

**PHASEOLUS LUNATUS LINN: BOTANY, MEDICINAL USES,
PHYTOCHEMISTRY AND PHARMACOLOGY.****Zainish M. Saleem, Salman Ahmed and Muhammad Mohtasheemul Hasan***Department of Pharmacognosy, Faculty of Pharmacy, University of Karachi,
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Corresponding Author*Mohtasheemul Hasan**Department of
Pharmacognosy, Faculty
of Pharmacy, University
of Karachi, Karachi-
75270, Pakistan.**ABSTRACT**

The present review shares an updated data on the botany, distribution, traditional medicinal uses, phytochemistry and pharmacology of *Phaseolus lunatus* L. All provided information was obtained through Google Scholar, Pubmed, Sci Finder, Scirus, Web of Science and library search.

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

INTRODUCTION

Phaseolus lunatus L. (Family: Papilionaceae) is native to Tropical America and now widely cultivated throughout the tropics of the world, including India and Pakistan. Two varieties are found as large-seeded Potato Lima and small-seeded Baby Lima which is half of the size of the large variety.^[1, 2] Names of *Phaseolus lunatus* in different languages are as follows.^[3]

Languages	Names
Bengali	Bina bidesi.
English	Lima bean, Butter bean, Burma bean, Rangoon bean, Duffin bean, Madagascar bean.
French	Fève créole, Haricot de Lima, Haricot lima à gros grains, Haricot de Madagascar, Haricot du Cap, Pois de Java, Pois du Cap, Pois souche.
German	Indische Mondbohne, Limabohne, Mondbohne.
Hindi	Sem Phali.
Italian	Fagiolo del Capo, Fagiolo detto di Lima, Fagiolo di Lima.
Latin	<i>Phaseolus lunatus</i> .
Malyalam	Amarakka, Amarakkaya, Amrapayar, Amara.
Portuguese	Feijão-de-Lima, Feijão-fava.
Spanish	Alubia de Lima, Chilipuca, Chilipuco, Fríjol chilipuca, Frijol de Lima, Frijol de luna, Frijol lima, Frijol manteca, Frijol mantequilla,

	Fríjol reina, Frijol viterra, Garrofó, Haba pallar, Judía de Lima, Judía de manteca, Judía Limeña, Lima, Layo, Palato, Pallar, Poroto manteca, Torta.
Tamil	Avaraikai , Mochai , Mocha Paruppu.
Telugu	Pedda Chikkudu , Anamulu.
Urdu	Sem Phali.

TAXONOMIC CLASSIFICATION

Kingdom	Plantae
Family	Papilionaceae
Tribe	Phaseolae
Sub tribe	Phaseolinae
Genus	<i>Phaseolus</i>
Species	<i>lunatus</i>
Synonyms	<i>Phaseolus inamoenus</i> L., <i>Phaseolus limensis</i> Macfad.

TAXONOMY^[1]

Plant	Perennial climber
Stem	Glabrous or pubescent
Leaves	Trifoliolate, petiole 1.5-19 cm long; leaflets 3-15 cm long, 1.2-10 cm broad, the lateral leaflets oblique, ovate to lanceolate or narrowly rhombic; acuminate, sparsely pubescent or glabrous; petiolules 3-5 mm long; stipules 2-3.5 mm long.
Inflorescence	Peduncled raceme; peduncle 1.5-30 cm long.
Bracts	1.5 mm long, bracteoles 1.5-2.0 mm long. Pedicel 5-10 mm long.
Calyx	Pubescent, tube 1.5-2.5 mm long, teeth 5-8 mm long, upper 2 joined to form an emarginate lip
Corolla	White, yellowish or pale rose.
Vexillum	5-7 mm long, sparsely pubescent or glabrous externally
Keel	10-14 mm long, spirally twisted for 1½ turns.
Fruit	5-10.5 cm long, 1.2-2.5 cm broad, oblong-falcate or oblong, 3-4-seeded, glabrous or pubescent
Seeds	Subrhombic reniform, brown, red, purple, and black, 12-13 x 8.5-9.5 mm

MACRO AND MICROSCOPY OF SEEDS

The exotesta is divided into cuticle, palisade and crushed cell layers. The mesotesta is composed of stapes cells. The endotesta is composed of support tissue, three crushed cell layers, phloem, xylem and testa bottom. The endotesta adjoins the cotyledon.^[4]



Figure-1: Seeds of *Phaseolus lunatus*.

TRADITIONAL MEDICINAL USES

In Indo-Pak subcontinent seeds are used in the diet as a treatment against fever.^[5] In Africa, the powdered seeds are applied over minor wounds and abscesses to promote healing.^[6]

Basic composition (mg/g)		Fatty acids (mg/g)	
Total lipid	8.60	Total saturated	1.98
Protein	68.40	Total mono unsaturated	0.50
Carbohydrate	201.70	Total poly unsaturated	4.19
Essential minerals (mg/g)		Vitamins (mg/g)	
Macro-minerals		Alpha-Tocopherol (E)	3.20
Calcium	0.34	Ascorbic acid (C)	234
Magnesium	0.58	Folate	0.034
Phosphorus	1.36	Niacin (B ₃)	1.474
Potassium	4.67	Phylloquinone (K ₁)	0.0056
Sodium	0.08	Pyridoxine (B ₆)	2.04
Micro-minerals		Retinol (A ₁)	209 IU/100g
Iron	0.03	Riboflavin (B ₂)	1.03
Zinc	0.0078	Thiamin (B ₁)	2.17
Total dietary fiber	49 mg/g	Caloric value	1.13 kcal/g

NUTRITIONAL VALUE

The nutritional value of the seeds of *Phaseolus lunatus* is reported as under.^[7]

PHYSICOCHEMICAL PARAMETERS

The Physicochemical parameters of the seeds of *Phaseolus lunatus* are given below.^[8]

Physicochemical parameters	Reported values	Physicochemical parameters	Reported values
Total ash	4.39-5.61 % w/w	Swelling index	0.98-1.64 %
Emulsifying capacity	49.63-59.99 %	Water absorption capacity	0.88-1.41 g/g
Foaming capacity	18.00-22.13 %	Water solubility capacity	17.00-21.01 %
Bulk density	0.66 g/ml	-	-

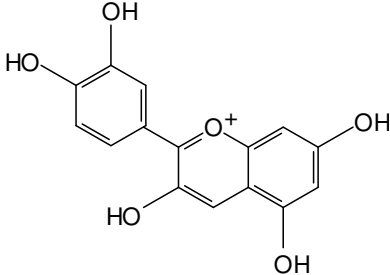
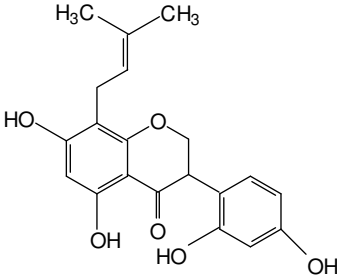
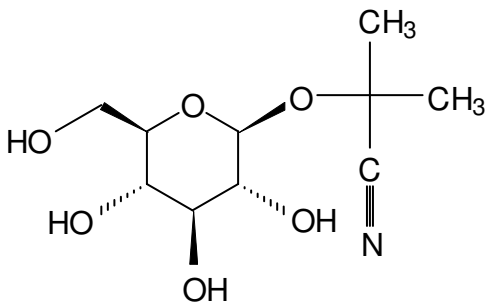
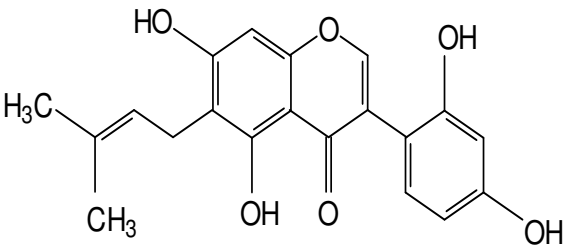
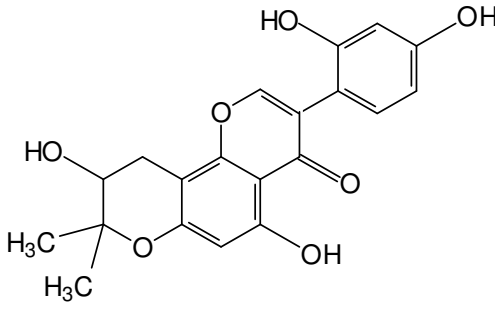
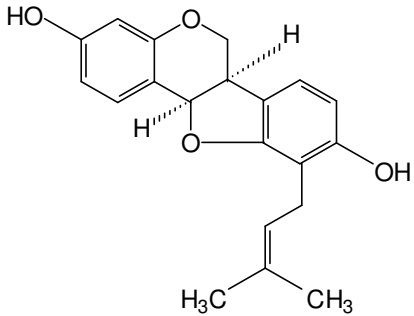
PHYTOCHEMISTRY

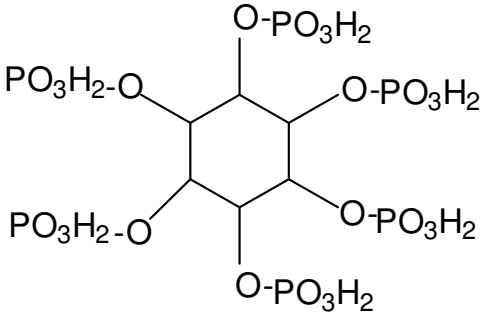
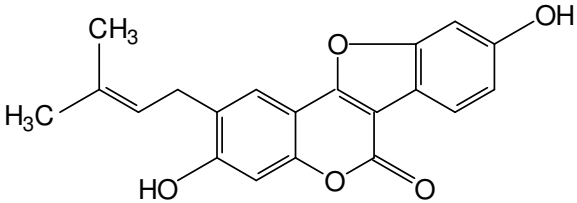
The phytochemical literature survey of *Phaseolus lunatus* revealed the presence of coumestrol,^[9] cyanidin,^[10] cyanogenic glycosides,^[11] cytokinin,^[12] kievitol, kievitone, cyclokievitone,^[9] lectins,^[13] linamarin,^[14] lunatone,^[9] lunatusin,^[15] luteone,^[9] phaseolin,^[16] phaseolidin,^[9] phytic acid,^[17] psoralidin,^[9] robinin,^[10] saponins, sapogenol and sojasapogenol, tannins and α -galactosidase.^[18]

PHARMACOLOGICAL ACTIVITY

Different extracts of *Phaseolus lunatus* have been evaluated for pharmacological activities and have shown antidiabetic,^[19] antifungal and antiproliferative,^[20] cysteine proteinase inhibition,^[21] hypocholesterolemic,^[22] trypsin and chymotrypsin inhibition.^[23]

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

	
Cyanidin (C ₁₅ H ₁₁ O ₆ ⁺)	Kievitone (C ₂₀ H ₂₀ O ₆)
	
Linamarin (C ₁₀ H ₁₇ NO ₆)	Luteone C ₂₀ H ₁₈ O ₆
	
Lunatone (C ₂₀ H ₁₈ O ₁₇)	Phaseolidin (C ₂₀ H ₂₀ O ₄)

	
Phytic acid (C ₆ H ₁₈ O ₂₄ P ₆)	Psoralidin (C ₂₀ H ₁₆ O ₅)

CONCLUSION

The review describes updated and comprehensive information about botany, medicinal uses, nutritional value, phytochemistry and pharmacology of *Phaseolus lunatus* which may lead to discovery of new therapeutically active compounds.

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