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Comparative Study of Feeding Soyachakali and Soyaflakes to Malnourished Preschool Children and its Impact on their Biochemical Analysis

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Abstract

More than five million children die each year as a result of under nutrition. Furthermore, billions of people suffer from vitamin and mineral deficiencies, especially of iron, iodine, vitamin A and zinc. Good nutrition is also constrained by inadequate safe drinking water and sanitation. To treat malnutrition among the preschool children the formulation of locally based protein rich product is must hence attempt was made to formulate soyabased food products such as soyachakali and Soyaflakes Chiwada. Soya products were formulated and prepared by standard methods. Organoleptically selected soya products were analyzed for its chemical composition such as protein, fat, vitamins, minerals, and anti nutritional factors. These products were supplemented to preschool malnourished children @ 40 gm/head/day for six months. Preschool malnourished children were graded according to grade of malnutrition. Their biochemical parameter such as serum iron (µg/dl) serum proteins (gl/dl), serum vitamin A (IU/dl), serum zinc (µg ml), blood glucose mg/dl and Haemoglobin g/dl had done monthly for six months. It had shown highly significant changes in blood glucose level, haemoglobin, serum protein, serum vitamin A, serum iron and serum zinc of preschool children after supplementation of soyaproducts.

Keywords: Soyaflakes Chiwada, Soyachakali, and supplementary feeding.

Introduction

Soyabean is higher in protein than other legumes and many animal products. The protein derived near by 40 per cent by Soyabean. Soyabean is a complete plant protein. Due to its high biological value and content good numbers of essential amino acids it can be use to prevent protein calorie malnutrition among vulnerable groups in the community. Hence, by keeping in view the feasibility in the preparation of formulated foods and due to nutritional significance of soya bean, its low cost, locally available and high amino acid profile it is planned to use the Soyabean after proper processing techniques in the preparation of soya by products with its effect on the treatment of malnourished preschool children to overcome the problem Messina and Barne 1994[1]

Material and Methods

Formulation: Formulation and preparation of soyachakali and soyaflakes chiwada was done by using standard method by Phillips and Thangana 1971[2]

Sensory Evaluation: Soya products were prepared and evaluated organoleptically by "Hedonic scale" Amerine et al. 1965[3].

Nutritional Evaluation: Nutritional quality analysis. Moisture content, total ash, major nutrient like crude protein, fat, carbohydrates, B complex vitamins including vitamin B_1,B_2 and B_3 , minerals such as iron, calcium, zinc and crude fiber were analyzed by use of methods described in AOAC 1984 and Rghunramula 1983[4]

Statistical analysis: The analysis significant at $p < 0.05$ level, S. E. and CD. at 5 per cent level by the procedure given by Gomez and Gomez 1984[5].

Biochemical Analysis: The nutritional status of the preschool children before and after the experimental period was evaluated through biochemical analysis method. The parameters such as haemoglobin g/dl, serum protein g/dl, blood glucose level mg/dl, serum vitamin A µ/dl, serum iron µg/dl and serum zinc µg/dl were analyzed by using methods given by Raghuramalu et.al. 1983[6].

Results and Discussion

Biochemical analysis of Experimental Groups of preschool children: This utilization of food depends on the conversion of food into functional nutrients after its absorption. This relevance is essential to study the facts and significance of food after consumption. Biochemical analysis is one of best and very relevant scientific method for assessment of nutritional status of the community. In this method biochemical parameters like blood, serum, plasma etc are used for the study.

The constituents in the blood such as blood glucose level, hemoglobin content serum protein, serum vitamin A, serum iron and serum zinc were analyzed in the experimental groups of children before and after supplementation.

The data of average in biochemical analysis of experimental group was given in table-1 It explained that, group I children found more average values of blood glucose i.e. 65.7mg/dl, haemoglobin 8.6±1.1 g/dl, serum protein 5.8 g/dl, serum vitamin A 112.3 IU/dl and zinc 1.05 µg/m respectively.

There was no major difference noticed in the average values of blood glucose level, serum protein, serum vitamin A, serum iron and serum zinc of group I and II children after supplementation. Haemoglobin level group I children noticed as 8.6 g/dl, i.e. 68.8 per cent. Where as it was reported as 9.8 g/dl i.e.78.2 per cent in group II.

Serum vitamin A observed in group I children as 112.3 IU/dl i.e 74.7 per cent. Where as it was recorded as 87.0 IU/dl i.e.58.0 per cent in group II children. All the average values of biochemical parameters were noted below the standard level in control group of children. Serum vitamin A (36.0 IU/dl) and zinc (0.54 µg/ml) level found drastically poor in this group of children.

The biochemical parameters which analyzed after supplementation were compared with their previous i.e. before supplementation values. The relevant data was presented in table 2 and 3. There was no major difference noticed in the average values of blood glucose level, serum protein, serum vitamin A, serum iron and serum zinc of group I and II children after supplementation. Blood glucose in group I was raised from 60.4 percent to 72.9 percent and in group II it was reported that it was ranges from 63.5 to 78.2 percent. The significant change was seen in blood glucose level in group I and II after supplementation. Haemoglobin level I group children noticed as 8.6 g/dl, i.e. 68.8 per cent. Where as it was reported as 10.0 g/dl i.e.78.2 per cent in group II children. The table-3 revealed average values of serum, protein vitamin A, iron and zinc. Serum vitamin A observed in group I children as 112.3 IU/dl i.e 74.7 per cent. Where as it was recorded as 87.0 IU/dl i.e.58.0 per cent in group II children. All the average values of biochemical parameters were noted below the standard level in control group of children. Serum vitamin A (36.5 IU/dl) and zinc (0.54 µg/ml) level found drastically poor in this group of children.

Serum iron in group I raised from 47.7 to 66.5 percent and in group II it raised from 48.3 to 65.5. The Significant change have seen after supplementation of soya product in supplemented group. No change have seen in control group.

Similarly serum protein values reported in group I it raised from 62.7 to 86.5percent significant changes have seen in group I and II. No change in values of serum protein in control group.

Serum vit A in group I significantly changed from 24.0 percent to 81.9 percent. Where as in group II serum vit A significantly changed but in group I significant range was more serum zinc value in group I and II were 11.65 µg/ml to 14.8 µg/ml and 8.8 µg/ml to 14.8 µg/ml respectively. No change is seen in control group.

Conclusion

On the whole, it can be concluded that, the supplementary feeding through soya byproducts found positive impact on improving the biochemical parameters of preschool malnourished children. The soya byproducts supplementation shown a highly significant effects on increasing blood glucose level, blood haemoglobin, serum protein, serum vitamin A, serum iron and serum zinc status of preschool children. All the analyzed biochemical parameters noted increased moderate to normal standard level. It indicated that soya byproducts have effectively worked. These products have capacity in improving the nutritional status of malnourished preschool children.

Table-1
Average in Biochemical Analysis of Experimental Groups

Biochemical analysis	Group I Mean ± S.D.	Group II Mean ± S.D.	Group III Mean ± S.D.
Blood glucose (mg/dL)	65.7 ± 2.9 (72.9)	68.7± 3.3 (76.3)	66.0 ± 9.0 (73.3)
Haemoglobin (g/dl)	8.6 ± 1.1 (68.8)	9.8 ± 1.3 (78.2)	7.6 ± 1.02 (60.7)
Serum protein(g/dl)	5.8 ± 0.8 (86.6)	6.0 ± 0.8 (89.7)	4.3±0.7 (65.5)
Serum Vitamin A (IU/dl)	112.3±2.9 (74.7)	87.0 ± 2.3 (58.0)	36.0±1.1 (24.0)
Serum Iron (µg/dl)	69.7±9.5 (66.4)	128.5±9.3 (65.2)	105.4±6.8 (48.2)
Serum Zinc (µg/ml)	1.05±2.0 (75.0)	1.02±2.0 (72.9)	0.54±0.9 (24.0)

Group I- Experimental group with supplementation of soyachakali.
Group II - Experimental group with supplementation of soyaflakes chiwada .
Group III - No supplementation i.e. control group.
Figures in paran theses indicate percentage.

Table-2
Average of Blood Glucose and Haemoglobin level of Experimental groups before and after supplementation

Biochemical analysis	Group I Mean ± S.D.			Group II Mean ± S.D.			Group III Mean ± S.D.		
I	**BS**	**AS**	**'t' value**	**BS**	**AS**	**'t' value**	**BS**	**AS**	**'t' value**
Blood glucose (mg/dl)	60.4± 2.2 (60.4)	65.7± 2.9 (72.9)	3.2*	63.7± 2.7 (63.0)	68.7±2.3 (73.6)	3.1*	60.9± 1.9 (65.9)	66.0± 1.8 (72.4)	1.5NS
Hemoglobin (g/dl)	8.1± 1.1 (64.4)	8.6± 1.2 (68.8)	1.4 NS	6.6± 0.9 (65.2)	10.0± 1.3 (78.2)	2.1*	7.6± 1.0 (60.0)	7.8± 1.1 (61.3)	-0.90 NS

Group I - Experimental group with supplementation of soyachakali.
Group II - Experimental group with supplementation of soyaflakes chiwada .
Group III - No supplementation i.e. control group.
Figures in Paran theses indicate percentage.
* significant at 5 per cent level ** significant at 1 per cent level
NS Non Significant BS – Before supplementation AS – After supplementation

Table-3
Average of Serum Protein, Vitamin A, Iron and Zinc Status Of Experimental Groups Before And After Supplementation

Biochemical analysis	Group I Mean ± S.D.			Group II Mean ± S.D.			Group III Mean ± S.D.		
II	**BS**	**AS**	**'t' value**	**BS**	**AS**	**'t' value**	**BS**	**AS**	**'t' value**
Serum Iron (µg/dl)	50.06±6.8 (47.7)	69.7± 9.5 (66.3)	2.50*	50.8± 6.9 (48.3)	68.5± 9.3 (65.2)	2.74*	50.5± 6.8 (48.2)	52.5± 6.8 (50.2)	0.47 NS
Serum protein (gl/dl)	4.2 ± 0.6 (62.7)	5.8± 0.8 (86.5)	2.7*	4.5 ± 0.6 (67.1)	6.0 ± 0.8 (89.7)	3.41**	4.4 ± 0.7 (67.7)	4.9 ± 0.5 (69.7)	1.24 NS
Serum Vitamin A (IU/dl)	8.28± 1.1 (24.0)	28.4 ± 3.9 (81.9)	3.71**	9.23 ± 1.3 (26.8)	20.0 ± 2.3 (58.7)	2.88*	8.21± 1.1 (23.7)	8.4± 1.4 (25.7)	0.71 NS
Serum Zinc (µg/ml)	11.65± 1.6 (61.3)	14.8 ±2.0 (76.7)	3.18**	8.8 ± 1.2 (46.3)	14.8 ± 2.0 (76.7)	3.06**	7.27± 1.0 (38.2)	7.8± 1.8 (40.2)	0.64 NS

Group I - Experimental group with supplementation of soyachakali.
Group II - Experimental group with supplementation of soyaflakes chiwada.
Group III - No supplementation i.e. control group.
Figures in Paran theses indicate percentage.
*significant at 5 per cent level ** significant at 1 per cent level
NS Non Significant BS – Before supplementation AS – After supplementation

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