritional status of urban slum children in India is far away from being satisfactory. High prevalence of malnutrition among young children is also due to lack of awareness and knowledge regarding their food requirements and absence of a responsible adult care giver. Improving nutritional status of urban poor requires a more direct, more focused, and more integrated strategy.

Soybean is one of the most important legumes having more than 40 per cent protein combined with 20 per cent oil (Deshapande, 1990). It can be effectively used for supplementing cereals based products due to of its amino acids profile. Beside it has a good source of minerals, vitamins antioxidants and better neutral-critical properties (Ketarpau and Goyal, 2008). Soybean is a complete plant protein. Due to its high biological value and content good numbers of essential amino acids it can be used to prevent protein calorie malnutrition among vulnerable groups in the community (Ghatge, 2014).

Soybean was targeted to be used in India, as major protein source to meet nutritional requirements. soybean contains, other than 43% protein, 19.5% fat, 21% carbohydrate and provides 432 kcal per 100 g. Soybean can make significant nutritional contribution if typical traditional foods are supplemented with properly processed soybean in combination with cereals.

Objective

To assess the effectiveness of protein and iron supplementation for improving protein energy malnutrition on health of pre-school children.

Hence, by taking into account the different properties of soybean, it is considered to use for the soya ladoo supplementary food

product. The data regarding formulation, preparation and evaluation of soya ladoo were collected.

Materials and Methods

This study was carried out during 2015-16 to 2017-18 at five angan wadies located at different location in Ratlam district of Madhya Pradesh (India). Wheat is the staple food of the district. In the present investigation, 40 malnourished pre-school children were selected by conducting camp and they were supplied with 100g of soy-poha ladoo for 90 days with various food ingredients. The following treatments have been decided based on food supplemental diet provided to the same children for 90 days and considerable changes were noted accordingly.

Soya ladoo

The local varieties of soybean and Bengal gram were procured from the market. It was cleaned, washed, dried, coarsely grind, de-hulled and made into flour separately by use of grinding machine. Soy-poha ladoo was prepared by use of appropriate formulations.

Treatments

1. T₁- daily diet (without providing supplements)
2. T₂- Provided with 100 grams of Soya-Poha Ladoo Daily (90 days)

First group of 20 children were not provided with any nutritional supplements i.e as on their daily diet intake, which were treated as control (T₁). The next group of 20 children was supplemented with 100 grams of soy-poha ladoo daily for 90 days. On the basis of nutritional composition of basic ingredients (Table 1), the nutritional content of soy-poha ladoo were estimated as presented in Table 2. From Table 2 it is seen that the 100g of

soy-poha ladoo contains 343.40 kcal, 102.25g fat, 6.87g protein, 0.57g Fiber, 63.40mg calcium and 8.26mg iron. Soy-poha ladoo prepared with combination of soybean flour, besan, ghee, poha and jaggery, and supplied to subject through daily diet for 90 days. After 90 days anthropometric Measurements was recorded.

Results and Discussion

As the pre-school children were recognized as a priority target group and to increase their anthropometric measurement level was the aim of the present investigation, the effect of soy-poha ladoo prepared and supplied to the subjects was observed as recorded in Table 3. According to basic anthropometric

measurement, data of the subjects is presented in table 3. The highest average height (88.55 cm), weight (13.52kg) and BMI (15.27) was recorded after intervention and the per cent increase of height, weight and BMI is 0.62%, 8.66% and 8.06 % respectively as compared to before intervention 88.0cm (height), 12.44kg (weight) and 14.13 (BMI). Whereas among the treatment T₂ recorded highest height (88.9 cm), weight (13.95Kg) and BMI (15.69) as compared to T₁ 88.2cm (Height), 13.10Kg (weight) and 14.85 (BMI) respectively after intervention. Within the treatment per cent increase of height (0.90%), weight (9.06%) and BMI (8.13%) was significantly observed by T₂, as compared to T₁ (0.34%, 8.26% and 7.92%)

Table.1 Composition and nutritional contents of basic ingredients for *soy- poha ladoo*

Items	Amt (g)	Energy (Kcal)	Fat (g)	Protein (g)	Fiber (g)	Calcium (mg)	Iron (mg)	Folic Acid (IU)	Vit.A (IU)
Poha	200	692	2.4	13.2	1.4	40	40	73.2	-
Besan	50	186	2.8	10.4	0.6	28	2.65	50	64.5
Soybean flour	50	216	9.75	21.6	1.85	120	5.2	4.95	213
Jaggery	300	1149	0.3	1.2	-	240	7.92	-	-
Ghee	75	75	675	-	-	-	-	-	-
Total	675	2318	690.25	46.4	3.85	428	55.77	128.15	277.5

Table.2 Nutrient content of soy-poha ladoo per 100g

Energy (kcal)	Fat (g)	Protein (g)	Fiber (g)	Calcium (mg)	Iron (mg)	Folic acid (IU)	Vit.A (IU)
343.40	102.25	6.87	0.57	63.40	8.26	18.98	4.11

Table.3 Changes in Anthropometric Measurements

RESULT S	Height (cm)			Weight (kg)			BMI		
	Before intervention	After intervention	% increase	Before intervention	After intervention	% increase	Before intervention	After intervention	% increase
T ₁	87.9	88.2	0.34	12.10	13.10	8.26	13.76	14.85	7.92
T ₂	88.1	88.9	0.90	12.79	13.95	9.06	14.51	15.69	8.13
Mean	88.0	88.55	0.62	12.44	13.52	8.66	14.13	15.27	8.06

Height, weight and BMI respectively shown in table 4 depict the height, weight and body mass index is higher than the traditional technology. Maximum increased height, weight and body mass index was observed with soy-poha ladoo.

In conclusion, results of the study clearly indicate positive effect of supplementation of locally available protein and iron rich food source like soybean and poha. However, the study gave encouraging results still more concentrated efforts are needed to arrive at conclusion on a large group. The children in growing age show increase in height, intake of nutritional supplementation and its acceptance and consumption by the children contributes to children growth and development. The nutritional supplementation to the experimental group for a period of 90 days contributed to increase in all the three anthropometric measurements: height, weight, body mass index. The control group children also showed increase in height, weight, body mass index but low growth rate. Which may also be attributed to regular nutritional supplementation in anganwadi centres. Yet the soy-poha ladoo proved to contribute in better nutrition of anganwadi children due to its nutritive value and acceptance as a low

cost nutritional supplement it is suitable for anganwadi children.

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