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Review Article

A Review on *Phaseolus vulgaris* Linn., ...

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ABSTRACT

Medicinal herbs have been discovered and used in traditional medicine practices since antiquated times. *Phaseolus vulgaris* Linn. (Family–Fabaceae) commonly known as French bean, is a most consuming carbohydrate and protein rich food crop having medicinal values. This plant having diverse compounds like carbohydrate, proteins, flavonoids, Saponins, tannins and phenolic acid. The seeds of *Phaseolus vulgaris* Linn. Possess having anti–urolithiatic activity and anti– obesity activity. This review provides a summary of phytochemistry and pharmacological effect of *Phaseolus vulgaris* Linn., The plant can be further investigated for other pharmacological activities as it contains variety of chemical constituents and it is a commonly using food crop and medical remedies of this plant are sync with nature.

Key words: *Phaseolus vulgaris* Linn, Food crop, Urolithiasis, Obesity.

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INTRODUCTION

We usually take food daily to get energy for our daily activities, our food may be vegetables, fruits, meat, etc. Some vegetables and fruit besides providing flavour, smell, taste, to food, they serve as medicinal plant. Medicinal plant is any plant which in one or more of its organs contains substances that helps to synthesis of new drugs.[1] *Phaseolus vulgaris* is one of the most consuming food crop and medicinal plant all around the world as it is popular because of its seed. Its extract has been used for treatment such as for weight reduction.[2] In Folk medicine, Beans are said to be used for acne, bladder, burns, cardiac, carminative, depurative, diabetes, diarrhoea, diuretic, dropsy, dysentery, eczema, emollient, hiccups, itch, kidney stone re solvant, rheumatism, sciatica, and tenesmus.[3] *Phaseolus vulgaris* Linn., has an high potential to be used as human and animal food and to be utilized as a pharmacological agent in medicine. In this paper, phytochemistry and pharmacological activities of this plant are reviewed and its potential for further investigation, exploitation, and utilization are discussed. *Phaseolus vulgaris* Linn., are grown in regions as diverse as Latin America, Africa, the Middle East, China, Europe, the United States, and Canada. The leading bean producer and consumer is Latin America, where beans are a traditional, significant food, especially in Brazil, Mexico, the Andean zone, Central America, and the Caribbean (Table 1).[4,5]

TAXONOMY[6]

- Plant: Annual, climber or sub erect, stem, pubescent to glabrescent.
- Leaves: Trifoliate, petiolate 4-9 cm long, leaflet 4.5-15cmlong.2.5-6.5cm broad ovate to ovate-rhombic, acuminate, lateral leaflet oblique; petiolate 1.5-2.5mm long, stipules 4mm long.

Table 1: Taxonomic classification.[5]

Kingdom	Plantae
Subdivision	Tracheoblonta
Superdivision	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Rosidae
Order	Fabale
Family	Fabaceae
Genus	Phaseolus
Species	vulgaris

- Inflorescence: 1-3 flowered, peduncle 0-5cm long.
- Bracts: 3mm long bracteolate 5-6mm long.
- Calyx: Pubescent, tube 2-3mm long, teeth 1mm long, joined to form an emarginated.
- Corolla: white, yellowish, purple/pale pink.
- Vexillum: 1-1.9cam long, glabrous, 5-12 seeded.
- Keel: 2.2cm long, spirally incurved.
- Fruit: 1-15cm long, 1-1.3cm broad, linear, calceolate, pubescent or glabrous, 5-12 seeded.
- Seed: Reniform, dark red 0.9-2.0×0.3-1.2cm.

Synonyms: *phaseolus aborigineus Burkart* , *phaseolus communis* Pritz, *phaseolus compressus* DC, *phaseolus esculentud* salisb, *phaseolus nanus* L.[7]

ORIGIN AND OTHER NAME

P.vulgaris is commonly known as French bean, kidney bean, common bean, bean. In India it's commonly called as बाकला Bakla, राजमाह Rajmah, Rajma.[6] Common bean (*Phaseolus vulgaris* L.) (Figure 1) is one of oldest cultivated crops in the Americas and is the most important grain legume for human consumption with production more than double that of second most important grain legume chickpea.[8] According to FAOSTAT of united states:

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23.6millon tonnes, led by china with 79% of total , world dried bean production in 2016 was 26.8millon tonnes, with Myanmar, India, Brazil as leading producer.

BIOACTIVE COMPONENTS OF *P.VULGARIS*

P.vulgaris contains carbohydrates (52%-76%), protein (14%-33%), amino acid such as lysine (6.4-7.6g/100g) protein, phenylalanineand tyrosine.[9] Besides nutritional content it content bioactive compounds such as anti-inflammatory, phenolic acid, flavonoids, flavan-3-ol, condensed tannins and anthocyanin, antioxidant especially protect from 2,2-diphenyl-1-picrylhydrazyl (DPPH), 3-ethylbenzothiazoline-6-sulfonic acid (ABTS) and peroxyl radicals (Figure 2).

Saponin[9]

Commonbean contain trace amount of saponin. These substance are characterized by possessing a structure containing steroidal aglycone or a triterpernoid including one or more sugar. Saponin are classified as A, B&E based on aglycones structure.

Non flavonoids phenolic compound[9]

The non-flavonoid phenolic compound such as hydroxybenzoic acid and hydroxycinnamic acid, are located in cotyledons, whereas flavonoid are found on seed coat.

Figure 1: Phaseolus vulgaris "The Red Cranberry".

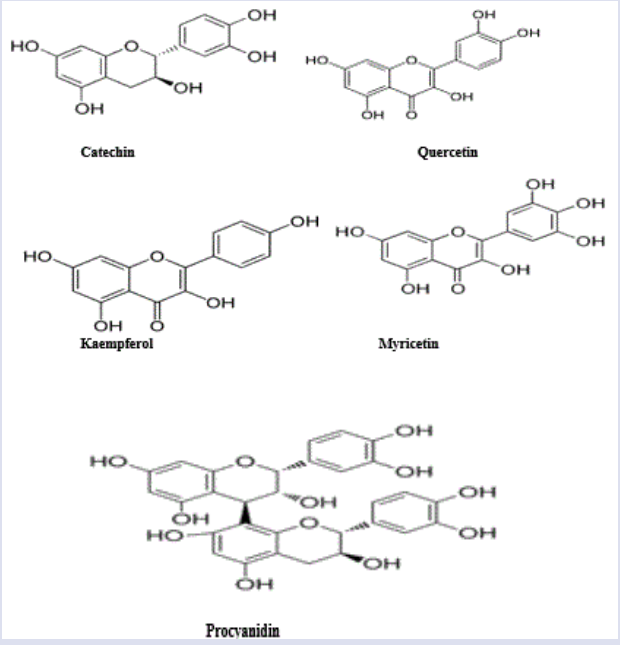

Figure 2: Bioactive components of *P.vulgaris.*

Flavonoids[9]

Flavonoids contained on common bean are phenolic compound on common ben are phenolic compound that has been work as inhibiter of tumour growth & some cancertypes. Flavonoids share a common structure consists of two aromatic rings that links 3c, form oxygenated heterocyclic. These are classified as six sub classes depending on their heterocyclic flavones, flavones, isoflavones, anthocyanides and flavonols (catechin & proanthocyanides). Main flavonoids are catechin, kaempferol, quercetin, myricetin & procyanidin.[10.]

Tannins[9]

Tannins are present most on seed coat, tannins are polymeric flavonoids that comprises a small part of widely diverse group of phenolic compound.

Phenolic acids[9]

Phenolic acids are of great importance in vegetables as they precursor of other more complex phenolic compound Gallic, Vanillic, Coumaric, Sinapic, Ferulic and Chlorogenic acids are mainly found on common bean.

BIOLOGICAL USES

Flavonoids contain basic antioxidant like qercetin and kaempferol, Catechin has been shown to reduce sensitivity of strokes, carotenoids in bean also acts antioxidant.[11] Triterpenoid saponin capability to deactivate virus, Saponins also contain antifungal and anti-microbial activity. It inhibit inflammatory mediators such as histamine, serotonin thus act as anti-inflammatory action.[12] Flavonoids such as quercetin and catechin contain hepatoprotective activity.[13] Quercetin produce inhibitory growth on malignant tumor such that act as anti-cancer activity.[13] Flavonoids also has property of control viral, bacterial growth (antiviral and antibacterial).[13] Phenolic acid prevent cell damage caused by free radical oxidation (antioxidant) Anticancer studies are carried on Gallic acid, gallic acid inhibit viral growth and it is also used cardiovascular disease and anti-allergic.[14]

PHASEOLUS VULGARIS IN KIDNEY STONE TREATMENT

Recent year we can notice increased kidney stone case, it is affecting good percentage of population around global. It is caused by several factor such as include diet, genetic and low activity suggested to be responsible.[15] Calcium oxalate, calcium phosphate, are most usual component of kidney stones with small portion of magnesium ammonium phosphate, uric acid or cysteine.[15] Approximately 80% are of calcium containing stones with calcium oxalate (50%) or calcium phosphate (1%) and mixture of both (45%) other stones such as struvite (10%), uric acid (9%) and cysteine (1%) (16). Metabolic abnormalities such as hypercalciuria, reduced urine volume, hyperxaluria, an alteration in urine ph, hypoctraturia, gouty diathesis and hyperuricosuria enhance stone formation by changing composition and saturation of these stones.[15,16] Seeds of *Phaseolus vulgaris* Linn., possess antiuritholithiartic activity because of its potassium and magnesium with phytic acid content which may help in protect formation of stones, It is because, potassium promotes urinary citrate excretion and together with magnesium it further inhibits crystal formation, Magnesium forms complex with oxalates which are more soluble than calcium oxalates.[17] Phytic acid also combines with calcium prevent calcium oxalate formation.[16]

OBESITY TREATMENT

Overweight and obesity occur when excess fat accumulation (regionally, globally, or both) increases risk to health. It is the point at which health risk is increased that is most important because, as covered below, body weights and fat distributions that lead to expression of co-morbid diseases occur at different thresholds depending on the population.[18] Meta-analysis give the evidence for the presence of proprietary alpha amylase inhibitor in *Phaseolus vulgaris* L.,[19] supplementation in human beings on modification of body weight and fat mass. Placebo studies made on *Phaseolus vulgaris* L., shows the reduction in weight.[20] Consumption of *Phaseolus vulgaris* L. *In vitro* studies on methanolic and aqueous extract of *Phaseolus vulgaris* Linn., shows good lipolytic activity, it also shows anti adipogenic activity.

CONCLUSION

Consuming of natural medicine can produce therapeutical effect without side-effect and it is cheaply available. This review article is evident that there are many phytoconstituents are available in *Phaseolus vulgaris* Linn., but there is a lesser number of proved Pharmacological activity related with chemical constituents. So that, this area will provide the basement for research and researchers to prove the large numbers of pharmacological activity of *Phaseolus vulgaris* Linn.,

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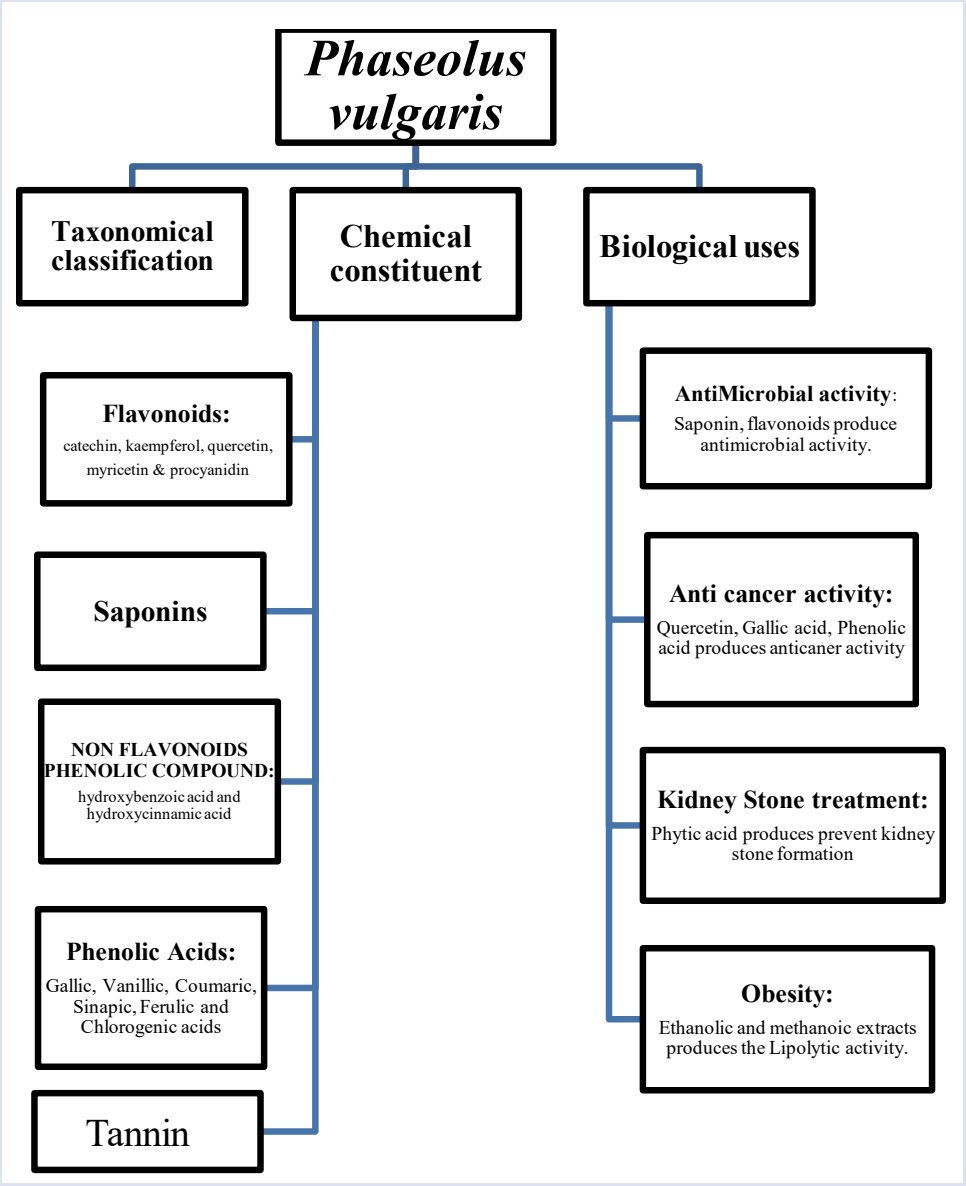
GRAPHICAL ABSTRACT



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