

Domestic Utilization of Soybean Based Food Preparations in Rural Area: An Action Research

B U DUPARE¹, S D BILLORE², PURUSHOTTAM SHARMA³
and S K VERMA⁴

ICAR-Indian Institute of Soybean Research, Indore 452 001, Madhya Pradesh
E mail: budupare@rediffmail.com

Received: 02.12.2015; Accepted: 28.03.2016

ABSTRACT

The present study was aimed at assessing the impact of efforts made by ICAR- IISR for popularization of processing techniques of various soybean based food preparations to the doorstep of rural housewives of Madhya Pradesh. By studying their daily food intake pattern, it was explored whether the rural people are making use of any of the soybean based food preparations in their daily use. A well designed questionnaire consisting of semi-structured questions on various aspects of knowledge gained/spread and its retention among the trained housewives was formulated and pre-tested before the data collection. A sample for this study consisted of 200 respondents belonging to villages where training-cum-demonstration programmes were conducted during past 10 years. It was observed that majority of the respondent families had awareness on the presence of quality protein, essential vitamins and minerals in soybean food and beneficial to human health. Further, majority of them were found to use soy nuggets (soy bari) as the most preferred soy products which they are using on regular basis in the rural areas. Interestingly, out of different soy products, nearly 22 per cent of the respondent families were found to have liking for soy pakora which is their most preferred soy product because of its crispy nature. However, the respondents from semi-urban area (adjacent to Indore city) are found to utilize tofu (soy paneer) which they are consuming on regular basis. Only 12 per cent of the respondent families are utilizing soybean for fortification with wheat flour but without following proper processing techniques. A small proportion of respondent families (7.5 %) are found making use of fried soy nuts (snack) regularly as well as during festive seasons.

Key words: Food preparations, rural area, soybean

Soybean, which is commercially an export oriented commodity. After cultivated by the farmers of India since extraction of oil, about 58 per cent of last four and half decades, is still largely resultant soy meal is being exported

¹Principal Scientist (Agril. Extension); ²Principal Scientist (Agronomy); ³Senior Scientist (Agril. Economics); ⁴Technical Officer

and remaining 42 per cent of it is utilized for poultry and fish meal domestically (Sharma *et al.*, 2014). In spite of capabilities to mitigate energy-protein malnutrition and health benefits, its domestic utilization as processed food in any form was found to be negligible (Agarwal *et al.*, 2013). However, the supplementation of edible oil by nearly 25 per cent (Sharma and Bhatia, 2015) by the crop has helped the country to reduce its import and thereby drain of valuable foreign exchange.

There is large vegetarian population in the country which mainly depends on pulses for protein source (TAAS, 2014). Since, the demand of pulses in the country is supplemented through imports; soybean is a better and less expensive alternative for fulfilling the protein requirement of large masses. Although, the use of soybean in daily diet in India is limited, efforts are being made to make aware households on benefits of its food uses. Several ethnic communities of Northeast India have invented the traditional technology of converting protein rich soybeans into flavoured fermented food with easy digestibility and bio-nutrients (Tamang *et al.*, 2009). Soybean is considered to be a functional food as it contains significant levels of biologically active compounds that impart health benefits besides basic nutrition (TAAS, 2014).

With the major objective of promoting the food uses of soybean coupled with creation of awareness on its capability of mitigating energy-protein malnutrition and other health benefits,

Indore based ICAR-Indian Institute of Soybean Research (Formerly NRCS or DSR) in addition to its major mandated R & D activities of production technologies, is also actively engaged in conducting activities specially targeting the rural womenfolk to utilized soybean at domestic level in the form of various soybean based preparations. The institution has so far educated more than 2,000 housewives and other clientele groups in the past 10 years through number of off-campus training programmes. The study was, therefore, conducted to know primarily, the nutritional intake profile of rural people, the associated impact of efforts of ICAR-IISR in translating the actual use by the rural housewives of Madhya Pradesh. The study also included perception of common people and their awareness about the health benefits and utility of soybean for food preparation, domestic utilization pattern of soybean, and bottlenecks in this food chain as felt by the trained housewives.

MATERIAL AND METHODS

An interview schedule was designed encompassing relevant questions about different issues like food habits of the respondents, consumption of different protein sources, use of soybean for food uses, their knowledge about health benefits and nutraceutical aspects of soybean and constraints (if any) faced by them during utilization of soybean for food uses and their suggestions in this regard. The interview

schedule also contained information on awareness of rural people about the benefits and nutraceutical properties of soybean which was aimed at studying the knowledge gain, and its retention/utilization in routine life particularly in their food intake behaviour. Accordingly, the data were collected from 200 respondents using pre-tested interview schedule which were analyzed after its scoring, compilation and coding of qualitative data applying quantification measures. The results of the study are presented in following sections.

RESULTS AND DISCUSSION

A. Daily food consumption pattern of rural households in the study area

It was observed that the trained women participants not only shared the knowledge received through training to their neighbors but also to their relatives located in other villages. The information generated related to daily food intake of the rural family clearly provided an interesting picture which is entirely different from the urban households. Rural People were found to take only morning tea (7 AM) in their breakfast and directly go for their lunch (10 AM), while the dinner time for rural household is 8.00 PM. In their daily food consumption pattern, *Dal*, *Roti* and *Sabji* are major ingredient in their diet prevalent in this part of the state. Very few households are found to cook rice at home on regular basis. *Dal Bati* is a very popular food item

for majority of respondents on every Sunday. Few people take this food twice a week.

As far as background information of respondents' families are concerned, majority were found to have nuclear type of family and sometime on special occasions like religious festivals they go on fast as a devotion to god/goddesses. It was also found from the survey results that majority of the respondents were vegetarian (97 %) and fulfils their protein requirement using pulses. The intake of soybean products in their daily diet serves an important purpose not only for the health of their family members, but also for other neighboring families through demonstration effect. Since, prices of pulses is skyrocketing recently, soybean can serve as an economical alternative source of protein for the vegetarian population in rural areas.

B. Awareness of respondent families about the nutraceutical aspects of soybean

ICAR-IISR activities carried out for popularization of different soybean based food preparations after following proper processing techniques are enlisted (Table 1) along-with the survey response. The results indicated that, most of the respondents (89.5 %) were found to have awareness about the utility of soybean as richest and cheapest source of good quality protein which is useful for maintaining health and increasing the work efficiency of the people. Similarly, majority of them were found to

be aware about the availability of different vitamins essential for human body. About two third majorities (77-78 %) of the respondents were found to have knowledge about the availability of minerals like calcium and iron, which helps to maintain bone and blood content. Similar results have earlier been reported by Dupare and Vinayagam (2006) in their previous studies.

However, with regard to medicinal and nutraceutical properties of soybean, only 35 per cent of the respondents had knowledge about usefulness of soymilk for lactose intolerant kids. Further, only 44 per cent of the respondents were found to have awareness about medicinal

properties of soybean which helps the women to avoid specific ailments like menopause and breast cancer, *etc.* Out of 200 respondents, it was found that nearly 39 per cent had knowledge regarding medicinal properties of soybean for prevention of cancer, diabetic and cardiac diseases. The role of daily intake of soybean in food on nutrition and health benefits is well documented (Grewal, 2000; Gandhi, 2006; Gandhi 2009; Nahashon and Kilonzo-Nthenge, 2011). Sandhya (2012) in a study reported that the knowledge of soybean processing technology through trainings to farm women will help to utilize soybean in their daily diet.

Table 1. Awareness about nutritional and nutraceutical aspects of soybean (N=200)

| Attribute | Aware | Not Aware |
|---|-------------|------------|
| <i>Nutritional properties</i> | | |
| Cheapest Protein Source | 179 (89.5%) | 19(9.5%) |
| Availability of Vitamins | 162 (81%) | 36(18%) |
| Availability of Calcium (Osteoporosis) | 156 (78) | 42(21%) |
| Availability of Iron (Anaemia) | 154 (77) | 44(22%) |
| <i>Medicinal properties</i> | | |
| Lactose intolerance (For Kids) | 70 (35) | 128(64%) |
| Especially useful for Women | 89 (44.5) | 109(54.5%) |
| Prevention of cancer | 79 (39.5) | 119(59.5%) |
| Cardiac diseases | 78 (39) | 120(60%) |
| Diabetic/Sugar/cholesterol | 78 (39) | 120(60%) |

C. Domestic utilization pattern of soybean in rural household

The utilization of soybean in the daily diet of respondents was analyzed (Table 2). Results indicated that, nearly one third of the respondents were found to use soybean in their daily diet in the

form of fortified soy flour mixed with wheat, soy nuts and soy pakora. Preparation and consumption of soy nuggets (*soy bari*) was said to be the most preferred soy products (60.5 %), which they are using on regular basis in the rural areas. As it is easily available in the

market outlets even in rural areas, they available soy product as protein substitute. Interestingly, out of different soy products, nearly 22 per cent of the respondent families had liking for *soy pakora*, which is their most preferred soy product because of its crispy nature. However, the respondents from semi-urban area (adjacent to Indore city) are found to utilize tofu (*soy paneer*), which they are found to consume on regular

found it most economical and easily basis. Only 12 per cent of the respondent families are utilizing soybean for fortification with wheat flour without following proper processing techniques (Table 2). However, a small proportion of respondent families (7.5 %) are found making use of fried soy nuts (snack) regularly as well as during festive seasons.

Table 2. Utilization of soy products

| Soy Preparation | Utilization by the respondents (N=200, multiple response) |
|--|--|
| Soy Flour (Fortified with wheat flour) | 24 (12%) |
| Soy Nuts | 15 (7.5%) |
| Soy <i>Pakora</i> | 44 (22%) |
| Soy milk | 5 (2.5%) |
| Tofu | 39 (19.5%) |
| Preferred Soy Product (Soy Bari) | 121 (60.5%) |

Soybean based food preparations are slowly making inroads into rural households as they becoming aware of its nutraceutical and medicinal properties. The commercially available products such as soy nuggets and soy granules are by now very popular among the predominant vegetarian type of rural households. Further, their awareness and inclination about the processing

techniques for making of various soybean based food preparations can change the health and nutritional status of common people of rural background. More and more systematic and concerted efforts are needed to make these people aware about the domestic utilization of soybean commodity which they are growing in their farm for more than four decades.

ACKNOWLEDGEMENT

The authors are indebted to Dr S S Vinayagam, Principal Scientist, NAARM Hyderabad, who during his initial tenure at ICAR-IISR assisted in organization of training/awareness programmes for popularization of food uses of soybean and its processing techniques among the rural areas of Madhya Pradesh.

REFERENCES

- Agarwal D K, Billore S D, Sharma A N, Dupare B U and Srivastava S K. 2013. Soybean: Introduction, improvement and utilization in India-Problems and prospects. *Agricultural Research* (December 2013) **2**(4): 293-400
- Dupare B U and Vinayagam, S S. 2006. Impact of training intervention on knowledge and domestic utilization of soy-based food preparations for health benefits and nutritional security. *Soybean Research* **4**: 63-68
- Gandhi A P. 2006. *Soybean - the greater bean, World Grain (USA)*, February issue, pp 59-62.
- Gandhi A P. 2009. Quality of soybean and its food products, *International Food Research Journal* **16**: 11-9.
- Grewal R B. 2000. Utilization and processing of soybean to prepare traditional foods of India. *The Third International Soyabean Processing and Utilization Conference (ISPUC-III): 2000 of the Innovative Era for Soyabeans*, October 15-20, 2000, Tsukuba, Ibarak, Japan, pp 325-6.
- Nahashon S N and Kilonzo-Nthenge A K. 2011. *Advances in Soybean and Soybean By-Products in Monogastric Nutrition and Health, Soybean and Nutrition*, El-Shemy H. (Ed.), ISBN: 978-953-307- 536-5, InTech, Available from: <http://www.intechopen.com/books/soybean-and-nutrition/advances-in-soybean-and-soybean-by-products-in-monogastric-nutrition-and-health>.
- Sandhya K. 2012. Strategic transfer of soy processing technology among rural women for enhancing the health status and for enhancing the home economy of rural area, *International Research Journal of Social Sciences* **1**(1): 6-14.
- Sharma P and Bhatia V S. 2015. Oilseed and Edible Oil Economy in India: Enhancing Supplies through Augmenting Productivity. In: *Souvenir 53rd All India Convention on Oilseeds, Oils Trade and Industry*, organized by COOIT on 24th - 25th October, 2015 at Nagpur.
- Sharma P, Patel R M and Srivastava S K. 2014. Comparative advantage of Indian soymeal *vis-à-vis* major exporters, *Soybean Research* **12** (spl. 1); 129-43.
- TAAS 2014. Proceedings and Recommendations of Brainstorming workshop on "Soybean for Household Food and Nutrition Security" organised on 21-22 March, 2014 by Trust for Advancement of Agricultural Sciences, Indian Council of Agricultural Research and National Academy of Agricultural Sciences, New Delhi.
- Tamang J P, Chettri R and Sharma R M. 2009. Indigenous knowledge of Northeast women on production of ethnic fermented soybean foods, *Indian Journal of Traditional Knowledge* **8**(1): 122-6.

Enhancement of Soybean Production through Varietal Replacement- A Case Study

R K SINGH¹, R K JAISWAL², B S KIRAR³ and K S BAGHEL⁴
Krishi Vigyan Kendra Panna 488 001, Jawaharlal Nehru Krishi Vishwa
Vidyalaya, Madhya Pradesh
E mail: rajiv_kvkv@rediffmail.com

Received: 25.06.2015; Accepted: 30.11.2015

ABSTRACT

Soybean [Glycine max (L.) Merrill] is an important leguminous oilseed crop, which is the economical source of good quality protein and edible oil. The crop has a distinct attribute of improving soil fertility in a cropping system. The KVK Panna has made consistent efforts to popularize the improved variety JS 97-52 along with recommended production technology since kharif 2009 in Gram Panchayat, Richhora for enhancing yield and income of farmers. The present case study deals with enhancement of soybean productivity through varietal replacement in the Richhora village of district Panna under Kymore Plateau and Satpura Hills Agro-climatic Zone of Madhya Pradesh during 2009 to 2014, which showed that by the end of 2014, 77.7 per cent area has been occupied with improved soybean variety 'JS 97-52' in the said village with an increase in yield by 690 kg per ha and net returns by 85.3 per cent over locally cultivated varieties. Maximum yield (2,630 kg/ha) was obtained during 2012-13 when annual rainfall in Gunour block recorded was 1,112.3 mm. During 2013-14 as well, with higher rainfall (1,821.2 mm) in the area the improved variety of soybean (JS 97-52) produced 2,070 kg per ha. This shows that this variety is suitable under higher rainfall regime also. The returns per rupee investment varied between 1: 2.5 and 1: 4.2 in case of improved variety (JS 97-52) and appropriate production technology as compared to 1: 2.1 to 1.3.0 in locally cultivated varieties with traditional farmers practice during 2009 to 2014.

Key words: Economic impact, improved varieties, soybean, spread of technology

The Panna district is situated between 23^o, 45' N and 25^o, 10' N latitudes and 75^o, 45' E and 80^o, 40' E longitudes in Kymore Plateau and Satpura Hills Agro-climatic zone of Madhya Pradesh. The Panna district had an area of 26, 000 ha under soybean cultivation during kharif 2014, which was only 12,500 ha in 2009. Current average productivity of the crop in the district is 885 kg per ha as against the state and national productivity of 1,086 and 959 kg

^{1&2}Subject Matter Specialist; ³Programme Coordinator; ⁴Programme Assistant