



FOOD AND NUTRITION NEWS

Acharya N.G. Ranga Agricultural University

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Soybean The Miracle Golden Bean

Soybean is the world's leading grain legume crop. Conventionally, it has been exploited primarily as a source of edible oil for human food and of protein rich meal for livestock. The production of soybean in India during 1985-86 was 0.98 mt. The production augmentation of Soybean in the country has been phenomenal with a record output of 5 mt. a year for over a decade since 1986 accordingly of its importance and increasing demand.

Soybean is hailed as the **Miracle Golden Bean of the 20th Century** and it is rightly praised as treasure trove of many nutrients. It has highest protein content among the plant products. Soy contains 40 per cent protein. Soy protein is rich in lysine, which is deficient in cereals, but is somewhat deficient in the sulphur-bearing amino acids that are contained in adequate quantities in cereals. When soy protein and cereal protein combined in appropriate proportions, the nutritional value of the product approaches that of casein.

Soybean contains 20 per cent fat, and it has number of poly unsaturated fatty acids, which are anti-cholesteric. The oil mainly contains long chain fatty acids such as linoleic, oleic and linolenic acids which are good for health.

The soybean has 35 per cent carbohydrate with major portion being polysaccharides. The galactosaccharides

such as raffinose, stachyose and verbasose present in soybeans are also known as flatus factors. The soybean has 5 per cent minerals and also the richest known source of isoflavones.

It is well known that there are some anti-nutritional factors in soybean, as in other pulses. These are protease inhibitors (8.1 to 38.5 TUI/mg), haemagglutinins 3%, saponins 0.5%, goitrogens and phenolic compounds. However, most of these anti-nutritional factors are heat labile and can be eliminated by suitable heat treatments.

PROCESSING OF SOYBEAN

The characteristic beany flavour and the presence of anti-nutritional factors are the main reasons for the non-utilization of soybean at domestic level in rural and urban areas. It is evident that alternative approaches to soybean processing are needed in order to benefit the majority that need better nutrition. In this direction, as an effort to promote the use of soybean, the Department of Foods & Nutrition, Faculty of Home Science, ANGRAU conducted extensive research on processing and utilization of soybean. Appropriate heat treatments during processing greatly improves the nutritional value of soybean.

A study conducted on making soybeans completely free from the inhibitor with simple device and inexpensive methods of heat treatment

Dr. Vijaya Khader Awarded Certificate of Appreciation



Dr. Vijaya Khader, Director, Centre of Advanced Studies, ANGRAU was awarded a Certificate of Appreciation in connection with the celebrations of Golden Jubilee Year of Independence by the Indian Council of Agricultural Research in recognition of the outstanding contributions made by the Centre of Advanced Studies in Foods & Nutrition by organising the programmes for Human Resource Development and developing excellent instructional materials.

which can be adopted at home level revealed that pressure cooking or 3 minutes of puffing in sand at 250°C or 12 minutes of roasting at 85 to 90°C or boiling the beans for 20 minutes was found sufficient for complete inactivation of trypsin inhibitors.

**R. Manorama
G. Sarojini**

Another simple technology for processing soybean at home level was also developed in the department.

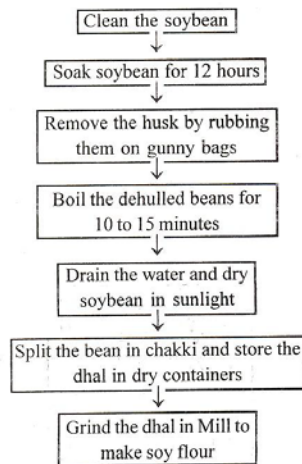


Fig.1: Technology for soybean processing at domestic level

**K. Krishna Kumari
P. Geervani**

UTILIZATION OF SOYBEAN

The functional properties of soy proteins like emulsification, gelation, viscosity, adhesion, cohesion, elasticity and aeration have contributed to the development of variety of processed foods like simulated meats, baked foods, macaroni, sausages, soups etc. in the developed countries by utilizing around 70 per cent of soybean produce in world. In recent times soy foods such as soy milk, soy paneer, soy cheese and meat substitutes like Mealmaker, Nuggets etc. find a good place in Indian market, but beyond the reach of common people due to higher prices. However, soydhal, soyflour and also the edible defatted

soyflour can be easily used to prepare traditional recipes, baked foods, roti blends, fermented products, supplementary foods and therapeutic foods.

TASTY TRADITIONAL RECIPES

Several traditional recipes like *Wheat roti, Sorghum roti, Poori, Pesarattu, Laddu, Mysorepak, Pakodi, Muruku, Sev, Vada* and *Chutney powder* were developed by adding soydhal/soyflour to cereal or pulse flours at 50 per cent level. All these recipes were

found acceptable through sensory evaluation trials. The addition of soy flour increased Protein Efficiency Ratio (PER) of the recipes. Though there was no change in Net Protein Utilization (NPU) values, a significant decrease in Digestibility was observed after soy incorporation. However, the Digestibility of *sorghum roti* and biscuits were better when soyflour was added at 3:2 proportion than in 1:1 proportion (Table-1).

**P. Geervani
K. Krishna Kumari
K. Umadevi**

Table 1 : Biological quality of protein in recipes with soybean

Recipe	PER	NPU	TD
Sorghum soy roti (1:1)	1.54 ± 0.22	43.06 ± 9.2	81.08 ± 3.16
Sorghum soy roti (3:2)	1.46 ± 0.20	53.66 ± 5.95	93.93 ± 2.67
Sorghum soy biscuit (1:1)	1.57 ± 0.78	42.12 ± 8.17	93.03 ± 2.45
Sorghum soy biscuit (3:1)	1.87 ± 0.37	50.37 ± 8.08	95.71 ± 3.08
Casein (control)	3.11 ± 0.22	78.5 ± 3.2	95.6 ± 0.88

COMPOSITE ROTI BLEND

There is a need to promote the products developed in the laboratory for the wide use of the community. To popularise soybean, sorghum-soy roti blend of 3:2 proportion was developed and evaluated for consumer acceptability in rural and urban areas. It was found that the majority of the rural people (65%) were not interested to substitute sor-

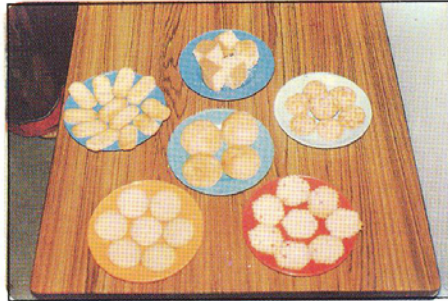
ghum-soy roti for sorghum roti due to the difference in flavour, while 80 per cent of the urban consumers accepted sorghum-soy blend in place of wheat roti. More than 40 per cent of them preferred to consume it daily because of improvement in the texture and nutritive value.

**A. Shobha Reddy
P. Geervani
K. Krishna Kumari**



CRUNCHY BAKED FOODS WITH SOYBEAN

A variety of baked products like *cake, biscuits, cookies, melting moments* etc., were developed by adding soyflour to maida. Consumer evaluation trails were carried out by selling



the sorghum-soy biscuits by name SOJO biscuits through super markets in Hyderabad. The taste and texture of these biscuits were found to be highly acceptable.

A. Shobha Reddy
P. Geervani
K. Krishna Kumari

FERMENTED PRODUCTS WITH SOYBEAN

In general the germination and fermentation improves the nutritive value of products. They play an additional role in case of soybean products by destroying the inhibitors and improving the flavour, texture and quality. The fermented products like *Tofu* and *Temp* are famous in several other countries. The fermented products namely *fermented soymilk drink, Shoyu* and germinated soybean bread were developed and assessed their protein quality. The method of preparation of these products was given in Fig. 2 & 3.

Vijaya Khader

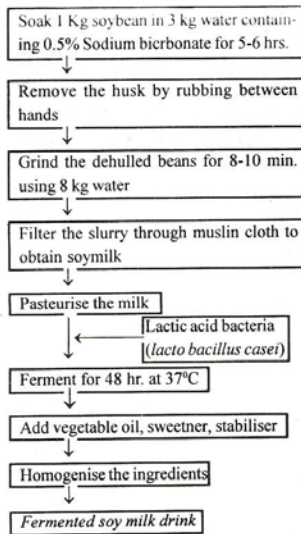


Fig. 2 : Preparation of fermented soymilk drink

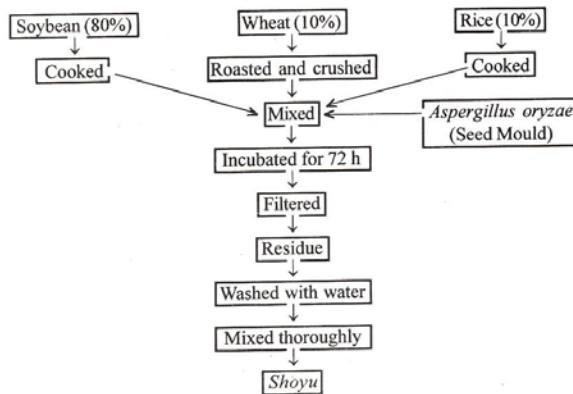


Fig. 3 : Preparation of Shoyu

GERMINATED SOY BREAD

Germinated soy bread was prepared by adding 15 per cent of germinated soy flour to maida flour. The ingredients used were Maida - 136g; Soy flour - 24 g; Sugar - 16g; Salt - 3g; Yeast - 6g; Dalda - 6.0g and Water - 100 ml. The ingredients were mixed and baked at 285°C for seven minutes. Addition of soyflour has advantages of shorter fermentation time and less mixing of the dough when compared to the normal bread.

Vijaya Khader

INFALLIBLE INFANT FOODS WITH SOYBEAN

Low cost foods namely *Rice-soy, Wheat-soy, Suji-soy* and *Sorghum-soy* infant foods were formulated by using cereal and defatted soyflour in 70:25 ratio. The processing methods used was roasting the ingredients at 85°C. These infant foods contained 370 to 380 Kcal of energy and 13 to 14 per cent protein and were highly accepted by pre-school children. The average values of PER, DC and NPU was 2.2, 94.4 and 82.9 respectively. These foods can be safely stored for 3 months at household conditions. The effect of supplementation of these foods was studied in low income children. The body weights and arm circumference of children increased significantly after supplementation and the difference was significant between experimental and control groups.

As an alternate approach the low income households response towards the sale of supplementary foods was assessed by organising the sale of *wheat-soy supplementary food* in rural, urban and tribal areas of Andhra Pradesh. The response was found to be discouraging in all areas which indicates lack of awareness. Nutrition education to mothers and wide publicity were found to be essential for promoting this approach.

Manisha Malhotra
Mayura Rao
K. Anuradha
V. Sujatha
P. Geervani



Infant Foods With Soybean

"PUSHTI" - A SUSTAINABLE SUPPLEMENTARY FOOD

A high density and low cost supplementary food PUSHTI was formulated with popped wheat, roasted defatted soyflour and sugar and further fortified with vitamins and minerals. Pushti has 377 Kcal of energy and 13 g of protein per 100 g. The calorie density, viscosity, proximate composition, Digestibility Coefficient (DC) and Net Protein Utilization (NPU) of Pushti was comparable with commercial supplementary food 'Ceralac'. Pushti stored in 67 micron polyethylene (LDPE) packing has a shelf life of seven months. Pushti was sold through rural fair price shops at 50 per cent subsidy for a period of nine months. Majority of parents showed willingness to buy the food at

subsidised price. Supplementation through Public Distribution System (PDS) has resulted in a significant decrease in the incidence of grade III malnutrition from 9.1 per cent to 2.6 per cent. There was a significant decrease in the incidence of 'wasting' and less pronounced effect was observed in the prevalence of 'stunting'. Sale of subsidised supplementary foods through PDS was found to be a viable alternative for providing food and nutrient security to the pre-school children of low income groups.

K. Krishna Kumari
P. Geervani

SOYBEAN - A TALENTED BEAN IN THERAPEUTICS

Soybean has great potential in solving the problems of protein energy malnutrition. Soybean, a high protein and a low carbohydrate legume would be of great use in the formulation of therapeutic diets.

SOYBEAN FOR DIABETICS

The glyceimic response of soy incorporated (40%) recipes namely *Roti*, *Upma*, *Dhokla* and *Chole* was assessed in normal subjects. The percent glyceimic response of soy incorporated recipes was significantly higher than control recipes.

Since *chole* was found to have the least glyceimic response, this was

tested in non-insulin dependent diabetic subjects. The glyceimic response of the diabetic subjects with soy *chole* was lower than that with Bengalgram *chole*.

Ramanichar
K. Krishna Kumari

SOYBEAN SAFEGUARDS THE CARDIO VASCULAR HEALTH

Natural soybean oil has highly unsaturated fatty acids and contains approximately 7 per cent of omega - 3 alpha linolenic fatty acids. Research indicates that omega - 3 - polyunsaturated fatty acids in the diet is beneficial to cardiac health. Generally populations that have higher intake levels of isoflavones have lower rates of cardio vascular disorders. The isoflavones present in soybean possess antioxidant activity and there is evidence that several flavanoids can inhibit oxidative modification of low density lipoproteins (LDL) and raises the High Density Lipoprotein (HDL) levels and thus reduces carido vascular disorders.

SOYBEAN SAVES THE RISK OF CANCER

Soybeans are the richest known sources of isoflavones and they are also known as phytoestrogens. Depending on the biological environment and their chemical stuctures, phytoestrogens can function either as estrogens or as anti-estrogens. Due to their phenolic structure isoflvones have antioxidant property and may prevent conversion of pre-carcinogens to carcinogens. They possess antioxidant, anti-inflammatory, anti-proliferative and anti-esterogenic properties. They are reported to be responsible for reducing the risk of breast, prostate and colorectal cancer and also reduces bone density loss in women after menopause.

It is estimated that the human beings would need to consume isoflavones at 1.5 to 2.0 mg/kg body weight per day to provide an 'anti-carcinogenic dose' of these compounds. This level of isoflavons intake could be met by consuming 120-360 g. of several soy products.



XXXI Annual National Conference of Indian Dietetic Association at Hyderabad

The A.P. Chapter of Indian Dietetic Association (IDA) hosted the XXXI Annual National Conference for two days with the main theme of "Nutrition Support Systems" at Cooperative Training Institute, Rajendranagar from 16th December. Dr. (Mrs) Vijaya Khader, Director of CAS, who is also the President of A.P. Chapter, IDA and Convenor of the conference welcomed the gathering.



Dr. (Mrs) T.E. Ananda Valli, Director of Medical Education, inaugurated the conference and stressed the need for involvement of Dietitians and Nutritionists in prevention of diseases.

In his presidential address, the Vice-Chancellor of ANGRAU, Dr. I.V. Subba Rao felt that food and nutrition security was vital to the nation, while the agricultural scientists should ensure the

food availability, the other scientists should take care of food accessibility.

Dr. Kamala Krishnaswamy, Director, National Institute of Nutrition, Hyderabad, said that Nutritionists and Dietitians had a role to play with changing times and increasing incidence of diseases in people.

The Malaysian Palm Oil Promotion Council sponsored stalwarts

in nutrition namely Dr. Nevin S. Scrimshaw, USA, Dr. A.J.S. Benade, South Africa, Dr. David Kritchevsky, USA and Koh Chu Sing, Malaysia as guest speakers in the conference.

Dr. Vijaya Khader was awarded the Registered Dietitian Certificate. Around 500 delegates participated the conference and were exposed to the recent trends in dietetics.

Dr.(Mrs)Manorama in International Palm Oil Congress



Dr.(Mrs)R.Manorama, Assistant Professor, Department of Foods & Nutrition, Post Graduate & Research Centre, Faculty of Home Science has

attended the Palm Oil Research Institute of Malaysia's (PORIM) International Palm Oil Congress (PIPOC 1999) held in Kuala Lumpur from 2 - 4 February, 1999. She was invited by PORIM to present two papers in the Nutrition and Chemistry sessions on "Effect of supplementation of red palm oil on serum lipids and antioxidant vitamin in healthy human subjects and iron absorption of anaemic adolescent girls" and "Purification of palm carotene extracts from red palm oil and evaluation of their stability and vitamin A potency".

Excellent Presentation Certificate

Excellent presentation certificate was awarded to Ms.N.Nirmalamma,



Research Associate, AICRP-FN, for her presentation of paper entitled "Effect of enriching groundnut oil with b carotene rich red palm oil on vitamin A nutritional status of children" authored by Dr. G. Sarojini and N. Nirmalamma, in XXXI Annual National Conference of the Indian Dietetic Association held on 16-17 December, 1998 at Hyderabad.

ANNOUNCEMENT

A short course on *Recent Advances in Nutrition for Vulnerable Groups* was planned from 4-2-1999 to 23-2-1999 by the Centre of Advanced Studies, Department of Foods & Nutrition, Post Graduate & Research Centre, Acharya N.G. Ranga Agricultural University, Rajendranagar, Hyderabad. Due to unavoidable circumstances the programme is re-scheduled from 2-6-1999 to 1-7-1999. Free boarding and lodging along with II class train/bus fare by shortest route will be provided. Nominations of trainees from State Agricultural Universities and other related departments may be sent to:

The Director
Centre of Advanced Studies
Post Graduate & Research Centre
ANGR Agricultural University
Rajendranagar
HYDERABAD - 500 030.

Last date for the receipt of nominations : 10-5-1999

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For any correspondence

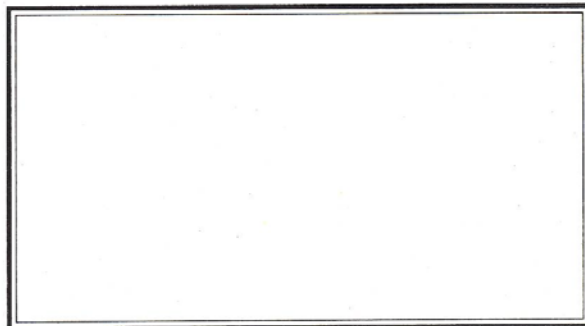
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