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## Nutritional profile of French bean: A mini review

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### Abstract

French bean is a legume vegetable which possess a unique place in the Indian cuisines. It is a rich source of proteins, carbohydrates, minerals and vitamins. The protein content in French bean is as comparable to meat protein. Besides its nutritional benefits, it also possesses nutraceutical properties and is a good natural cure for several health related problems.

**Keywords:** French bean; nutrition; proteins; vitamins

### Introduction

French bean (*Phaseolus vulgaris* L.,  $2n=2x=22$ ) is an important legume crop, used as green pod vegetable (commonly known as snap bean, string bean, garden bean, fresh bean) or for dry seeds (also known as dry beans). French beans are known to have originated from Central and South America where they are grown as an indigenous crop for the past 5,000 years. French bean evolved from a wild growing vine viz., *Phaseolus aborigineus* and distributed in the highlands of middle America and Andes is one of the oldest cultivated pulse crops [1]. Among the 150 species of *Phaseolus*, *Phaseolus vulgaris* is the most widely cultivated form. More than 400 cultivars of this crop are now cultivated in the world and it occupies a premier place among grain legumes in the world including India. Spanish and Portuguese explorers introduced the legume to Europe and Africa, and by the nineteenth century the slim pods became a common vegetable in France, hence being called "French" beans. The slender, less stringy, delicate bean with tiny seeds earned its status as a sophisticated and important dish in French cuisine by the twentieth century. Today, French beans are a common alternative to green beans and other legumes, and are grown around the world including India and Africa where they are a staple food.

*Phaseolus* beans are recognized as valued vegetables in many dietary items. It offers promise to fight against protein mal-nutrition, especially in vegetarians. Majority of population in India are vegetarian and increased production and consumption of French bean as a pulse and vegetable can appropriately supplement their nutritional requirements [2]. In India, French bean is extensively grown as green pod vegetable for fresh pods which are known as *Fras bean*. The dry seed type varieties are known as 'Rajmash' in India. Snap bean seeds can also be used in dry state like the dry bean types, in that case terms like pinto, kidney, pink, small red, etc., can be used. In India, green pods as well as dry seed consumption is conspicuous and are primarily grown in Jammu and Kashmir, Himachal Pradesh and on the hills of Uttarakhand. Leaves are also used as vegetable in Africa and Asia. In tropical countries, it is grown for fresh pods while, in temperate countries it is consumed as dry bean. In northern India, dry seeds of French bean fetch higher price to that of other pulse crops as its vegetable preparation is considered to be one of the most nutritious and delicious dish for the 'Sunday special'. The dry seeds are also canned and exported. Among the pulses, raj mash is one of the high potential pulse crops with a yielding potential of 18 to 20 q/ha. French bean fetches premium price in market as compared to other vegetables and is a popular vegetable grown under irrigated conditions almost throughout the year. It is gaining lot of importance due to its short duration and high production potential as well as its high nutritive value [3].

### Nutritional profile of French bean

Beans are a large group of leguminous vegetables that serve as a main source of proteins in human diet. French bean also known as 'meat of the poor' [4], 'grain of hope' [5] and 'Super food' [6] is one of the highly relished pulse, quite nutritious and potential source of protein,

carbohydrates and minerals. French bean is one of the important leguminous crops which achieve its foremost importance in cultivation in the agricultural field due to its higher nutritional index of protein in fresh pods (1.7%) as well as in dried seeds (21.1%) that serve as a cheap source of higher protein. Some nutritional components of beans are discussed below.

### Proteins

Beans are considered to be an excellent source of proteins which along with other foods such as cereals plays an important role in human nutrition and is an important way to overcome the problem of malnutrition [7, 8]. Unlike cereal proteins, the proteins present in beans are considered to be the range of meat protein, with a range of 20-30% proteins. Beans are rich in globulins which constitute 50-70% of the total proteins along with a considerable amount of glutelins [9] (20-30%), prolamin (2-4%), and free amino acids [10] (5-9%). A glycoprotein, phaseolin consisting of neutral sugars especially mannose is also found in beans. Beans are also rich source of essential amino acids including lysine which is deficient in cereals.

### Carbohydrates

Carbohydrates are one of the major constituent of beans (*Phaseolus vulgaris*) which accounts for 50-60% of the dry matter [11]. The major carbohydrates found in beans are starch and non-starch polysaccharides along with considerable amounts of oligosaccharides [12]. 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.

The digestibility of beans starch is much lower than that of cereal starch which is affected by factors such as amylose/amylopectine ratio, molecular structure of amylopectin, amylose chain length, and degree of crystallinity and size of granules [13]. However, presence of high amount of resistant starch, protein-starch interactions, amylase inhibitors and phytic acid may also account for the degree of starch digestibility. Beans also possess substantial amount of dietary fibres and soluble as well as insoluble fibres have been well characterized from beans [14, 15]. The insoluble fibres have been reported to improve laxation whereas soluble fibre has been reported in regulating blood glucose level and lowering blood cholesterol.

### Lipids

Beans consist of nearly 2% lipid content and are considered as an essential source of unsaturated fatty acids comprising of 61% of the total fatty acids. Linolenic acid that accounts 43.1% of the fatty acids in beans is dominant among unsaturated fatty acid [16]. The major lipid components in beans are phospholipids and triacylglycerols, while small amount of diacylglycerols, hydrocarbons, steryl esters and hydrocarbons may also be present. The lipids found in beans are mostly in the form of Phosphatidylcholine, phosphatidylethanolamine and phosphatidylinositol [17].

### Minerals and Vitamins

Beans are considered as an essential source of minerals and vitamins and are considered to be superior to cereals as micronutrient sources [18]. Beans are an indispensable source of minerals like iron, zinc, copper, phosphorous and aluminium [19], iron being the highest with a range of 62.0-150 µg/g [20]. Beans are also considered as an essential source of

vitamins and are good source of folate, tocopherols, thiamine, riboflavin, niacin, biotin and pyridoximine [21, 22]. The quantity of folate present in beans is sufficient to meet 95% of the daily requirement [23]. Other vitamins such as Thiamine, riboflavin, niacin, vitamin B<sub>6</sub> and folic acid are also found in considerable amount in beans [22].

### Conclusion

French beans are a good source of dietary fiber, low in calories, and contain Vitamins A, B, and C as well as folates, minerals (iron, calcium, potassium, and selenium), and antioxidants such as lutein and beta-carotene. French beans can be eaten raw when fresh, cooked or sautéed. They are best cooked whole and very briefly then cooled under cold water. Its dry seed contains 21.1 per cent protein, 69.9 per cent carbohydrates, 1.7 per cent fat, 381 mg calcium, 425 mg phosphorus and 12.4 mg iron per 100 g of edible part [24]. It also possesses some medicinal properties which are useful in controlling diabetes and certain cardio vascular problems and is a good natural cure for bladder burn, dysentery, eczema, hiccups, rheumatism, sciatica and tenesmus. It has both carminative and depurative properties against constipation and diarrhea [25].

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