



Impact of Soya product Supplementation on Major Nutrition Intake of Preschool Malnourished Children

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Abstract

Protein calorie malnutrition is major nutritional problem of the world. 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 soyaladoo, soyachakali and soyaflakes chiwada. These products were evaluated for its major nutrient content like carbohydrates energy, protein and fat. The energy of soyaladoo, soyachakali and soyaflakes chiwada was 1070 ± 1.8 , 1065 ± 1.4 , 8260 ± 3.6 respectively. The protein content was 32.1 ± 1.7 , 30.8 ± 1.5 and 28.0 ± 0.6 in soyaladoo, soyachakali and soyaflakes chiwada. Similarly fat content were 24.0 ± 1.3 , 22.8 ± 1.7 and 22.9 ± 0.7 . The malnourished preschool children were classified as grade II and III. These products were given to preschool malnourished children experimental group of children @50 gm product/day /child at provides energy; protein and fat as per ICMR recommendation were seen. Highly significant change in their major nutrient consumption.

Keywords: Soyladoo, soyachakali, soyaflakes chiwada and Supplementary Feeding.

Introduction

Soyabean is oilseed legume group getting its importance as cash crop as well as legume crop. It contains 40 per cent of protein. Among all legumes it is only the cheapest legume having nutraceutical properties. It contains almost all nutrients and plenty of antioxidant properties¹. It contains isoflavonoids. The amino acid pattern of the soyabean is similar to cow milk. The proteins are alkaline in nature. Due to its high biological value it contains good number of essential amino acids. Hence it can be used to prevent protein calorie malnutrition among vulnerable group of community. The regular intake of traditional soya foods help to prevent –breast cancer, prostate cancer, color cancer and menopausal problem of women². Regular intake of soyabean also prevents hyper cholesterol level in the blood; by preventing atherosclerosis³ Consumption of soyabean daily suitable for diabetic patients. It also prevents osteoporosis in elderly person. It contains emulsifier and helps in dispose of fatty material from vital organs.

Material and Methods

Formulation: Formulation and preparation of soyaladoo, soyachakali and soyaflakes chiwada was done by using standard method by Thangamms Phillips⁴.

Evaluation of soya products: Sensory⁴ Evaluation: Soya products were prepared and evaluated by organoleptically with the help of trained panel of judges on a nine point Hedonic scale⁵.

Nutritional Evaluation: High scored soyaflakes chiwada in sensory evaluation was selected for the nutritional quality analysis. Moisture content, total ash, major nutrient like crude protein, fat, carbohydrates, B complex vitamins including vitamin B₁, B₂ and B₃, minerals such as iron, calcium, zinc and crude fiber were analyzed by use of methods described in AOAC and Rghunramula⁶⁻⁷.

Statistical analysis: Soya products food intake were carried out. The obtained data was analyzed by statistical significant at $p < 0.05$ level, S. E. and CD. at 5 per cent level by the procedure given by Gomez⁸.

Results and Discussion

Nutrient Intake by Experimental Groups: The major nutrients intakes in terms of their six months period of supplementation were assessed month wise. The averages of these nutrients intake were calculated. The mean intake of nutrients within experimental period compared with their before supplementation. These relevant data was reported in Figure no 1, 2, 3.

The data about different month wise nutrient intake by all experimental groups (I to IV) was shown in figure no. 1 to 3 Figure 1 indicated the calorie intake of all experimental groups during entire period of supplementation. Calorie intake by Group I preschool children were shown highest as compared with other groups i.e. II, III and IV. During these months the per cent of calorie intake at initial month was as 68.5 and found increased as 73.0 per cent at last month. Slow increasing level in calorie intake was noticed in Group I during different months of

supplementary period. Group II and III found nearly equal per cent intake of calorie within the supplementary period. Group IV i.e. control also noticed a steadily intake of calories during experimental period.

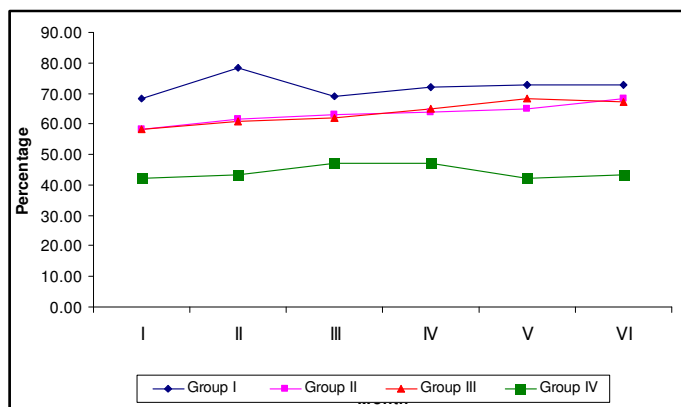


Figure-1

Calorie intake of different experimental groups of preschool children

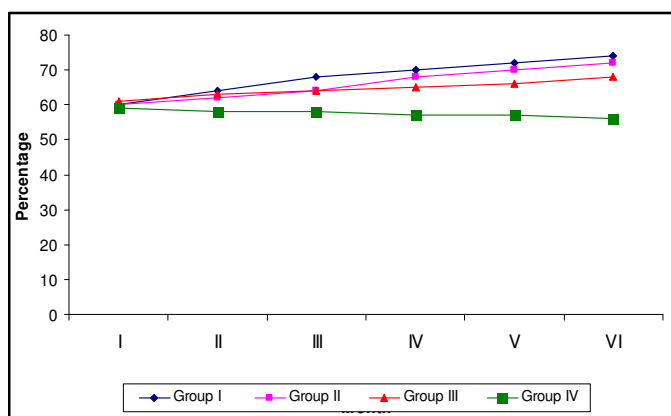


Figure-2

Protein intake of different experimental groups of preschool children

Figure-2 explained the protein intake by experimental groups during the supplemented period. It focuses that, there was no remarkable difference noticed in month wise in protein intake among these groups i.e. I,II and III during entire period of supplementation. However Group I noted as highest in protein intake during this period. Whereas control group found at lower level in regards with protein intake during the supplementation period. It was noted only 59.0 per cent at initial month and found decreased as 56.0 per cent at last month.

Supplementary Feeding: The soya ladoo, soya chakali and soya flakes chiwada were given @ 50gm /day/child for six months to preschool malnourished children.

Figure 3 highlights the month wise fat intake by experimental groups during the supplementary period. It stated that, Group I

scored at higher fat intake as compared with other groups in the initial month it observed 81.0 per cent fat intake and found 95.0 per cent at last month. Group II clearly shown in IInd and Group III period noticed in IIIrd position in fat consumption during found in fat intake from initial to last month in control group. Hence, it recorded as in IVth position.

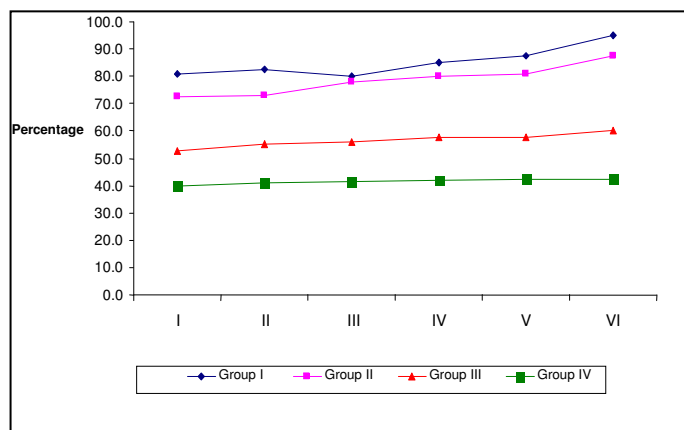


Figure-3

Fat intake of different experimental groups of preschool children

Proximate Analysis of the product: Table no 1 represents the precise picture of average major nutrients content in content different soya by products. It revealed that, the values of major nutrients like carbohydrate (95.4 g), energy (1070 k.cal), total protein (32.1g) and crude fat (24.0g) noticed more in soyaladoo than other soya by products. Per cent of moisture and ash were noted more in soyafakes chieada. Among these products lower values of carbohydrate (86.7g), energy (826 k.cal) and total protein (28.0 g) were shown in soyafakes chiwada. Major nutrients content between soyachakali and soyafakes chiwada did not found significantly by different.

Average major nutrient like calorie, protein and fats minor nutrients such as vitamins and minerals intake by experimental group expressed in table 1. The mean calorie intake by soyaladoo supplemented group was 1144 Kcal±11.4 and (78.4per cent) which was higher among all supplemented groups followed by soyachakali group it was 1060.6 Kcal±6.2 and (72.6per cent) and that of soyflakes group was 924.3 Kcal±3.1 and (63.3 per cent). The control group had lower calorie intake i.e. 634.2 Kcal±5.3 and (43.4per cent). The calorie intake of control group was noted as 56.6 per cent less than their required calorie.

The mean protein intake by all supplemented groups found higher than control group. The protein intake by soyaladoo was noted as 17.4 (g) ± 4.3 and (66.9per cent) followed by soyachakali group i.e. 16.9 (g) ± 4.2 and (65.1per cent) and soyafakes chiwada was 16.6 (g) ± 4.1 and (64.0per cent). The control group reported the protein intake only 10.0 (g) ± 2.7 and (38.5per cent), it was noted as 61.5 per cent inadequate level.

The average fat intake of supplemented groups was also noticed more than control group. The mean fat intake by soyaladoo was found more 21.1(g) ± 4.3 and (84.5per cent) among all the experimental groups ranked in II as intake of fats. Whereas preschool children who supplemented with Group II it was s 19.5(g) soyaflakes chiwada group III recorded as 14.5(g) fat intake and ranked III. Control group noted only 10.3(g)±2.1 fat intake which found poorly adequate level i.e. (41.3per).

Average nutrients intake by experimental group was compared with their before supplementation intake. The relevant data was presented in Table 7.8, 7.10 and 7.12. Table 2 given an idea about the comparative average in major nutrient intake like calorie, protein and fats before and after supplementation among experimental groups. Average calorie (1144.0 kcal) intake in group I seen increased highly significant after supplementation. Before supplementation it was recorded as only 724.0kcal in this group. Per cent calorie (78.1) intake of group I after supplementation found nearby moderate adequate level. Highly significant increased in up to 63.1 per cent in group III after supplementation. There was no significant change noticed in average calorie intake of control group. Group I found highly significant increased protein intake (17.4 g) after supplementation. Average protein (9.0 g) intake in group II before supplementation recorded increased at highly significant (17.0 g) after supplementation Group III found in III position in the increased protein intake (16.6g) after supplementation. It

recorded as increased from 29.4 to 64.0 per cent protein intake after supplementation. Whereas the average intake of protein after supplementation was slightly found decreased in control group as compared with intake before supplementation.

Average fat consumption in group I noticed increased at highly significant level. It shown that, fat intake before supplementation 6.1g increased up to 21.1 g after supplementation. This fat intake was noted as moderately adequate (84.5 per cent) level in group I after supplementation. Group II also found highly significant increased in fat intake (19.5g) after supplementation, but this fat intake was not modernly adequate (77.8 per cent).

A similar picture found in case of fat intake in group III. Whereas control group noted as non significant fat intake as compared with before and after six months of experimental period.

Conclusion

On whole it can be concluded that the consumption of soyabased food products like soyaladoo, soya chakali and soyaflakes chiwada shown significant increased in the consumption of major nutrient like energy, protein and fat. These products can be used to combat protein calorie malnutrition among the children.

Table-1
Average Major Nutrients Content in Soya By Products

Sr. No.	Major nutrients (per 100g)	Soya by products			't' Test
		Soyaladoo Mean ± SD(a)	Soyachakali Mean ±SD(b)	Soyaflakes chiwada M± SD(c)	
1	Moisture(per cen)	11.6±2.2	11.4±1.2	11.8±1.7	a vs b (0.06) NS b vs c (1.10) NS c vs a (0.07) NS
2	Ash (per cent)	3.1±1.7	2.9±0.9	3.6±1.5	a vs b (1.23) NS a vs c (1.61) NS c vs a (0.91) NS
3	Carbohydrat(g)	95.4±1.9	93.1±0.7	86.7±3.1	a vs b (1.77) NS b vs c (2.65) * c vs a (2.81) *
4	Energy (k.cal)	1070.0±1.8	1065.0±1.4	826.0±3.6	a vs b (1.22) NS b vs c (2.78) * c vs a (2.86) *
5	Total protein(g)	32.1±1.7	30.8±1.5	28.0±0.6	a vs b (1.07) NS b vs c (1.23) NS c vs a (2.61) *
6	Crude fat (g)	24.0±1.3	22.8±1.7	22.9±0.7	a vs b (0.92) NS b vs c (0.03) NS c vs a (1.13) NS

*significant at 5 per cent level, NS – Non Significant

Table-2
Average Major Nutrients Intake of Experimental Groups

Sr. No.	Nutrients	Group I Mean ± S.D.	Group II Mean ± S.D.	Group III Mean ± S.D.	Group IV Mean±S.D.
1	Calories (K.cal)	1144 ±11.4(78.4)	1060.6± 6.2(72.6)	924.3± 3.1(63.3)	634.2± 5.3(43.4)
2	Protein (g)	17.4±4.3(66.9)	16.9±4.2(65.1)	16.6±4.1(64.0)	10.0±2.7(38.5)
3	Fat (g)	21.1±4.3(84.5)	19.5 ±4.0(77.8)	14.5±3.0(58.0)	10.3±2.1(41.3)

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

Table-3
Average nutrients majorintake of experimental groups with their before and after supplementation

Sr. No.	Nutrients	Group I Mean ± S.D.			Group II Mean ± S.D.			Group III Mean ± S.D.			Group IV Mean ± S.D.		
		BS	AS	't' value	BS	AS	't' value	BS	AS	't' value	BS	After 6 months	't' value
1	Calories (K.cal)	724±98.9 (49.4)	1144±114.6 (78.1)	14.1**	745±101.7 (50.9)	1060±106.2 (72.4)	10.6**	624±85.2 (42.6)	925±93.1 (63.1)	10.1**	634±86.6 (43.8)	635±86.5 (43.8)	0.15 NS
2	Protein (g)	8.4±1.1 (32.2)	17.4±2.37 (66.8)	8.0*	9.0±1.2 (34.3)	17.0±2.3 (65.1)	6.8**	7.6±1.0 (29.4)	16.6±2.2 (64.0)	3.2**	15±1.3 (38.5)	15.2±1.3 (38.7)	0.70 NS
3	Fat (g)	6.1±0.8 (24.5)	21.1±2.8 (84.5)	8.3**	5.5±0.7 (21.8)	19.5±2.6 (77.8)	6.9**	7.5±1.0 (29.9)	14.5±6.0 (57.9)	2.6*	10.00±1.3 (40.0)	10.3±1.4 (41.3)	1.10 NS

Group I- Experimental group with supplementation of soyaladoo., Group II - Experimental group with supplementation of soyachakali, Group III- Experimental group with supplementation of soyaflakes chiwada, Group IV - 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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