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Study on Nutritional Analysis of Soya by products before and after Processing

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Abstract

Formulation (developing a formula for a preparation) is carried out to achieve desired characteristics that make it suitable for a specific action or application. Formulation means making all possible combinations. The formulation of food products had done with its varying amounts in different food products. The most traditional and familiar foods in the family and among the children are purposefully selected. These products are ladoo, chakali and chiwada are the most traditional and familiar products in India particular in Maharashtra, these products are selected for the formulation with Soybean. The principle of nutrition such as carbohydrates, fats, proteins, vitamins and minerals were analyzed from the high scored selected soya by products. The vitamins such as thiamin, riboflavin, niacin, ascorbic acid and β carotene were estimated from soya products as well as minerals like iron, calcium and zinc were analyzed before and after processing. It has been seen that no significant changes in all nutrients have been seen after processing of these soya products, except β complex vitamins.

Keywords: Soya products, nutrients and malnourished preschool children.

Introduction

Soybean is an important legume and oil seed crop in Maharashtra. It is one of the natures wonder and nutritional gift which provides good quality protein with minimum saturated fat and high calorie value. Soybean has endowed with apithel functional food of the country as beyond traditional basic nutrition[1]. Soybean also contain the nutraceutical properties like isoflavones, phytoestrogen, soluble phosphate and potassium sulphate in which these properties are mostly used to prevent the risk of dreaded diseases like breast cancer, osteoporosis, cardiovascular disease, kidney stone and help in beating menopausal blue[2].

Material and Methods

Formulation: Formulation and preparation of soyaladoo, soyachakali and soyaflakes chiwada was done by using standard method by Thangamms[3].

Evaluation of soya products: Sensory Evaluation: Soya products were prepared and evaluated by organoleptically with the help of trained panel of judges on a nine point "Hedonic scale"[4].

Nutritional Evaluation: High scored soyflakes 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 B_1,B_2 and B_3 , minerals such as iron, calcium, zinc and crude fiber were analyzed by use of methods described in Official methods of analysis, Annual Laboratory techniques [5and6]

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, Statistical Procedures for Agricultural Research[7].

Results and Discussion

Major Nutrients Content in Soya by product: The data presented in table-1 highlights the major nutrients content in soya doo. It revealed that, per cent of moisture and ash content in raw ingredients of soyaladoo was 13.2 and 4.8 respectively. It was non significantly decreased in per cent of moisture as 11.6 and ash as 3.1 after processing in finished product. Carbohydrate content in the ingredients of soyaladoo noticed as 96.9 (g) before processing. When it was prepared in soyaladoo, decreased non significant level as 95.4 (g). The energy (k.cal) was obtained from raw ingredients of soyaladoo as 1073.7 and as in finished product as 1070.0. Reduction of energy level in the preparation of soyaladoo was found at non significant level. Total protein (g) content in prepared soyaladoo was slightly noted as reduced (32.1) as compared with its raw ingredients (33.5). Similar observations were obtained in case of crude fat. It was found as 26.7 g in the raw ingredients of soyaladoo. Whereas it decreased non significantly as 24.0 in prepared soyaladoo. A non significant reduction were reported in content of moisture, ash, Carbohydrate, energy, total protein, crude fat after processing treatment in the preparation of soyaladoo as compared with its raw ingredients[8]. The ingredients and finished product i.e. soyachakali was given in table 2 It explained that, moisture content in raw ingredients used for the preparation of soyachakali was 12.6 per cent. It was found decreased non

significantly as 11.4 per cent in finished product. Per cent of ash content in raw material and soya chakali as a finished product was obtained as 3.4 and 2.9 respectively. 94.7 g carbohydrates were noted in raw ingredients of soyachakli. Whereas it was recorded as 93.1 in finished product. Total protein (g) content in raw ingredients of soyachakali reported as 32.6. It was slightly decreased in final product i.e. (30.8). 24.3 and 22.8 g crude fat was found respectively in ingredients used for soyachakali and its final product after processing. A non remarkable reduction was observed in all the major nutrients in final product i.e. soyachakali. The major nutrients in raw ingredients of soya flakes chiwda and its content in final product. Percent of moisture recorded as 12.6 in the raw material of soyaflakes chiwada. It was noted as 11.8 per cent in final product as soyaflakes chiwada. 3.8 and 3.6 per cent ash content were observed in raw ingredients from which the soyaflakes chiwada prepared. Whereas 826.6 (k.cal) energy had recorded from its final product. The values of total protein (g) were slightly found lower (28.0) in final product of soyaflakes chiwada than their raw ingredients (29.2). Whereas 23.6 and 22.9 (g) of crude fat were measured from raw material and final preparation of soyaflakes chiwada respectively. A non significant reduction was observed in all the major nutrients after the application of processing techniques.

Vitamins Nutrients Content in Soya by product: The data about average vitamins content in raw ingredients of soyaladoo and its final preparation is presented in table no 1It describes that, thiamine content (mg) in raw ingredient noticed as 0.38, where it was found as 0.36 in final product. Very low content of riboflavin (mg) and niacin (mg) were obtained as 0.18 and 3.35 in soyaladoo respectively. The values of vitamin B_2 and B_3 found decreased slightly in its processing. Whereas content of β Carotene (µg) in soyaladoo was measured as 1186.6. The values of all vitamins were decreased non significantly in the process of soyaladoo preparation. The vitamin content in raw ingredients used for soyachakali preparation and final product of soyachakali was explains that, thiamin content (mg) in raw material and final prepared soyachakali was recorded as 037 and 0.32 respectively. In comparison of thiamin values between raw ingredients and final product, it found decreased significantly after processing. The content of riboflavin (mg) was as 0.21 in raw ingredients and 0.19 in its final prepared product. The values of niacin (mg) showed significantly reduced in the finally prepared product (5.27) than their raw ingredients (5.89). The β Carotene (µg) values were also noted lowered due to processing in soyachakali (968.5) than that of its raw material (1084.6). It was clearly observed that expect riboflavin, all vitamins levels were reduced during processing of soyachakali. It might be due the deep frying cooking affected on water soluble as well as fat soluble vitamins[9]. The highlights the average vitamin content in soyaflakes chiwada. Vitamin content in raw ingredients of soyaflakes chiwada found as 0.30 mg thiamin, 0.29 mg riboflavin, 7.21 mg niacin and 1129.6 µg β carotene. These values of vitamin were noted as 0.29 mg, 0.27 mg, 7.11 mg and 1127.8 µg as thiamin, riboflavin, niacin and β carotene respectively in final prepared soyaflakes chiwada. Slight changes were observed in the values of vitamins content in raw material and final product. But these changes were noted as non significant.

Minerals Nutrients Content in Soya by product: The soya by products were also evaluated for their mineral contents. The data about minerals such as calcium iron and zinc content in different soy by products was presented in table-3.

Table-1
Major Nutrients Content in Soya by product

Sr. No.	Major nutrients (per 100g)	Soyaladoo Mean ± SD		't' Test	Soyachakali Mean ± SD		't' Test	Soyaflakes chiwada Mean ± SD		't' Test
		Before processing (raw ingredients)	After processing (final product)		Before processing (raw ingredients)	After processing (final product)		Before processing (raw ingredients)	After processing (final product)	
1	Moisture (per cent)	13.2±2.61	11.6±2.19	0.26 NS	12.6±2.04	11.4±1.22	0.21 NS	12.6±2.8	11.8±1.7	0.65 NS
2	Ash (per cent)	4.8±4.90	3.1±1.72	0.21 NS	3.4±1.31	2.9±0.94	0.62 NS	3.8±1.4	3.6±1.5	0.08 NS
3	Carbohydrate (g)	96.9±2.06	95.4±1.91	0.04 NS	94.7±2.75	93.1±0.68	0.04 NS	88.2±2.3	86.7±3.1	1.27 NS
4	Energy (kcal)	1073.7±2.11	1070.0±1.76	0.90 NS	1069±1.36	1065±1.41	0.65 NS	827.8±4.4	826.0±3.6	1.08 NS
5	Total protein (g)	32.1±1.87	28.5±1.65	0.53 NS	32.6±1.28	30.8±1.50	0.41 NS	29.2±1.8	28.0±0.6	0.91 NS
6	Crude fat (g)	26.7±1.69	24.0±1.25	0.41 NS	24.3±1.80	22.8±1.73	0.63 NS	23.6±0.9	22.9±0.7	0.05 NS

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

Table-2
Vitamins Nutrients Content in Soya by product

Sr. No.	Minor Nutrients (per 100g)	Soyaladoo Mean ± SD		't' Test	Soyachakali Mean ± SD		't' Test	Soyaflakes chiwada Mean ± SD		't' Test
		Before processing (raw ingredients)	After processing (final product)		Before processing (raw ingredients)	After processing (final product)		Before processing (raw ingredients)	After processing (final product)	
1	Thiamine (mg)	0.38±0.04	0.36± 0.01	0.24 NS	0.37±0.52	0.32± 0.39	2.88 *	0.37±0.52	0.32± 0.39	2.88 *
2	Riboflavin (mg)	0.20±0.06	0.18±0.03	0.18 NS	0.21±0.04	0.19±0.01	1.38 NS	0.21±0.04	0.19±0.01	1.38 NS
3	Niacin (mg)	4.65±0.19	3.35±0.15	0.28 NS	5.89±1.23	5.27±0.98	2.94*	5.89±1.23	5.27±0.98	2.94*
4	B Carotene (µg)	1190.6± 5.65	1186.6±4.49	1.37 NS	1084.6± 4.09	968.5±3.11	2.97*	1084.6± 4.09	968.5±3.11	2.97*

*Significant at 5 per cent level. NS – Non Significant

Table-3
Minerals Nutrients Content in Soya by product

Sr. No.	Major nutrients (per 100g)	Soyaladoo Mean ± SD		't' Test	Soyachakali Mean ± SD		't' Test	Soyaflakes chiwada Mean ± SD		't' Test
		Before processing (raw ingredients)	After processing (final product)		Before processing (raw ingredients)	After processing (final product)		Before processing (raw ingredients)	After processing (final product)	
1	Calcium (mg)	288.4±11.5	286.9±8.6	0.14 NS	247.6±8.2	245.5±4.1	0.16 NS	275.4±4.8	273.8±3.5	0.29 NS
2	Iron (mg)	6.4±1.2	6.3±0.90	0.07 NS	5.3±2.5	4.9±1.4	0.08 NS	6.2± 1.3	5.8 ± 0.6	0.15 NS
3	Zinc (mg)	4.1±0.6	3.8±0.70	0.17 NS	2.3±1.7	2.1±0.6	0.11 NS	2.8 ± 0.7	2.5 ± 0.1	0.08 NS

*Significant at 5 per cent level. NS – Non Significant

It indicated that the raw ingredients of content 288.4 mg calcium, 6.4 mg iron and 4.1 mg zinc. Whereas these values were slightly reduced as 286.9, 6.3 and 3.8 mg of calcium, iron and zinc respectively after the processing and preparation of soyaladoo.

It describes that, calcium (mg) was obtained as 247.6 in raw ingredients of soyachakali. It was slightly noted lower i.e. 245.5 mg in final product of soyachakali. Iron contents (mg) in raw material and its final product of soyachakali were noticed as 5.3 and 4.9 respectively. Zinc (mg) appeared as 2.3 in raw ingredients and 2.1 in the final product of soyachakali[10] mineral content in soyaflakes chiwada calcium (mg) found 275.4 in the raw materials of soyaflakes chiwada. Whereas it was noted as 273.8 mg in final product of soyaflakes chiwada. Iron and zinc were noticed as 6.2 and 2.8 mg in the raw ingredients of soyaflakes chiwada where as it these values were observed as 5.8 and 2.5 mg in final product. All these mineral values were found non significantly decreased after processing in the preparation of soya flakes chiwada[11].

Conclusion

It has to be seen that all formulated soy byproducts; there were no significant change in all nutrients seen after processing of these soya products, except β complex vitamins. In soya chakali and soya flakes chiwada significant changes were seen in thiamine, niacin and ascorbic acid. The major nutrients content in different soya by products were not found significantly different. Similar picture was noticed regarding evaluation of major and minor nutrients like energy, protein, fats vitamins and mineral in all these soy byproducts. These soya products can be utilized to overcome malnutrition among the preschool children.

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