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Biochemical Status of Malnourished Preschool Children after Supplementation of Soychakali

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Abstract

Supplementary feeding programmes are the emerging need in under nutrition for vulnerable segment in the population. Food which is used for additional requirement and supply adequate nutrient hence soyachakali was formulated and evaluated for its organoleptic qualities like taste, texture, flavour and over all acceptability. Highly scored soyachakali was selected for feeding. The nutritional qualities likes major nutrients such as energy(465.0kcal), proteins (19.3 g) and fats (20.8 g) content found more in soychakali. The micro nutrients such as iron (4.9 mg), zinc (2.1 mg) and calcium (245.5 mg) were also observed higher range in soychakali It also noted that it content, very less antinutrtional factors. It has shown better keeping qualities upto two months when stored in a high gauge package at room temperature. Soychakali has also shown very low production cost. Hence, it found very cheap and affordable to the below poverty line group of children. The soychakali was given @ 50 g/ child/day. The biochemical parameters such as haemoglobin g/dl, serum protein g/dl, blood glucose level mg/dl; serum vitamin A µg/dl, serum iron µg/dl and serum zinc µg/dl were analyzed for the every month of interval during research work. Significant effect on increasing blood glucose level, blood haemoglobin, serum protein, serum vitamin A, serum iron and serum zinc status of preschool children were seen after supplementation of soychakali for six months.

Keywords: Biochemical analysis, Soychakali and Supplementary Feeding.

Introduction

Soyabean is very much popular food crop in most of the countries of the world where as large number of people is found of soya products are prepared from soya seeds. 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. Soyabean is now getting wide acceptance in India. Soyabean is higher in protein than other legumes and many animal products. The protein derived near by 40 per cent by soyabean. However, the quality of soya protein that is most remarkable health care professionals across the global recognizes. The superiority in quality of soya protein considers equivalent to that of the other high quality protein sources[1].

The protein of meat, fish, eggs and grains become acid producing while most of the soya proteins are measured alkalizing in their effects which make desirable and substitute as human food. The soya protein is free from nucleoproteins and therefore it does not lead to formation of uric acid, hence it helps to inhibit gout. Soyabean contained sufficient amount of fat soluble vitamins like A, D, E and K where as water soluble vitamins such as B complex vitamins i.e. vitamin B_1, B_2, B_3, B_6 and B_{12} which are quite essential for the promotion of growth and reproduction. When soyabean soaked in water and sprouted they contain vitamin C which is found in fresh fruit and green vegetables. Hence attempt was made to produce soyachakali. It is traditional very much popular in children[2].

Material and Methods

Local varieties of soybean MC HS 58 and rice i.e. Ratanagri were procured from market. It is cleaned washed dried roasted and ground separately. The different combinations were used for the formulation of and preparation of soychakali.

Sensory evolution: By the use of three different combination soychakali was prepared and evaluation by organoleptically with the help of trained panel of judges on a nine point Hedonic scale[3].

Chemical analysis of soyproducts: High scored soychakali in sensory evaluation was selected for chemical analyses. Such as moisture content, total ash, major nutrient like crude protein, fat, carbohydrates, B complex vitamins, minerals such as iron, calcium, zinc and crude fiber with the use of method described in[4].

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 µg/dl, serum iron mg/dl and serum zinc µg/dl were analyzed by using methods[5].

Statical analysis: The organoleptical qualities of soychakali was carried out after it storage for 0 to 1 month and 1 to 2 month packed in polythene and high gauge packaging materials

at room temperature. The differences noticed among this were calculated by statically and also biochemical parameters before and after feeding with one month interval. The obtained data was analyzed statically significant at P < 0, 0.5 levels SE and CD at 5 per cent level[6].

Selection of malnourished children: Selection of preschool malnourished children were done by evaluating weight for height and body mass index

Results and Discussion

Biochemical compositions and storage stability of soychakali: The data given in table 1 reveals the storage changes in proximate, biochemical compositions and sensory qualities in soychakali kept in different packages for 0p to 1 and 1 to 2 months at room temperature. The changes in per cent of moisture and the content of B complex vitamins and β carotene in soychakali were noticed at significant level after two months of storage table-1.

The per cent of proximate compositions such as and protein was found decreased at highly significant level i.e. 22.12. to 21.02 in the chakali stored unto 2 months of period. Where as the value of B complex vitamins such as vitamins B_1 (0.45to 0.26 mg) vitamin B_2 (0.39 to 0.28mg) and vitamin B_3 (1.69 to 1.27mg) were observed reduced significantly in the soychakali. Similarly significant change was seen for βcarotene (230.0 to 288.9)µg for 2 months. Non significant effect was noticed in the changes of minerals and crude fiber contents in the soylchakali after 2 months of storage.

The data of average biochemical analysis of experimental group was given in table II It explained that, Group I children found more average values of blood glucose i.e. 65.7 mg/dl, hemoglobin 8.6 g/dl, serum protein 5.8 g/dl, serum vitamin A 112.3 IU/dl 130.0 µg/dl serum iron and zinc 1.05 µg/ml. These values i.e 66.0 mg/dl, 7.6 g/dl, 4.3 g/dl, 36.0 IU/dl ,81.9 µ/dl and 05.54 µ/ml per cent as blood glucose, hemoglobin, serum protein, serum vitamin A, serum iron and serum zinc respectively noted in group II children.

All the average values of biochemical parameters were noted below the standard level in control group of children.

The biochemical parameters which are analyzed after supplementation were compared with their previous i.e. before supplementation values. The relevant data was presented in tables-2

Table III represents the data regarding average biochemical assessment of blood glucose and hemoglobin levels in different experimental groups of children before and after supplementation. It shown that, group I children had highly significant difference in their blood glucose level before supplementation (66.5 mg/dl) and after supplementation (72.1 mg/dl). Where as group had increased these values from 60.4 to 65.7 mg/dl and(60.4) to (72.9).7 mg/dl blood glucose level after supplementation respectively[7]. There was no significant difference noted in blood glucose level before and after experimental period in control of group of children.

A similar observation were recorded about haemoglobin level of these experimental groups However, group I children noticed slightly increased in haemoglobin level, but this increase did not found significant. These children shown increase of haemoglobin from 8.1 to 8.6 g/dl (i.e. 64.4 to 68.0) per cent[8]. Control group children did not shown any increase difference in the haemoglobin level after experimentation.

The data regarding average values of serum protein, vitamin A, iron and zinc of experimental group of children compared with before and after supplementation, it was presented in table IV. Whereas group I reported that there was an increased values from 62.7 to 86.6 per cent 4.2 to 5.8 g/dl serum protein after experimentation. There was slight decreased in serum protein level from 4.4 to 4.3 g/dl,in control group.

Group I children also noticed increased the level of serum vitamin A from 36.2 to 112.3 IU/dl after supplementation. However, this increased per cent of serum vitamin A level recorded in below the moderate level of their standard value. No significant change was observed in serum vitamin A level after experimentation among control group children.

Serum iron status of the group I found highly significant increased. Where as it was noticed as 76.8 per cent increased in group I children after supplementation. Control group of children reported a non significant increased in serum iron level from 78.0 to 81.9 µg/dl (i.e. 45.9 to 48.2 per cent).

Increased serum zinc level from 46.4 to 75.0 per cent after supplementation in group I. In control group of children the values recorded shown non significant increase in serum zinc level after supplementation.

Conclusion

On the whole, it can be concluded that, the supplementary feeding through soychakali found positive impact on improving the biochemical parameters of preschool malnourished children. supplementation of soychakali shown a 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 soyachakali have effectively worked. Soyachakali has capacity in improving the nutritional status of malnourished preschool children.

Table-1
Biochemical Changes in Soy Product on Storage

Sr. No	Nutrient	Soya chakali		
		Up to 1 Month	1 to 2 Month	`t' test
1	Moisture %t	8.69	8.01	2.218*S
2	Ash %	13.92	3.06	0.267*S
3	Protein g/100gm	22.12	21.01	3.705**S
4	Fiber %	51.45	1.40	0.166NS
5	Fat %	9.99	9.09	0.60NS
6	Carbohydrates g/100gm	54.57	53.07	5.007*S
7	Iron g/100gm	7.01	6.99	0.066NS
8	Zincmg/100gm	4.05	4.00	0.667 NS
9	Calcium mg/100gm	159.9	159.6	1.001 NS
10	BcaroteneUg/100gm	230.0	288.9	3.672**S
11	B1 mg/100g	0.45	0.26	2.155**S
12	B2 mg/100g	0.39	0.28	1.981*S
13	B3mg/100g	1.69	1.27	1.920*S

NS- non significant, *Significant at 1 per cent level. **Significant at 5 per cent level.

Table-2
Average Biochemical Analysis of Experimental Groups

Sr. No.	Biochemical analysis	Group I Mean ± S.D.	Group II Mean ± S.D.
1	Blood glucose (mg/dL)	65.7 ± 2.9(72.9)	66.0 ± 1.8(73.3)
2	Haemoglobin (g/dl)	8.6 ± 1.1(68.8)	7.6 ± 1.0(60.7)
3	Serum protein(g/dl)	5.8 ± 0.8(86.6)	4.3±0.7(65.5)
4	Serum Vitamin A (IU/dl)	112.3±2.9(74.7)	36.0±1.1(24.0)
5	Serum Iron (µg/dl)	130.7±1.5(76.8)	81.9±3.8(48.2)
6	Serum Zinc (µg/ml)	1.05±2.0(75.0)	0.54±0.9(38.6)

Group I - Experimental group supplemented with soyachakali. Group II - No supplementation i.e. control group. Figures in parantheses indicate percentage.

Table-3
Average Blood Glucose and Haemoglobin Level of Experimental Groups Before and After Supplementation

Sr. No	Biochemical analysis	Group I Mean ± S.D.			Group II Mean ± S.D.		
I		BS	AS	't' value	BS	AS	't' value
1	Blood glucose (mg/dl)	60.4± 2.2 (60.4)	65.7± 2.9 (72.9)	3.2*	60.9± 1.9 (65.9)	66.0± 1.8 (73.3)	1.8NS
2	Haemoglobin(g/dl)	8.1± 1.1 (64.4)	8.6± 1.1 (68.8)	1.4 NS	7.2± 1.0 (60.0)	7.6± 1.0 (61.7)	-0.90 NS

Group I - Experimental group supplemented with soyachakali. Group II - 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-4
Average Serum Protein, Vitamin A, Iron and Zinc Status of Experimental Groups Before and After Supplementation

Sr. No.	Biochemical analysis	Group I Mean ± S.D.			Group II Mean ± S.D.		
II		BS	AS	't' value	BS	AS	't' value
1	Serum protein (gl/dl)	4.2 ± 0.6 (62.7)	5.8± 0.8 (86.6)	2.7*	4.4 ± 0.7 (67.7)	4.3 ± 0.7 (65.5)	1.24 NS
2	Serum Vitamin A (IU/dl)	36.2± 1.1 (24.9)	112.3 ± 2.9 (74.7)	3.71**	34.0± 1.1 (23.4)	36.0± 1.1 (24.0)	0.71 NS
3	Serum Iron (µg/dl)	81.0± 2.6 (47.6)	130.7± 1.5 (76.8)	3.50*	78.0± 2.8 (45.9)	81.9± 3.8 (48.2)	0.47 NS
4	Serum Zinc (µg/ml)	0.65± 0.6 (46.4)	1.05 ±0.2 (75.0)	3.18**	0.57± 0.1 (40.7)	0.54± 0.2 (38.6)	0.64 NS

Group I - Experimental group supplemented with soyachakali. Group II - 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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