

CHAPTER 17

Qualitative Analysis of *Vigna Trilobata* (L.) Verdc Pods

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Abstract

The present study was qualitative analysis of *Vigna trilobata* belongs to family Fabaceae. Therapeutically used as anti-inflammatory, anti-oedema, sedative and urinogenital disorders. In current investigation the pods used for phytochemical analysis. It will provide better understanding of potential application of *Vigna trilobata* species. Phytochemical constituents that are isolated from *Vigna trilobata* in Ethanol and Aqueous extracts are Alkaloids, Coumarins, Flavonoids, Phlobatannins, Proteins, Steroids, Tannins, Terpenoids etc. The best result of secondary metabolites are found in Ethanolic extract.

Keywords: Pods, phytochemical, secondary metabolites, Ethanol, Aqueous

Introduction

The plant serves as diverse source of phytochemicals. From ancient time, plants are used by tribal peoples to cure different human disorders. Many plant families show medicinal properties in their different species. The family Fabaceae is one of the largest and economically important family of flowering plants contain legumes. Legumes are also known as beans are cosmopolitan in nature (Kunkel, 1984). Legumes contain non-nutritive, phytate and saponins which are glycosides composed of lipid soluble glycone that consist either a sterol which are phytochemicals. The leaves, stem, and pods of *Vigna* species can be used erosion control and have low glycaemic indices which helps reduce fatal and non-fatal heart attack and helps lows cholesterol level which blocks the blood pressure. (Gepts *et. al.*, 2005). *Vigna radiata* have antibacterial activity (Jayapraksh *et. al.*, 2012). Legumes have detoxifying, relieve heat exhaustion, boost mental clarity properties (Kaya M., 2005, Jin W. L. 2006, Lambirdes CJGI, 2007). *Vigna* Species have High level of proteins and main contributors for antioxidants, anti-microbial, anti-tumour, anti-inflammatory activities and involved in regulation of lipid metabolism (Ohdan T. 2005, Neema M. *et al.*, 2006). The efficiency of Chloroform extraction has maximum

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positive test in *Vigna mungo* and *Vigna aconitifolia* (Shukla S., 2017). The root and whole plant used as Trodosha Shamak, specially against Vat and Pitta and intermittent fever (Mehreen Zaheer *et.al.* 2021)

Hence, in the present work Soxhlet methods is used for extraction of phytochemicals from *Vigna trilobata* species. The distilled water and ethanol are used as solvent for extraction of bioactive molecules. Phytochemicals like Alkaloids, Flavonoids, Tannins, Terpenoids, Triterpenoids, Saponins, Steroids, Glycosides, Phlobatannins etc. are present in plants with huge potential of antibacterial and antioxidant activity.

Materials and Methods

Material

Pods sample of *Vigna trilobata* species.

Chemicals

Ethanol, Conc. H_2SO_4 , CuSO_4 , alcoholic NaOH, one percent aqueous HCl, Ten percent FeCl_3 , Ten percent Sodium hydroxide, pyric acid, strong base (sodium hydroxide), Distilled water, Dragondroff reagent, Chloroform, Fehling solution A and Fehling's solution B.

Other apparatus

Soxhlet apparatus, Test tube, Dropper, Beaker, Petri plate, measuring cylinder, and Test tube stand.

Preparation of extract

The collected pods were shade dried for 8 to 9 days. The dried samples were crushed in mixture grinder and made powder. Extract was further used for phytochemical screening by Soxhlet extraction method. The Soxhlet extraction method was used for extraction in Aqueous and ethanolic extract with 1:4 ratio (Md. A. Khan, 2021).

Qualitative Analysis

Test for alkaloids: 1 ml Dragondroff reagent + 2 ml HCl + 5 ml extract. The alkaloids are present in the form of red or orange precipitate.

Test for coumarin: Few drops of alcoholic NaOH + 2 ml extract. The coumarins presence denoted by formation of yellow colour.

Test for glycosides: 1 ml of Conc. H_2SO_4 gently poured in test tube with 1 ml extract + 10% ferric chloride. Appearance of brown, violet or greenish ring indicates presence of glycosides.

Test for Phlobatannins: 1% aqueous HCl heated with plant extract. The red precipitate shows presence of Phlobatannins.

Test for proteins: Aqueous extract + 1% NaCl + drops of aqueous CuSO_4 (II).

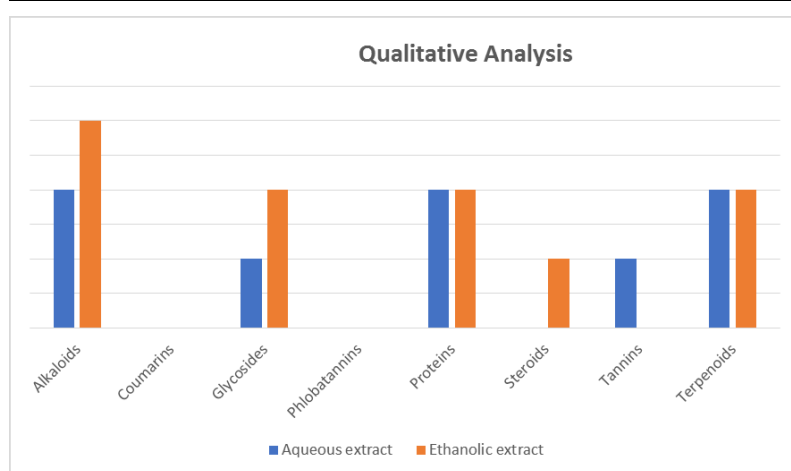
Test for steroids: 1 ml extract + 10 ml of chloroform + 10 ml of H_2SO_4 along the side of test tube. Upper layer gets red in colour and H_2SO_4 . The yellow and green colour presence indicates steroids.

Test for tannins: 1 ml filtrate + 1 ml distilled water + few drop ferric chloride. The brownish green colour or blue-black colouration indicates presence of Tannins.

Test for terpenoids: 1 ml extract + 0.4 ml chloroform + 0.6 ml conc. H_2SO_4 . Terpenoids are indicated by a reddish-brown colour.

Table No. 1: Phytochemical analysis in *Vigna trilobata* (Aqueous extract & Ethanol extract of Pods)

Sr. No.	Compound	Aqueous extract	Ethanol extract
1	Alkaloids	++	+++
2	Coumarins	-	-
3	Glycosides	+	++
4	Phlobatannins	-	-
5	Proteins	++	++
6	Steroids	-	+
7	Tannins	+	-
8	Terpenoids	++	++

**Figure No. 1**

Result

The phytochemical test was performed using pods of *Vigna trilobata* species. The test revealed the presence of Alkaloids, Phlobatannins, Glycosides, Coumarins, Proteins, Steroids, Tannins, Terpenoids test in Aqueous and Ethanol extract. The ethanol extract showed presence of Alkaloids, Glycosides, Proteins, Steroids, Terpenoids and low presence of Steroids whereas, maximum presence of Alkaloids, Glycosides, Proteins, Terpenoids and Coumarins, Phlobatannins and Tannins were found to be absent. In the Aqueous extract showed presence of Alkaloids, Glycosides, Proteins, Terpenoids and low presence of Glycosides, Tannins whereas, maximum presence of Alkaloids, Proteins, Terpenoids and Coumarins, Phlobatannins and Tannins were found to be absent. The present study reveals that the ethanol extract shows maximum phytochemical in high amount compared to aqueous extract.

Conclusion

The *Vigna trilobata* species is rich in bioactive molecules like Alkaloids, Proteins, Glycosides and Terpenoids. The qualitative testing was conducted and Ethanol extract produced the best results. Alkaloids, coumarins, flavonoids, terpenoids, steroids, and other compounds are tested in aqueous and ethanol extracting agents. This finding can be further used in hybridization or drug development and other analytical purpose.

References

1. Gepts P, Beavis WD, Brummer EC, Shoemaker RC, Stalker KT, Weedan NF, Young ND, 2005. Legumes as a model plant family. Genomics for food and feed reports of the cross legumes advances through genomic conference. J. Plant Physiol., 137: 1228-1235.
2. Jaya Prakash Priya, Yamini SudhaLakshmi, Fouzia Banu, Gopalakrishnan, Dhanalakshmi, Sagadevan, Manimaranand Arumugam, 2012. Phytochemical screening and antibacterial activity of *Vigna radiata* L. against bacterial pathogens involved in food spoilage and food borne diseases. J. Acad. Indus. Res. Vol. 1(6).
3. Jin WL. 2006. Appraisal of quality characters for seeds of Chinese adzuki bean local varieties. J Chin Cereals Oils Assoc, 21: 50-59.
4. Kaya M, Atak M, Khawar KM, Ciftci CY, Ozcan S, 2005. Effect of pre-sowing seed treatment with zink and foliar spray humic acids on field of common bean (*Phaseolus vulgaris* L.). J Agric Biol, 7: 875-878.
5. Kunkel G, 1984. Plants for human consumption. An annotated checklist of the edible phanerogram and ferns. Koelz scientific books, pp. 10-21
6. Lambrides CJGI. 2007. Mung bean. Gen Mapp Mol Breed Plants, 3: 69-90.
7. Mehreen Zaheer, Anum Kalim, Maaz Uddin Ahmed Siddiqui and Salman Ahmed 2021. *Vigna trilobata* (L.) Verdc: a review of medicinal uses, phytochemistry and pharmacology, Journal of Pharmacognosy and Phytochemistry, 10(2): 118-120.
8. Md. A. Khan & W. Ahmad, 2021. Microbes for Sustainable insect Pest Management, Springer Nature Switzerland, 103, Vol. II.
9. Ohdan T., Francisco PB, Sawada T, Hirose T, Terao T, Satoh H. 2005. Expression profiling of genes involved in starch synthesis in sink and source organs of rice. J Exp Bot., 56: 3229-3244.
10. Shukla S., Tyagi B., 2017. Comparative Phytochemical Screening and Analysis of Different *Vigna* species in Organic Solvents. *Austin J. Biotechnol. Bioeng*, 4(3):1084.