

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/309827649>

Phaseolus vulgaris Linn.: Botany, medicinal uses, phytochemistry and pharmacology

Article in World Journal of Pharmaceutical Research · November 2016

DOI: 10.20959/wjpr201611-7371

CITATIONS

0

READS

4,327

3 authors, including:



Salman Ahmed

University of Karachi

153 PUBLICATIONS 445 CITATIONS

SEE PROFILE



Mohtasheem Hasan

University of Karachi

126 PUBLICATIONS 594 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Exploring globally used medicinal plants of different families against urinary stones to help-out researchers for shifting globally used antiurolithiatic plants to Pharmacy shelf [View project](#)



Growing kidney stone crystals on glass slide: Designing of new simple, inexpensive and authentic in vitro model to evaluate natural antiurolithiatic drugs. [View project](#)

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

Zainish M. Saleem, Salman Ahmed and Muhammad Mohtasheemul Hasan*

Department of Pharmacognosy, Faculty of Pharmacy and Pharmaceutical Sciences,
University of Karachi, Karachi-75270, Pakistan.

Article Received on
21 Sept. 2016,

Revised on 12 Oct. 2016,
Accepted on 01 Nov. 2016

DOI: 10.20959/wjpr201611-7371

***Corresponding Author**

Muhammad

Mohtasheemul Hasan

Department of
Pharmacognosy, Faculty of
Pharmacy and
Pharmaceutical Sciences,
University of Karachi,
Karachi-75270, Pakistan.

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

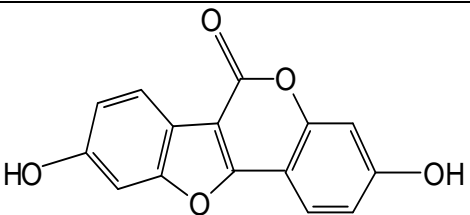
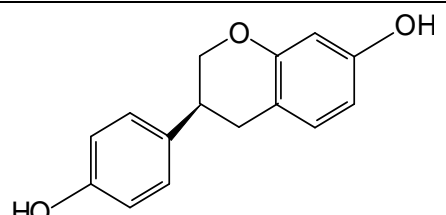
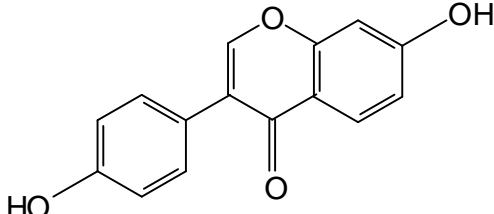
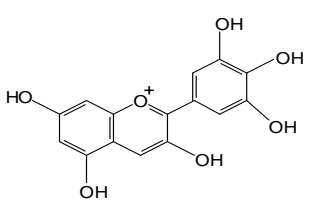
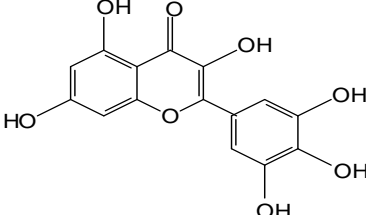
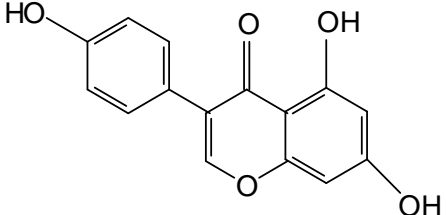
PHYTOCHEMISTRY

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)

REFERENCES

1. Ali S. Papilionaceae. In: Flora of West Pakistan. Vol. 100. Nasir E and Ali S, Eds. Karachi: Department of Botany, University of Karachi, 1977; 239-252.
2. Porcher, M.H. *Phaseolus vulgaris* L. In: Multilingual multiscrypt plant name database. <http://www.plantnames.unimelb.edu.au/Sorting/Phaseolus.html>, 2013 [cited 2016 14th Oct].
3. Anonymous. The Wealth of India: Raw Materials. Ph-Re. New Delhi, India: Publications and Information Directorate, C.S.I.R, 1979; VIII.
4. USDA. National Nutrient Database for Standard Reference Release 27: Basic Report 16032, Beans, Kidney, red, mature seeds, raw. 2015 [cited 2016 Sept 23, 03:45EDT]; Available from: <http://ndb.nal.usda.gov/ndb/nutrients/index>.
5. Onyilagha JC and Islam S. Flavonoids and other polyphenols of the cultivated species of the genus *Phaseolus*. International Journal of Agriculture and Biology, 2009; 11: 231-234.
6. Park SC, Kim T-W and Kim S-K. Identification of brassinosteroids with 24R-methyl in immature seeds of *Phaseolus vulgaris*. Bulletin-Korean Chemical Society, 2000; 21(12): 1274-1276.

7. Oomah BD, Corbé A and Balasubramanian P. Antioxidant and anti-inflammatory activities of bean (*Phaseolus vulgaris* L.) hulls. *Journal of Agricultural and Food Chemistry*, 2010; 58(14): 8225-8230.
8. Atchibri AL, Ocho-Anin, Brou KD, Kouakou TH, Kouadio YJ, Gnakri D. Evaluation of bioactive components in seeds of *Phaseolus vulgaris* L. (Fabaceae) cultivated in Côte d'Ivoire. *Journal of Applied Biosciences*, 2010; 31: 1928-1934.
9. Díaz-Batalla Luis, Widholm JM, Fahey GC, Castaño-Tostado E, Paredes-López O. Chemical components with health implications in wild and cultivated Mexican common bean seeds (*Phaseolus vulgaris* L.). *Journal of Agricultural and Food Chemistry*, 2006; 54(6): 2045-2052.
10. Hayat I, Ahmad A, Masud T, Ahmed A, Bashir S. Nutritional and health perspectives of beans (*Phaseolus vulgaris* L.): an overview. *Critical Reviews in Food Science and Nutrition*, 2014; 54(5): 580-592.
11. Agrawal K, Bahl OP. Glycosidases of *Phaseolus vulgaris* II. Isolation and general properties. *Journal of Biological Chemistry*, 1968; 243(1): 103-111.
12. Shi John, Xue SJ, Kakuda Y, Ilic S, Kim D. Isolation and characterization of lectins from kidney beans (*Phaseolus vulgaris*). *Process Biochemistry*, 2007; 42(10): 1436-1442.
13. Reynoso C, Ramos G and Loarca P. Bioactive components in common beans (*Phaseolus vulgaris* L.), In: *Advances in Agricultural and Food Biotechnology*, R.G. Guevara-González and I. Torres-Pacheco, Editors. Research Signpost: Trivandrum, Kerala, India, 2006; 217-236.
14. Marshall JJ and Lauda CM. Purification and properties of phaseolamin, an inhibitor of alpha-amylase, from the kidney bean, *Phaseolus vulgaris*. *Journal of Biological Chemistry*, 1975; 250(20): 8030-8037.
15. Deshpande SS, Sathe SK, Salunkhe DK, Cornforth DP. Effects of dehulling on phytic acid, polyphenols, and enzyme inhibitors of dry beans (*Phaseolus vulgaris* L.). *Journal of Food Science*, 1982; 47(6): 1846-1850.
16. Aparicio-Fernandez X, Yousef GG, Loarca-Pina G, de Mejia E, Lila, MA. Characterization of polyphenolics in the seed coat of black Jamapa bean (*Phaseolus vulgaris* L.). *Journal of Agricultural and Food chemistry*, 2005; 53(11): 4615-4622.
17. Rana JH, Patel UR, Patel SJ, Lambole V, Shah, DP. Pharmacological activities of *Phaseolus vulgaris*: A review. *Pharma Science Monitor*, 2016; 7(2): 107-115.

18. Nyau V. Nutraceutical perspectives and utilization of common beans (*Phaseolus vulgaris* L.): A review. African Journal of Food, Agriculture, Nutrition and Development, 2014; 14(7): 9483-9496.
19. Atchibri, ALO-A, Brou KD, Kouakou TH, Kouadio YJ, Gnakri D. Screening for antidiabetic activity and phytochemical constituents of common bean (*Phaseolus vulgaris* L.) seeds. Journal of Medicinal Plants Research, 2010; 4(17): 1757-1761.
20. Câmara CR, Urrea CA and Schlegel V. Pinto beans (*Phaseolus vulgaris* L.) as a functional food: Implications on human health. Agriculture, 2013; 3(1): 90-111.