
A BRIEF DESCRIPTION ON SOYBEAN AND ITS FOOD PRODUCTS

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ABSTRACT

Soybean, (Glycine max), sometimes called soja bean or soya bean, annual legume of the pea family (Fabaceae) with its edible seed. The soybean is economically the most significant bean in the world, supplying vegetable protein for millions of people and components for hundreds of chemical goods. The dominating position of soybeans and their products is mainly linked with their excellent nutritional quality particularly with regard to protein and amino acids. While fundamental standards requirements for soybeans/soy meals have been developed, no formal specifications exist for additional soy products that are utilized these days. The usage of soybean products in the feed and food sector has grown significantly. Specific criteria utilized for both soybeans and soy based goods accessible globally were thoroughly examined. Besides the author provided particular procedures for various soy products produced at Soybean Processing and Utilization Center. These guidelines will be guiding principles for both the producer and consumer of soybeans worldwide.

KEYWORDS: *Food, Products, Soybean, Quality, Factors.*

INTRODUCTION

Like other beans, the soya bean (Glycine max) develops in pods containing edible seeds. They are typically green but may be yellow, brown or black. The texture is so flexible that soya beans are often processed into a range of meals. Soya beans – also known as edamame beans when eaten fresh from the pod – are used as a substitute to meat. They are the foundation of soya milk, tofu, miso, tempeh and soya protein.

The usage of soybean products in the feed and food sector has grown significantly. The global soybean output is presently 219.8 million metric tons out of which India produced 9.3 million metric tons representing approximately 4 percent of the entire world production. Out of this output, less than 10 percent is directly utilized for human consumption. Furthermore NOPA standards only relate to four chemical components. Current assessments of soy products are based on a considerably wider variety of tests enabling a more reliable evaluation of the nutritional content of the various products. Developments in the technical adaptations of soybean products, coupled with a greater knowledge of the impact on performance and health of relatively unknown chemicals, such as is of flavones, will add value to soy products. Accurate analysis of these novel chemicals will be of increasing significance. Hence the quality analysis of soy products is required at all stages of the protein supply chain in the food and feed sector and quantified with the maximum and lowest limits of each desired component. Figure 1 illustrates the soybean that is beneficial for health[1]–[5].

Quality features may be divided into three basic categories: faults, shipping and storage issues and end usage related variables. End use quality variables are categorized as either physical qualities or chemical composition characteristics. The physical characteristics include germination, hilum

color, seed count, seed size, hardness, seed coat breaking, and purity. Chemical composition comprises moisture, protein, Nitrogen Solubility Index(NSI), 7S/11S proteins, Protein Dispersibility Index(PDI), amino acids, lipoxygenase, Trypsin Inhibitor(TI), oil, fatty acids, fiber, carbohydrates and isoflavones. The degree, plus presence or absence of these qualities is usually referred to as Quality. High grade soybeans have optimal amounts of specific traits or combination of features.



Figure 1: Illustrates the soybean that is good for health[6]

Soybean Grading:

The categorization of grain and oil seeds according to quality qualities or variables is termed grading. The process of grading is termed inspection. The US Grades and Standards for grain were originally established in 1916. The Federal Grain Inspection Service, a component of USDA sets the methods and equipment used for official inspections. The grain standards act defines soybeans as grain that consists of 50 percent or more of whole or broken soybeans that will not pass through an 8/64-inch round hole sieve and not more than 10 percent of other grains for which standards have been set. There are two types of soybeans: yellow and mixed soybeans. Yellow soybeans contain yellow or green seed coats, which in cross section are yellow or have yellow tinge and may comprise not more than 10 percent of soybeans of various hues. Mixed soybeans are ones that do not satisfy criteria of the class Yellow soybeans[7]–[9].

Soybean Seed Type and Applications:

Large seeded soybeans for tofu, soymilk, Edamam and soy nuts:

Large seeded soybeans are primarily bred for tofu and soymilk production. They are relatively high in protein content with enhanced ratio of 7S/11S or absence of lipoxygenase and reduced oil content. Tofu beans also have a high NSI or PDI, high water up take, low calcium and high germination rate. The production and quality of tofu and soymilk are affected by protein and oil content. A high protein/oil ratio offers a greater tofu production and firmer texture. The flavor of tofu and soymilk is strongly linked to soluble sugars in seeds. High total carbs, high sucrose, low raffinose and low stachyose are very desired. Most tofu beans have big seeds (greater than 20 g/100 g) with yellow seed coat, yellow cotyledons, clear hilum and thin but robust seed coat that is free from breaking and discolouration.

Medium Sized Soybeans for Bean Sprouts, Meal and Oil:

Soybeans with moderate seed size (10 to 12 g/100 g) as well as a good germination rate are

recommended for bean sprouts. High protein, high isoflavone, high sugar and lipoxxygenase neutral soybeans are ideal for bean sprouts. For quality assessment of soybean meal and soybean oil, National Oilseed Processors Association (NOPA) has established criteria for trade.

Other Soybean Products:

Defatted Soy Flour:

The ASA suggested criteria for defatted soy flour. It is produced completely from defatted soy meal and is now utilized globally by commercial processors. Soy flour is also a popular component in blended food assistance products and may also be supplemented with different micronutrients.

Soy Protein Concentrate:

It is produced entirely from defatted soy meal. Soy protein is flour like substance consisting of approximately 70 percent protein and is being utilized in a range of meat systems, baked goods and dairy applications. ASA has recommended the following standards.

Soy Protein Isolates:

It is produced entirely from defatted soy meal and is utilized as a component in high protein meals including dairy foods, nutritional supplements, meat systems, baby formulae, nutritional drinks, cream soups, sauces and snacks. It is also an excellent source of protein in milk replacers. Due to high protein content, it is well suitable for those individuals who have high protein requirements due to growth (children), hunger (acute needs) and chronic illnesses (HIV/AIDS/tuberculosis).

Textures Soy Protein:

It is produced entirely from either defatted soy meal flakes or soy protein concentrates. It is commonly used as ingredient in ground beef for patties, sausages, and meal loaves, and in vegetarian meals and stews.

Full Fat Soy Flour:

Full Fat Soy flour is used for strengthening the other cereals/millet/pulses at 10-15 percent level in the production of traditional recipes. It is offered in sealed polythene bags and hermetically sealed metal containers. The shelf life is approximately one month at typical retail shelf temperatures. It is important to guarantee product safety. Gandhi established HACCP procedures for the manufacture of higher quality full fat soy flour with product safety.

Medium Fat Soy Flour:

Medium Fat Soy flour is used for fortification with various cereals/millet/pulses at 10-15 percent level in the production of traditional dishes. In chickpea flour and papad, it may be added up to 20 and 40 percent, respectively. It is available in sealed polythene bags (HDPE 400 microns) and hermetically sealed metal containers. The keeping quality is approximately six months at typical retail shelf temperatures and needs to be utilized within a month after opening the package. It is important to guarantee product safety. The packaging should include all the nutritional information and directions to use.

Soy Biscuits:

Soy cookies are eaten immediately at any time either with tea or alone. They are offered in sealed polythene bags (HDPE 400 microns)/laminated packages/ hermetically sealed metal containers. The shelf life is approximately six months at typical retail shelf temperatures, but, should be utilized within a month after opening the package. It is important to guarantee product safety. The packaging should include all the nutritional information.

Soy Bread:

Soy bread is eaten straight at any time either with tea or alone. It is offered in sealed polythene bags (HDPE 400 microns)/laminated packaging. It will be fresh for 6 day's at typical retail shelf temperatures. It is important to guarantee product safety. The packaging should include all the nutritional information.

Soy Milk:

Soy milk (plain/flavored) is ready to drink and suitable to all sections of individuals suffering from lactose intolerance (Infants/youth/old/pregnant etc). The soymilk may consist of clean water, soybean extract, sugar and salt. It contains 3-4 percent protein, 1.5-2.0 percent fat and 8-10 percent carbs. Flavored soymilk may consist of clean water, soybean extract, sugar, salt, flavors and allowed food colors. Plain soy milk is packaged in 200/500 ml polythene bags/ glass bottles/ tetra packs. The soy milk has shelf life of six months when packaged in tetra packs or else for few weeks under refrigerated circumstances. It needs to be kept and dispensed at ambient temperature. It is important to guarantee product safety.

Soy Paneer (Tofu):

Also known as soybean curd, it is a high-protein and is of flavones-rich food. It's produced by combining calcium and magnesium salts with soy milk, causing the soy protein to coagulate and form curd. Domestically, a simple and low-cost tofu-making technique has been created. Calcium becomes a necessary component when tofu is produced with it. Tofu comes in a variety of textures, including extra firm, firm, soft, and silky, and may be used in nearly any recipe. Tofu that is extra firm is ideal for marinating and chopping into cubes for stir-fries. Desserts and other dishes that need a wetter consistency are made with the softer one. It is critical to guarantee product safety once again.

LITERATURE REVIEW

R. Vital et al. discussed about production, quality and acceptance of Soybean[5]. The food sector has been tasked with creating new healthier food items. Tempeh, a nutritious meal originated in Indonesia and created via fungal fermentation, might be a good option for the Brazilian people. The goal of this research was to make white bean tempeh burger and compare its nutritional and sensory characteristics to those of traditional soybean-based tempeh burger. The tempeh was produced and the proximate composition and microbial contamination were evaluated using reference techniques. A nine-point hedonic scale test was conducted with 82 untrained evaluators for the sensory analysis, and at the conclusion, a buy intent question was asked. The findings revealed substantial variations in the nutritional content of the tempehs, which may be explained by changes in the raw material composition. There was no danger of microbial contamination in the samples, therefore they were safe to eat. The white bean tempeh burgers had a comparable look and crisp quality to the soybean burgers, but they scored worse on taste, likely owing to the residual beany flavor. By extending the cooking time of the beans, the beany taste may be reduced. White bean tempeh can be a nutritious alternative to meat, and its manufacturing may encourage the development of other bean-based items, giving Brazilian cuisine a new emphasis. To achieve greater acceptance, it is still essential to enhance manufacturing methods and test novel components for the creation of tempeh burgers.

S. Tidke et al. discussed a review on potential of soybean[10]. Soybean is one of the most significant food plants, with its seeds serving as a source of protein, oil, and nutraceuticals. Its isoflavone and folic acid levels have made it a versatile crop for health food uses. The soybean crop's use in food applications is discussed. Soybean proteins, which are high in essential amino acids, are becoming more popular as a vegetable source for protein-based products. Its presence of good fats and polyunsaturated fatty acids (PUFA) is also significant from a nutraceutical

standpoint. Fermented soybean meal is also an excellent source of nutrient-dense tofu. The biological characteristics of isoflavones and folic acid, in addition, provide value to the formulations presented here. Patents for new goods and methods have become more common, and they offer promise for the soybean industry's future.

DISCUSSION

Soybeans may be eaten in a variety of ways. Soybean-based foods may be classified as either unfermented or fermented. Tofu, soymilk, edamame, soy nuts, and sprouts are examples of unfermented foods, whereas miso, tempeh, natto, and soy sauce are examples of fermented soy products. When used for up to 6 months, dietary supplements containing soy extracts may be considered safe. Constipation, bloating, and nausea are some of the minor stomach and intestine adverse effects of soy. In certain individuals, it may produce allergic responses such as rash, itching, and breathing difficulties. Soybeans and soy meals may lower the risk of cardiovascular disease, stroke, coronary heart disease (CHD), and certain malignancies, as well as improve bone health. Soy is a high-quality protein that may be helpful to our health if we consume one or two servings each day.

CONCLUSION

Glycine max, often known as soybean, soy bean, or soya bean, is a legume native to East Asia that is extensively cultivated for its edible bean, which has a variety of applications. Soybeans are processed for their oil (which is used in a variety of ways) and meal (which is used in a variety of ways) (for the animal feed industry). A lesser proportion is processed for human consumption, resulting in goods such as soy milk, soy flour, soy protein, tofu, and a variety of retail food items. Many non-food (industrial) items include soybeans. High-quality soybeans and soy-based meals are usually favored, and the available standards will aid producers and consumers in selecting the best based on physical and chemical qualities as well as end-use. These guidelines will be beneficial to everyone involved in the soybean business throughout the world.

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