

HOMEMADE BLACK SOYBEAN MILK AND ITS NUTRITIONAL EVALUATION-A PHYSICAL AND BIOCHEMICAL STUDY

Kirtikumari D. Patel* and Dr. Ajit V. Pandya

JJTU Scholar, JJT University, Jhunjhunu, Rajasthan.

Article Received on
11 Feb 2015,

Revised on 08 March 2015,
Accepted on 02 April 2015

***Correspondence for
Author**

Kirtikumari D. Patel

JJTU Scholar, JJT
University, Jhunjhunu,
Rajasthan.

ABSTRACT

Black soybeans, *Glycine max* (L.) Merr. also identified as SoRiTae and *Rhynchosia nulubilis* (Yak-Kong) are species of legume native to East Asia. For hundreds of years black soybean was utilized in nutritionally rich food and in folk medicine. (Yim et al. 2009). In China black soybean is used for detoxification and anti-inflammatory process and also for improve the blood. (Liao et al 2005). In Korea, black soybean is consumed in the form of soymilk, tofu, soy sauce, soy sprout and cooked with rice. Due to increase in consumer knowledge, the sales of black soybean are also increases. The aim of this to study the physical and biochemical composition of black soybean milk. The black

soybean milk was evaluated in term of physical attributes like pH, ash, and moisture and biochemical attributes like protein, carbohydrates, fats, phosphorus, calcium, sodium, magnesium and potassium. The contents of carbohydrates, phosphorus, calcium, sodium and fats were found in black soybean milk is 2.86mg/100gm, 13.78mg/100gm, 44.5mg/100gm, 94.11mg/100gm and negligible respectively. The results obtained in this study imply that black soymilk can be used as good source of protein, carbohydrates, and minerals with negligible fat amounts. Calcium level is three times higher than phosphorus signify powerful absorption for calcium from intestine and also in the bone tissue As the percentage of fat is negligible and protein is in high concentration indicates this as a good supplement and body building milk preparation for athletes and muscular body building The result achieved from the present studies possibly the helpful information for the food scientists, researchers and also the soybean consumers of India and all over the world.

KEYWORDS: black soybean milk, biochemical and physical, protein, negligible fat.

INTRODUCTION

Variety of soybean seed of different colours likes yellow, green, black and several shades of brown, although cultivars of yellow seed are mainly. The colours of soybean seed are mainly controlled genetically apart from green. (Mullen 2003). Soymilk is an excellent alternative of cow's milk in place where cow's milk is not obtainable in sufficient quantity. Soymilk is an off-white emulsion or suspension containing the water soluble proteins and a large amount of the oils of the soybean. It doesn't contain lactose and therefore suitable for lactose-intolerant individuals. (Nelson et al, 1971; Osundahunsi et al. 2007; Sanful, 2009; Soy milk contains same amount of protein as cow's milk; it can substitute animal protein and supplementary sources of nutritional fibre, vitamins and minerals (Sacks et al., 2006). Soy milk contains little digestible calcium because pulp of bean bound to calcium, which is indigestible by humans. To counter this, manufacturers enrich their products with calcium carbonate. Unlike cow's milk, less saturated fat and negligible cholesterol found in soy milk.

It has been recommended that consumption of soybean will reduce the low- density lipoprotein ("bad cholesterol") and triglycerides (Anderson, Johnstone and Cook-Newell, 1995).

Black soybean polysaccharides are more susceptible to heating and not with the sunlight. The polysaccharides of black soybean were difficult to oxidized and also difficult to deoxidize. Hot water extract of black soybean confirmed antiviral activity against human adenovirus type 1 and coxsachievirus B1.(Yamai, et al. 2003) Black soybean have various bioactive compounds showing radical –scavenging activity, anti-tumor activity (Furuta, Maeda , and Liano)and activity for improving the fluidity of the whole blood. (Kikuchi. Active peptide compounds present in black soybean is responsible in the treatment of diabetes, hypertension, anti-ageing, cosmetology and blood circulation. Black soybeans are efficient in sperm and bone marrow production, muscle strength, hair growth and immune system. Black soybean contains many important phytochemicals like isoflavones, saponin, and anthocyanin. The excellent source of anthocyanin pigment like delphinidin-3-glucoside, cyaniding-3-glucoside and petunidin-3-glucoside found in seed coat of black soybean.

The seed coat of black soybean contains anthocyanin which makes the seed coat darker than other types of soybean. Black soybean contains good amount of high dietary fiber and also 8 human essential amino acids, which helps in gastrointestinal function and decrease the

discomfort caused by flatus. The adipogenesis inhibitor tripeptide. Ile-Gln-Asn present in black soybean helps in control of adiposity.

Soybean is used as food for human as well as for animal. Nowadays soybean are also utilize as alternative for fuel as biodiesel. (Maurya 2011).

MATERIAL AND METHODS

Method of preparation: Black Soymilk

Step 1: Soaking and dehulling

- Soak the soybeans in with six cups of water for the night in the bowl. The beans should triple in size. Remove the hull (skin) by rubbing the beans with palms after 24 hrs.

Step 2: Drain the water

- When the beans are soft, with help of strainer, drain the soaking water, when they are completely drained, pour the beans into a bowl or other container.

Step 3: Grinding the soybean

- Grind the soybeans and 1 liter water in a blender. Sieve the mixer through a cheese cloth and recover the soy milk. The insoluble residue on the sieve is called Okara, can be used as an for bread making or as cattle feed.

Step 4: Boiling the soy milk

- Heat the soymilk till boiling point and continue for about 5 to 10 minutes. After cooling, the prepared soy milk can be held in reserve in the fridge for another 3 days.

Biochemical analyses

pH, Ash and moisture content: The physical attributes pH, ash and moisture content were determined using the standard method.(AOAC,1970).

Protein, carbohydrate and fat: The protein and fat content (Roese-Gottlieb method)was determined by the D.G.H.S method and the total carbohydrate content was calculated by UN FAO Chapter 2,2003.

Sodium, potassium, Calcium, and Magnesium: Na, K, Ca and Mg were analyzed by AOAC 19th edition 985.35method and phosphorus was estimated by IS: 12756:1989.

All the analyses were carried out in triplicate.

RESULT AND DISCUSSION

The physical and biochemical compositions of black soybean milk were shown in table 1 and 2.

Table: 1 Physical parameters of Black soybean milk

Sr. No.	Parameters	Result
1	pH	6.10
2	Ash %	0.37
3	Moisture %	94.54

Table: 2 Overall biochemical composition of black soymilk

Parameters	mg/100gm
Protein %	2.23(g/100gm)
Carbohydrate mg/100gm	2.86
Fat %	Negligible (g/100gm)
Phosphorus mg/100gm	13.78
Calcium mg/100gm	44.5
Sodium mg/100gm	94.11
Magnesium mg/100gm	18.01
Potassium mg/100gm	78.70

The proximate compositions of the homemade soymilk of black soybean are shown in table 1 and table 2. From the data it was observed that the soymilk made from black soybean contained ash (0.37%), moisture content 94.54% and pH (6.10). It also contained protein (2.23%), carbohydrate (2.86mg/100gm), fat (nil), Phosphorus (13.78mg/100gm), calcium (44.50 mg/100gm), sodium (94.11mg/100gm), magnesium (18.01 mg/100gm) and potassium (78.70mg/100gm).

CONCLUSION

It was found out from this study that black soybean milk was good nutritional composition of protein, carbohydrates and minerals with zero fat.

As per table 2 sodium and potassium concentration are highest, hence it a good source of sodium and potassium. Such high level of both contents is rare in single food source. Therefore black soymilk may consider as unique combination of sodium and potassium. Hence people suffering from low blood pressure are advice to take black soymilk instead of cow/buffalo milk.

Calcium level is three times higher than phosphorus indicates powerful absorption for calcium from intestine and also in the bone tissue.

As the percentage of fat is negligible and protein is in high concentration indicates this as a good supplement and body building milk preparation for athletes and muscular body building. This combination of protein and fat is quiet contrast to that cow and buffalo milk. This also reduces the calorie intake in calories conscious people.

As the carbohydrate is very low, this milk is suitable for diabetic people as compare to cow and buffalo milk.

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