

PHASEOLUS VULGARIS LINN.: BOTANY, MEDICINAL USES, PHYTOCHEMISTRY AND PHARMACOLOGY.

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ABSTRACT

The present review shares an updated data on the botany, distribution, medicinal uses, phytochemistry and pharmacology of *Phaseolus vulgaris* L. All provided information was obtained through Google scholar, Pubmed, SciFinder, Scirus, Web of Science and a library search.

KEYWORDS: *Phaseolus vulgaris*, botany, medicinal uses, phytochemistry, pharmacology.

INTRODUCTION

Phaseolus vulgaris L. (Family: Papilionaceae) is native of Tropical America and now widely cultivated throughout the tropics and temperate regions of the world including India and Pakistan.^[1]

Phaseolus vulgaris in different languages is called as^[2]

Languages	Names
Bengali	Barbati Beej.
English	Kidney bean, Snap bean, Green bean, Dry bean, String bean.
French	Haricot commun.
German	Gartenbohne.
Hindi	Rajma.
Italian	Fagiolo, Faxoe, Faisoe (Liguria) , Fasoel (Piemonte), Cornett (Lombardia), Fasioi, Fasoler (Veneto), Fasol, Fasulein (Emilia), Fasciolo (Umbria), Fascinale (Abruzzi), Suriaca, Vasuli (Calabria), Fasolu, Trujaca (Sicilia), Fasoleddu, Basolu, Pisu (Sardegna).
Latin	<i>Phaseolus vulgaris</i> .
Malyalam	Beans.
Portuguese	Feijão (dry), Feijão-vagem (green).
Spanish	Caraota (Venezuela), Chaucha (green - Argentina, Uruguay), Ejote

	(green - Mexico), Judía, Judía común, Frejol (Bolivia, Chile, Peru), Fréjol (Ecuador), Frijol (Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Cuba, Peru), Alubia, Fríjol (Colombia), Frisol (Colombia), Habichuela (Puerto Rico, Dominican Republic), Habilla (Paraguay), Chícharo (dried seed), Poroto (Argentina, Bolivia, Chile, Panama, Peru, Uruguay), Tabla (green - Chile), Vainita (green - Bolivia, Ecuador, Peru, Chile).
Tamil	Sigappu Kaaramani.
Telugu	Chikkuduginjalu.
Urdu	Lal lobia.

TAXONOMIC CLASSIFICATION

Kingdom	Plantae
Family	Papilionaceae
Tribe	Phaseolae
Sub tribe	Phaseolinae
Genus	<i>Phaseolus</i>
Species	<i>vulgaris</i>
Synonym	<i>Phaseolus aborigineus</i> Burkart.

TAXONOMY^[1]

Plant	Annual, climber or sub erect, stem pubescent to glabrescent
Leaves	Trifoliate, petiole 4-9cm long, leaflets 4.5-15cm long, 2.5-6.5cm broad, ovate to ovate-rhombic, acuminate, lateral leaflets oblique; petiolule 1.5-2.5mm long; stipules 4mm long.
Inflorescence	1-3 flowered, peduncle 0-5cm long.
Bracts	3mm long; bracteoles 5-6mm long.
Calyx	Pubescent, tube 2-3mm long, teeth 1mm long, upper 2 joined to form an emarginated lip.
Corolla	White, yellowish purple or pale-pink.
Vexillum	1-1.9cm long, glabrous.
Keel	2.2cm long, spirally incurved.
Fruit	10-15cm long, 1-1.3cm broad, linear, lanceolate, pubescent or glabrous, 5-12 seeded.
Seeds	Reniform, dark red, 0.9-2.0x0.3-1.2 cm.



Seeds of *Phaseolus vulgaris*.

MEDICINAL USES

Seeds are reported as diuretic especially in kidney and heart ailments and are also useful in mild cases of diarrhea.^[3]

NUTRITIONAL VALUE

The seeds of *Phaseolus vulgaris* are nutritionally very important and have following important constituents.^[4]

Basic composition (mg/g)		Fatty acids (mg/g)	
Total lipid	10.60	Total saturated	1.54
Protein	225.30	Total mono unsaturated	0.82
Carbohydrate	612.90	Total poly unsaturated	5.86
Essential minerals (mg/g)		Vitamins (mg/g)	
Macro-minerals		Alpha-Tocopherol (E)	0.0021
Calcium	0.83	Ascorbic acid (C)	0.045
Magnesium	1.38	Folate	3.94 µg/g
Phosphorus	4.06	Niacin (B ₃)	0.0211
Potassium	13.59	Phylloquinone (K ₁)	0.056 µg/g
Sodium	0.12	Pyridoxine (B ₆)	0.00397
Micro-minerals		Retinol (A ₁)	---
Iron	0.0669	Riboflavin (B ₂)	0.00215
Zinc	0.0279	Thiamin (B ₁)	0.00608
Total dietary fiber	0.1520	Caloric value	3.37 kcal/g

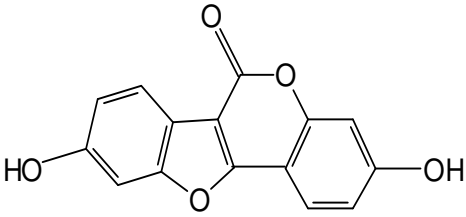
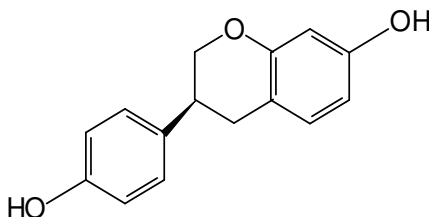
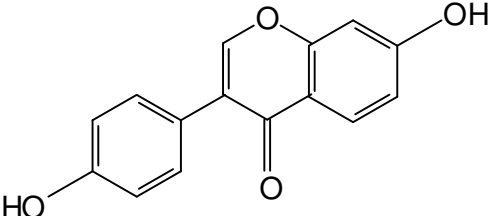
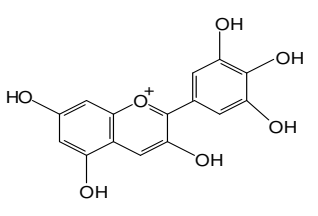
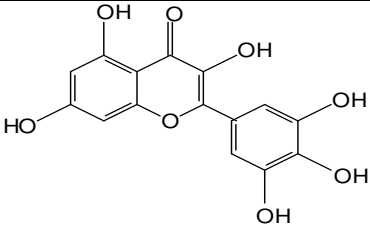
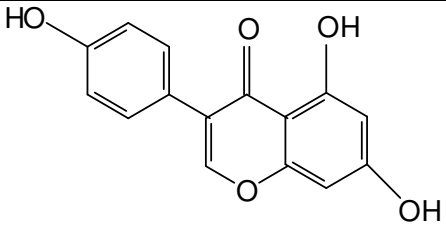
PHYTOCHEMISTRY

The phytochemical literature survey of *Phaseolus vulgaris* revealed the presence of anthocyanins^[5], brassinosteroids^[6], caffeic acid^[7], catechic and gallic acid^[8], coumestrol, daidzen^[9], delphinidin^[10], equol^[9], ferulic acid^[7], galactomanans^[11], gallic acid, genistein^[9], hemagglutinins^[11], kaempferol^[9], lectins^[12], malvidin^[10], myrecitin glycoside^[13], para coumaric acid^[7], petunidin^[10], phaseolamin^[14], phaseolin^[10], para hydroxybenzoic acid^[9], phytic acid^[15], phytohaemagglutinin^[12], proanthocyanidins^[16], proanthocyanins^[5], quercetin^[9], robinin^[5] and vanillic acid^[9].

PHARMACOLOGICAL ACTIVITY

Different extracts of *Phaseolus vulgaris* have been evaluated for pharmacological activities and have shown analgesic, anti obesity^[17, 18], antibacterial^[19], anticancer^[7, 20], antidiabetic^[10], antifertility^[17], anti-inflammatory^[7, 20], anti-oxidant^[10], hepatoprotective^[7], hypolipidemic^[10], litholytic^[17], trypsin and ^[13] α-amylase inhibitor^[14].

Chemical structures of some compounds isolated from *Phaseolus vulgaris*.

	
Coumestrol (C₁₅H₈O₅)	Equol (C₁₅H₁₄O₃)
	
Daidzein (C₁₅H₁₀O₄)	Delphinidin (C₁₅H₁₁ClO₇)
	
Myricetin (C₁₅H₁₀O₈)	Genistein (C₁₅H₁₀O₅)

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