

Nutritional & Anti-Nutritional Profile of Indian Bean: A Mini Review

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Abstract

Indian bean is one of the most ancient among the cultivated plants. It is a rich source of protein, carbohydrates, minerals and vitamins. Compared to animal protein they are very cheap, readily available and in view of the growing concern for nutritional security in third world countries. Besides its nutritional benefits, it also possesses nutraceutical properties and is a good natural cure for several health related problems. Anti-nutritional factor is one of the major drawbacks limiting the nutritional and food quality of the legume.

Keywords: Indian bean, protein, minerals & nutraceutical.

Introduction

Indian bean [*Lablab purpureus* L. (Sweet), $2n=2x=22, 24$] is member of the family Leguminosae, sub-family Faboideae, tribe phaseoleae and sub-tribe phaseolinae. In general, two cultivated types viz., *Lablab purpureus* var. *typicus* and *Lablab purpureus* var. *lignosus* are under cultivation. Former is vegetable type cultivated for its soft and edible pods while the latter is cultivated as field bean for its dry seed as pulse crop. Both Varieties are cross compatible. Indian bean is known by various synonyms viz., Hyacinth Bean, Country Bean, Bonavist Bean, Tonga Bean, Lablab Bean, Dolichos Bean, Butter Bean, Field Bean, Poor's man Bean and in Hindi Sem or Semi.

Indian bean is one of the most ancient among the cultivated plants (Vavilov Vavilov, N.I.1939) had considered India as the primary centre of origin of Indian bean and wild forms are found in many parts of the country. The crop is documented by archaeo-botanical finds in India from 2000-1700 BC at Hallur, the earliest Iron Age site in Karnataka, to 1200-300 BC at the Veerapuram excavation site in Andhra Pradesh (Fuller, D.Q. 2003). It is widely distributed in many tropical and subtropical countries where it has become naturalised (Purseglove, J.W. 1968). And grown mainly in South Asia (India and Bangladesh), South-



East Asia, Africa and Australia. In India it is grown in North East India, Tamil Nadu, Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Gujarat, Haryana, Uttar Pradesh and West Bengal.

It plays an important role in protein nourishment as it contains 20-30% protein on dry matter basis. Hence, it is one of the best sources of plant protein for millions of people in tropical and sub-tropical countries, particularly the poor and developing countries. Compared to animal protein they are very cheap, readily available and in view of the growing concern for nutritional security in third world countries, their importance will become greater in future.

Nutritional profile of Indian bean

Proteins

Indian bean plays an important role in protein nourishment as it contains 20-30% protein on dry matter basis 23.90g/100g (Panwar *et.al.*, 2013). Hence, it is one of the best sources of plant protein for millions of people in tropical and sub-tropical countries, particularly the poor and developing countries. Compared to animal protein they are very cheap, readily available and in view of the growing concern for nutritional security in third world countries, their importance will become greater in future (Hossain *et.al.*, 2016).

Dietary Fiber

Dry Indian beans are very good source of dietary fiber among pole beans. 100g dry beans carry 25.6g or 64% of fiber (Sheahan *et.al.* 2012). Dietary fiber works as a bulk laxative that helps to protect the colon mucosa by decreasing its exposure time to toxic substances as well as by binding to cancer causing chemicals in the colon. Dietary fiber has shown to reduce blood cholesterol levels by decreasing re-absorption of cholesterol binding bile acids in the colon (Soetan *et.al.*, 2010).

Carbohydrates

Carbohydrates as Nitrogen free extract (NFE) calculated by difference for whole raw Indian bean (65.85g/100g) was well comparable with the range values of 60-65g/100g for cowpea and common bean^[5], 65-70g/100g for pigeon pea. Beans possess good quantity of resistant starch which on fermentation results in production of short chain fatty acids such as acetic, butyric and propionic acids. High carbohydrate content of Indian bean enables the

legume to act as a good source of calories which would be anti miasmas, especially in infant nutrition (Vadivel V and Janardhanan K ., 2000). The range in calorific values exceeds energy values of cowpea, green gram, horse gram, moth bean and peas (Rao *et.al.*, 1982).

Lipids

Lipids was categorized the lowest content among nutritional components in Indian bean although it constituted the primary component of human diet. Indian bean is very low in total fat (1.10%) and its contribution to the total calorie was only $\approx 2.8\%$ (Hossain *et.al.*,2016). Fatty acid profiles showed that oils composed of 24.2% saturated fatty acids, 18.42% mono unsaturated fatty acids and 57.38% poly unsaturated acids and linoleic acids (44%) was the major constituents of fatty acids (Al-Othman *et.al.*,1999).

Minerals and Vitamins

The nutritive value of Indian bean is very high with good content of minerals and vitamins (Basu *et.al.*, 2002) Sodium and potassium are useful in checking nerve irritability controlling glucose absorption and enhancing normal retention of protein during growth (NRC., 1989). Inadequate iron (5.10mg/100g) in the diet has been associated with poor learning and decreased cognitive development (FAO, 1987). Also Iron facilitates the oxidation of carbohydrates, proteins and fats (Adeyeye *et.al.*,2014). Zinc (9.30mg./100g) is one of the many minerals that are deficient in the diet and is associated with impaired growth, reproduction and immune disorder (Adeyeye *et.al.*,2014).. Other minerals such as Calcium (130mg/100g), Copper (1.335mg/100g), Magnesium (283mg/100g), Manganese (1.573mg/100g), Phosphorous (0.372mg/100g), Selenium (8.2 $\mu\text{g}/100\text{g}$) were also present. Essential vitamins such as Folates (2 $\mu\text{g}/100\text{g}$), Niacin (1.610mg/100g), Pyridoxine (0.155mg/100g), Thiamin (1.130mg/100g) and Vitamin-A 0.1IU were also found to be present.

Anti-nutritional Factor

The presence of anti-nutritional factors is one of the major drawbacks limiting the nutritional and food quality of legumes. The TIA values were higher than those of cowpea, Chick pea and kidney bean. High phytic acids content which indicated that phytate in Indian bean was the main form of storage of Phosphorous not only makes the phytate phosphorous unavailable to humans but it also lowers the availability of many other essential minerals.

Tannins have also been claimed to adversely affect protein digestibility. Indian beans were found to contain 2000-2205mg/100 g tannin. All tannins were found to be located in the seed coat with only traces in the cotyledon. However, soaking, removal of seed coat and cooking was found to substantially remove or inactivate the trypsin inhibitors, phytate and tannins in Indian bean seeds.

Conclusion

The tender fleshy pods, shelled green seeds and also dry beans are eaten after cooking and have very good nutritive and medicinal value as it has anti diabetic property and is good for natural cure of bladder burns, cardiac problems, diarrhoea, sciatica and tenesmus. Indian beans are also gluten free and they are often recommended as alternative for gluten free product food for gluten allergy and celiac disease patients. Therefore, Indian bean consumption is recommended especially for children because its high nutritive values.

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