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A review on prepration and processing of soymilk from soybean

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Abstract
The soybean (*Glycine max*) is the native to East Asia which comes under the leguminous family and grown for its bean as they are edible and have numerous uses. Soybean is a highly nutritious food popular for protein source this review give information of Soybean *(*Glycine max) based product and there nutritional importance.

Keywords: Soybean, milk, grinding, homogenizing, soaking and de-hulling

Introduction
Soybean is one of richest source of oilseed of the world and has now found a prominent place in India (Mahna, 2005). More recently, (Chauhan 2008) reported that soybean has first rank among oil seeds in India 2005 onwards. The world market for food-grade soybeans was estimated as one million metric tons and continued to grow with the constant innovation of new commercial soy foods. Soybean firstly originated from northeastern China about 4,000 years ago and is now grown worldwide. The main soybean producers include the United States, Brazil, China, Argentma, Indonesia, and Russia. Soybean cultivation in India has steadily increased over the years. The average production of the crop was cultivated on 4.5 million and the production figure touched about 4.3 million tones

India soybean attributed about 10 % to the domestic edible oil pool (Joshi 2003) and the country earned substantial foreign exchange through export of around 65% of soymeal production. At present it is cultivated over an estimated area of 8.0 million ha. With a production of about 0.75 million tones. It shares nearly 32% of total oil seed production in India and contributes about 13% to the domestic edible oil pool (Dupare *et al*, 2005). Maharashtra has become second soybean growing state of the country next to Madhya Pradesh. The total production in Maharashtra estimated is 32.374 lakh tones with productivity of 1221 Kg per Ha. (SOPA2007). This increase in yield could become possible due to improved agronomic practices as well as the enhancement of genetic potential for higher yield of the new soybean varieties. Breeding of improved varieties suitable for tropical agriculture, beside various agroclimatic regions of our country, has been responsible for the rapid increase in soybean acreage.

Processing of Soy Milk from soybean
The main ingredients for soy milk preparation require soybeans and water. In industries, essential nutrients are fortified in soy milk for increasing its nutritional quality which majorly includes calcium, vitamin D, and some vitamins B. Highly concentrated flavors, are often added to the milk such as vanilla, strawberry, chocolate, almond and pista are often added to the finished product. Some industries add sugar and salt according to the required quantity so that no awful taste develops. As we are preparing saffron flavored soy milk so saffron is also an essential ingredient for us.

Soaking and De-hulling
2 cups (50gm) full of soybean were soaked in 100ml of water overnight or for 24 hours so that the hull could be easily removed from the bean. If hull is not removed, soymilk will give awful taste and also a smooth texture will not be obtained. After soaking is complete water is rinsed off and the beans are removed from hull and split in half. This loosens the hull on the bean. Hull was removed manually with hands and beans were collected.

Grinding
The beans were then churned and grinded finely into a mixer with some amount of water added in it because water helps in obtaining a smooth texture or paste of the beans. If the beans are still rather coarse then it is again churned in mixer. The hot slurry was obtained which was white in color with extreme small particles of insoluble soybean particles. These particles are separated from the soy milk slurry using a centrifuge. After the centrifugation process (Kumar S *et al* 2017) [11] fiber is separated physically from soybean slurry. The solid waste that comes out is called okara which seems like mashed potatoes and is the soy fiber. Okara is further used for other consumption than human consumption. It is used as roughage for animal feeding, some industries converts this fiber into cookies which are healthy and rich in fiber. The fiber-less soy liquid is obtained after the removal of okara which is also called as raw and pure soy milk.

Blending
The raw soymilk is kept in a container and the sugar syrup is prepared separately in a different container with the any flavor in it. Mixture of sugar syrup and flavor is added with the raw soymilk and blended together. After blending is completed it is important to seal the container so that no microbial activity, bacteria and germs that can grow in the room temperature and air can increase the acidity of the milk.

Homogenizing
The hot milk is homogenized which helps in breaking down the fat particles and helps in forming a smooth textured milk

with no solid particles in it.

Cooling
The hot soy milk was kept for cooling in room temperature. And the soymilk is prepared.

Quality Control
Quality control starts with the selection of variety of soybean used for preparing soymilk. During the preparation of soy milk it is necessary to take some essential precautions to ensure that no bacteria grow in the low acid medium. The different samples were tested and analyzed constantly at different temperatures for checking its pH, temperature, and microbial growth.

Determination of Quality
PH Value of soymilk
The calibrated digital pH meter was used to measure the pH of soymilk. pH was measured for a month which changes according to the acidity increases with time taken for preservation.

Total Solids and Moisture content
Procedures described by Liu and Chang were used for determination of the total solid content present in soymilk. 15 ml of soy milk was weighed into a pre-weighed crucible and placed in a hot air oven at 100 °C for 20 h. Total solid was calculated after the dry residue weighed after cooling in a desiccator, and based on this, moisture content was also determined.

Protein, Fat and Carbohydrate
Protein content was determined by the Kjeldahl method. Fat content was measured by weight after alkaline hydrolysis coupled with solvent extraction (ether and petroleum ether). Carbohydrate content was calculated by subtracting the moisture, protein, fat and ash content from the total mass.

Comparison between soy milk and cow's milk
Soy is a plant-based protein which is rich in low-fat. It contains less saturated fat in comparison with cow's milk therefore it is cholesterol free and lowers the LDL in the body. On the other hand cow's milk is rich in calcium in comparison with natural soy and this calcium helps to develop bones in human being and prevents osteoporosis. Cow milk is also rich in more vitamins, such as vitamin B12 and vitamin However, in food industries manufacturing process of soy milk includes the fortification of essential nutrients such as calcium and those which are similar to cow's milk in it. At the same time, cow's milk is also improving its quality in industries by removing the fat from milk and developing in low-fat versions and these have lower saturated fat than commercial soy milk. Therefore, if soymilk is not consumed due to food allergy, cow milk with lower unsaturated fat can be consumed as a healthy benefit. Both calcium-fortified soy milk and low-fat milk are good sources of protein and calcium.

Table 1

Nutrient	Soymilk (300ml)	Milk (300ml)	
	Natural	Full cream	Hi-calcium, low fat
Energy (kcal)	138	150	110
Protein (g)	7	8	8.8
Fat (g)	4	8.1	2.5
Cholesterol (mg)	0	25	6.3
Calcium (mg)	25	282	375

The Health Benefits of Soy Milk
1. Soy Milk Protein
Soymilk is a good source of protein therefore it can be tried including in a balanced diet for protein consumption. Soy protein helps in lower the level of bad cholesterol. Each cup of unsweetened and unfiltered, plain soy milk provides 6 grams of protein in comparison with a glass of two-percent dairy cow milk contains 7 grams of protein.

3. Rich in Calcium and Iron
Soymilk is also rich in calcium but not more than cow milk. It is also rich in iron which helps in boosting up the energy by its intake. Calcium is required in a proper diet by the body for the formation of dense and strong bone tissue.
All the tissue present in our body requires oxygen for its proper functioning and the presence of iron in soymilk helps the red blood vessels function properly.

The non-healthy benefits of Soy Milk
1. Allergy from soymilk
There are some exception people who are allergic to soymilk therefore it is not necessary to neglect the soymilk from regular diet.
Soy is one of the top nine food allergies but it is also included in a balanced diet as it has more healthy benefits.

2. Sugar Addition
During the preparation of soymilk, sugar is added to it for its better sweet taste which has some major nutritional disadvantages. Added sugars do not add any nutritional value to the milk which increases the risk of developing heart disease and diabetes. Also because of added sugar, calories are obtained from soymilk.

Conclusion
The conclusion of this review paper is soya after processing is well known for milk and milk-based products because of its nutritional properties. The techniques of milk processing is important for preservation of milk. the quality assessment and the shelf life of milk can affect by different processing techniques.

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