



## Phytochemical screening of two varieties of cowpea (*Vigna unguiculata* L.) from Adilabad district of Telangana

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### Abstract

The present investigation deals with phytochemical screening of the seeds of *Vigna Unguiculata* L. the petroleum ether, Ethanol, Methanol, Chloroform and Aqueous extracts are subjected to preliminary phytochemical screening. The phytochemical constants obtained were found to be within normal level prescribed by phytochemical standards. The phytochemical studies of seeds *Vigna unguiculata* L. revealed the presence of primary and secondary metabolites like proteins, carbohydrates, glycosides, phenols, terpenes, coumarins, anthocyanin and flavonoids. These studies provide a referential information for identification of the crude drug and the result is helpful for the isolation of medicinally important active components.

**Keywords:** phytochemical screening, cowpea, *Vigna unguiculata* L, Telangana

### Introduction

*Vigna unguiculata* L. is a leguminous plant which belongs to the family Fabaceae and cultivated and domesticated in Africa for centuries. It is now grown worldwide especially in the tropics and warm season crop and produce in semi-arid regions. It was the most commonly cultivated, bean used for human consumption in the old world (Allen and Allen, 1981) [1]. Today the crop is still widely popular and good harvests are critical to ensure adequate levels of protein in the diets of population in India and East Asia (Allen, 1981) [1]. Cowpea is commonly known as black-eyed pea and southern pea. It is grown as a vegetable garden plant in most parts of the country. It is known to be economically important as it improves soil nitrogen levels and also used as a fodder for animals. These seeds are simple, dry dehiscent, fruit bearing pods containing one or more seeds. The seed is reported to contain 24% crude protein, 53% carbohydrates, and 2% fat (FAO, 2012). The leaves and flowers can also be consumed. The seeds are a major source of plant proteins and vitamins B riboflavin and niacin, which help to release energy from nutrients. The daily intake of cowpeas emphasizes the spleen, with improvement in the cell manufacture with promotes immune system. The seeds are used to treat common cold, warms in the stomach, blood in urine (Vanwyk and Gericke 2000) [18]. Roots are used to treat snake bites, consumption epilepsy, various pains, and painful menstruation & chest pain. The leaves can be applied on burns and used as a snuff to treat headache (Hutchings *et al.*, 1996) [7]. The seeds also hold diuretic and anthelmintic properties are used to treat liver complaint associated with the jaundice (Noorwala *et al.*, 1995) [12]. In India, it is mainly eaten as cooked whole seeds or immature seeds (Kachare *et al.*, 1998). As food pulses are eaten in different forms, they could be boiled, fried, roasted, mixed with sauce and consumed directly. Its seeds are consumed in different forms as they provide important

vitamins, nutrients phytonutrients including antioxidants beside carbohydrates, minerals, trace elements. The cooking liquor of the seeds with the spices is considered to be potential remedy for the common cold (Siddhuraju and Becker, 2007) [13].

### Materials and Methods

Preliminary phytochemical screening of petroleum ether, ethanol, chloroform, methanol, aqueous extracts of *Vigna unguiculata* L. seeds was done by using various phytochemical identification tests. These tests exposed the presence of carbohydrates, alkaloids, glycosides, saponins, tannins and phenols in the various extracts of *Vigna unguiculata* L. while the aqueous extract showed the flavonoids in addition and in the ethanolic extracts steroids were observed. The present work was undertaken to evaluate the phytochemical constituents of *Vigna unguiculata* L. seeds were used for the present study. 10 gr. of plant material was taken and then powdered or extracted with methanol and water from 2 varieties of cowpea. The phytochemical screening for aqueous and methanol, petroleum ether, chloroform and ethanol extracts were carried out using standard methods.

### Plant collection and preparation

The seeds of *Vigna unguiculata* L. plant varieties (white and brown) were collected from Adilabad district of Telangana, India. The seeds were collected, washed thoroughly in tap water, shade dried in an open air separately. Powder of seeds is obtained by grinding them mechanically. About 100gm of each dried powder of the plant seeds were soaked separately in 100ml of solvents like methanol, chloroform, ethanol, petroleum ether and aqueous in conical flasks and then subjected to filtration, filtered with Whatman filter paper separately. Conc. extracts were preserved in sterilized air light labelled and in refrigerator at 40°C until

required for further use. The extract was filtered under reduced pressure using rotary flash evaporator and subjected for further preliminary phytochemical test.

### Identification Test

Various phytochemical tests were conducted to identify presence of different phytochemical in two varieties of *Vigna unguiculata* L. seeds.

### Test for Alkaloids

The 5ml of extract 5ml of 2 NH<sub>4</sub>Cl is added and boiled and then the mixture is filtered. To the filtrate a few drops of Mayer's reagent is added. A cream colour precipitate was produced immediately indicating the presence of alkaloids.

### Test of Steroids

1ml extract was dissolved in 10ml of chloroform and equal volume of concentrated sulphuric acid was added from the walls of the test tube. Appearance of red colour in the upper layer and yellow with green fluorescence indicates the presence of steroids. (Savithiramma *et al.*, 2011)

### Test of Flavonoids

4ml of extract 1.5ml of 50% methanol solution is added. The solution was warmed and metal magnesium is added. To this solution, 5-6 drops of concentrated hydrochloric acid is added, red colour will be observed for flavonoids and orange colour for flavones. (Maobe *et al.*, 2013)

### Test for Cardio Glycosides

The solution of the extract glacial acetic acid, few drops of 5% ferric chloride and concentrated sulphuric acid are added, and observed for a reddish-brown coloration at the junction of two layers and the bluish green colour in the upper layer (Siddique and Ali, 1997).

### Test for Phenols

Phenols are tested by adding 2ml of ferric chloride solution to 2ml of plant extract. Appearance of bluish green colour solution indicates the presence of phenols. (Yadav *et al.*, 2011)

### Test of Saponins

Saponins are tested by boiling 5ml of extract in 10ml of distilled water in test tube and are shaken vigorously for 30 second; the test tube is allowed to settle for half an hour. Formation of froth indicates the presence of saponins. (Thenmozhi *et al.*, 2011) <sup>[17]</sup>

### Test for Tannins

0.5ml of extract solution, 1ml of water and 1-2 drops of ferric chloride solution is added. Blue colour will be observed for gallic tannins and green black for catecholic tannins (Lyenger, 1995) <sup>[8]</sup>.

### Test for Coumarins

3ml of 10% NaOH was added to 2ml of aqueous extract. Formation of yellow colour indicated the presence of Coumarins. (Savithiramma *et al.*, 2011)

### Test for Anthocyanin

2ml of aqueous extract was added to 2ml of 2N HCL and ammonia. The appearance of pink – red turns blue violet

indicated the presence of anthocyanins. (Savithiramma *et al.*, 2011)

### Test for Terpenoids

An amount of 0.8g of selected plant sample was taken in a test tube, then poured 10ml of methanol in it, shaken well filtered to take 5ml extract of plant sample. Then 2ml of chloroform were mixed in extract of selected plant sample and 3ml of sulphuric acid were added in selected sample extract. Formation of reddish-brown colour indicates the presence of terpenoids in the selected plants.

### Result and Discussion

Table-1 shows the results of phytochemical screening for two different varieties of *Vigna unguiculata* L. seeds were used for the present study. The results indicate that quantitative chemical analysis was useful for preliminary phytochemical characterization of the species and possible prediction of the bioactive compound. The seeds extract of *Vigna unguiculata* L. varieties show similar activity in presence of phytochemicals. From the extraction of white and brown varieties we came to know the presence of the phytochemicals like glycosides, tannins, flavonoids, reducing sugars, steroids, alkaloids, phenols, and saponins. From the tables, alkaloids, terpenoids and flavonoids were maximum present in the both varieties. Cardio glycosides, coumarins, Phenols and anthocyanin were low presence in less quantity in both varieties. Tannins are less present in both varieties but more quantity of tannins are present in chloroform and ethanol extract of white and brown varieties. The ethanol and methanol extracts of studied plants showed the presence of bioactive compounds in all the two varieties but among the two varieties white cowpeas have maximum bioactive compounds. The steroids and saponins were only detected in the petroleum ether, methanol, chloroform, aqueous extracts were compared to ethanol extract. While the Petroleum ether, methanol, aqueous extracts are showed the tannins are absent and present in chloroform, and ethanol extract of two varieties. The results reveal the presence of phytochemical constituents which are helpful for the manufacturing of new drugs. The previous phytochemicals analysis and present studied show nearly the similar results due to the presence of the phytochemicals constituents. Several studies confirmed the presence of these phytochemicals that contribute medicinal as well as physiological properties to the plant studied in the treatment of different ailments.

### Conclusion

The extract from *Vigna unguiculata* L. varieties revealed the presence of flavonoid, steroids, phenols, glycosides and tannin compounds that are known to have curative activity against diseases producing pathogen. The presence of phenols indicated that these seeds have the ability to block specific enzymes that cause inflammation. They also modify the prostaglandin pathways thereby protecting platelets from clumping. Alkaloids are useful in the prolonging of the action of several hormones and acting as stimulants. Flavonoids are capable of treating certain physiological disorder and diseases. They are potent water soluble, super anti-oxidant and free radical scavenger which prevents oxidative cell damage and have strong anti-cancer activity which adds protection against all stages of carcinogenesis. Saponins has the property of precipitating and coagulating

red blood cells. Some of the characteristic of saponins include formation of foams in aqueous solution, hemolytic activity, cholesterol binding properties by Sodipo *et al.*, (2000). The study has revealed the presence of phytochemicals considered as active medicinal chemical

constituents. Therefore, the phytochemical analysis of the plant is also important and has commercial interest in both research institutes & pharmaceutical companies for the manufacturing of the new drugs for treatment of various diseases.

**Table 1:** Phytochemical analysis of various Solvent Extracts of *Vigna unguiculata* L.

S No	Secondary metabolite	Methanol		Chloroform		Ethanol		Petroleum		Aqueous Extract	
		White cowpea	Brown cowpea	White cowpea	Brown cowpea	White cowpea	Brown cowpea	White cowpea	Brown cowpea	White cowpea	Brown cowpea
1	Steroids	++	++	+++	+++	-	-	++	++	++	++
2	Saponins	+++	+++	+++	+++	-	-	++	++	+	+
3	Alkaloids	+++	+++	+++	+++	++	++	+	+	++	++
4	Flavonoids	+	+	++	++	+++	+++	++	++	++	++
5	Terpenoids	+++	+++	++	++	++	++	+++	+++	+	+
6	Coumarins	--	--	+	+	--	--	+	+	--	--
7	Phenols	+	+	--	--	+	+	--	--	--	--
8	Cardiac glycoside	++	++	+++	+++	+	+	++	++	++	++
9	Antho cyanins	--	--	+	+	-	-	-	-	+	+
10	Tannins	--	--	++	++	++	++	--	--	--	--

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