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Experimental Insights into the Medicinal Potential of *Vigna trilobata* Linn. (*Mudgaparni*): A Review

[1]Dr. Manaswini Singh, [2]Dr. Rajesh Sharma
[1]PG Scholar, Dravyaguna Vigyana, Ayurvedic & Unani Tibbia College & Hospital, Karol Bagh, New Delhi, University of Delhi.
[2]Professor, Dravyaguna Vigyana, Ayurvedic & Unani Tibbia College & Hospital, Karol Bagh, New Delhi, University of Delhi.
Email: manaswinisingh1998@gmail.com, rajsakshi.sharma@gmail.com

Abstract:

Vigna trilobata (*Mudgaparni*) is an important medicinal herb of the family Fabaceae, widely used in *Ayurveda* for its nutritive, rejuvenative, and strength-promoting properties. Several experimental studies have been conducted to validate its traditional uses through pharmacognostical, physicochemical, phytochemical, and pharmacological investigations. Studies have reported the presence of bioactive constituents including flavonoids, alkaloids, tannins, phenolics, glycosides, proteins, and saponins, along with biological activities such as antioxidant, anti-inflammatory, antimicrobial, and immunomodulatory effects. This review compiles and analyzes the available experimental literature on *Vigna trilobata* to provide a consolidated scientific overview of its medicinal potential on the basis of its experimental study.

Key words: *Vigna trilobata, Mudgaparni,* Experimental study.

Introduction

Vigna trilobata Linn., commonly known as *Mudgaparni*, is an important medicinal plant belonging to the family Fabaceae and holds a significant place in traditional *Ayurvedic* medicine. The plant is distributed throughout tropical and subtropical regions, especially in India, where it grows naturally in open grasslands, agricultural margins, and wastelands. It is widely used as a forage crop in India. Traditional literature describes *Mudgaparni* as having *balya*, *brimhana*, *rasayana*, and *tridosha-shamaka* properties. It has been used in the management of general debility, fever, respiratory disorders, inflammatory conditions, and nutritional deficiencies. Experimental studies on medicinal plants are essential for validating traditional claims through scientific methods. Hence, this article summarizes the experimental studies conducted on *Vigna trilobata* to accept it as a promising medicinal plant and emphasize the need for further advanced research and clinical validation.

S. No	Title	Experimental Model	Results	References
1	Evaluation of Sedative Activity of Leaves of Vigna Trilobata (L.)Verdc.	Aqueous extract of the Vigna trilobata leaves (AEVTL) was used to investigate the sedative activity using Rotarod apparatus and Photoactometer in mice at a dose of 200 and 400 mg/kg of body weight and compared to standard diazepam (5mg/kg, i.p.)	AEVTL possessed significant ($p<0.05$ and $p<0.01$) sedative activity at a dose of 200 and 400 mg/kg by reducing locomotor activity and fall off time in mice in a dose dependent manner	Kesha, D., Chetan, A., Mittal, D., Bhavya, S., & Harshit, D. EVALUATION OF SEDATIVE ACTIVITY OF LEAVES OF VIGNA TRILOBATA (L.) VERDC.
2	Evaluation of Anti-oxidant, Anti-inflammatory and Anti-bacterial	Seed protein sample of *Vigna trilobata* was precipitated using the ammonium sulphate method, at 80% concentration. Then subsequent analysis of the	The Anti-antioxidant activity exhibited that at a concentration of 10 mg/ml, the maximum percentage of	Kavya, N., Krithika, S., Subikshaa, V.S. *et al.* Evaluation of antioxidant, anti-inflammatory and antibacterial properties of protein extract isolated

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	properties of protein extract isolated from *Vigna trilobata*	crude sample was conducted using following techniques RP-HPLC (reverse phase high-performance liquid chromatography) and LC–MS (liquid chromatography–mass spectrometry)	inhibition of DPPH (1,1-diphenyl-2-picrylhydrazyl) radical was found to be 87.88 ± 0.01%. The ABTS (2,2′-azino-bis (3-ethylbenzothiazoline -6-sulphonic acid) assay revealed the most significant scavenging activity (22.69 ± 0.22%) at a concentration of 10 mg/ml of crude protein. Furthermore, the FRAP (ferric reducing antioxidant power) assay identified the highest scavenging activity in the crude protein at a concentration of 25 mg/ml, amounting to 2.344 mol Fe^{2+}/mg. The anti-inflammatory efficacy was assessed by the protein denaturation and proteinase inhibition assays. The antibacterial activity of protein extract was also evaluated against Gram-positive and Gram-negative bacteria.	from *Vigna trilobata*. *Food Measure* 18, 6331–6341 (2024). https://doi.org/10.1007/s11694-024-02651-2
3	Psychoactive effect of the leaf extract of *Vigna trilobata* Linn., on a fresh water	Effects of 10, 100, 200, 300, 400 and 500 ppm leaf extracts of *V. trilobata* on the behaviour and chromatophore of *L. rohita*, as well as on the acetylcholinesterase activity in the brain serum of the fish were determined. Fish	300-500 ppm leaf extracts resulted in punctate chromatophores. The treated fish returned to their normal behaviour upon transferring them into fresh water. The	Varsha Rathod, Varsha Rathod, and U. S. Chaudhari. "Psychoactive effect of the leaf extract of Vigna trilobata Linn., on a fresh water fish Labeo rohita." (2002): 101-103.

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	fish *Labeo rohita*.	exposed to 200 and 300 ppm leaf extracts for 72-96 h exhibited erratic swimming with hyper-excitability, spiralling and convulsion, whereas those exposed at 400 to 500 ppm became lethargic and remained steady at the bottom of the aquarium	acetylcholine content of the whole brain tissue of treated fish was lower compared to the control.	
4	Phytochemical and antidiabetic evaluation of *Phaseolus trilobus* roots	Oral administration of root extract at the dose of 400 mg/kg showed a significant increase in body weight and decrease in blood glucose level on 15th and 20th day of post induction as compared to untreated diabetic rats	Significant decrease in blood glucose level in diabetic rats is found comparable to that of standard drug Glibenclamide thereby indicating the root extract of *P. trilobus* to be a potent antidiabetic drug	Navpreet Kaur, Navpreet Kaur, et al. "Phytochemical and antidiabetic evaluation of Phaseolus trilobus roots." (2012): 5202-5205
5	Antiemetic activity of leaves extracts of five leguminous plants	Methanol extracts of five leguminous plants leaves viz., *Cassia siamea* Lamk., *Cyamopsis tetragonoloba* Taubert, *Delonix regia* Rafin., *Samanea soman* Merr. and *Vigna trilobata* Verde, at a dose of 150 mg/kg body weight orally, using chick emesis model. Emesis was induced in male chicks by the oral administration of copper sulphate (50 mg/Kg body weight).	All the extracts showed antiemetic activity when compared with standard drug chlorpromazine (150 mg/kg body weight orally)	Ahmed Salman, Ahmed Salman, et al. "Antiemetic activity of leaves extracts of five leguminous plants." (2012): 251-253
6	Assessment of Antiemetic Potential of Crude Extract of Vigna Trilobata (Linn.) Against Different Emetogenic Stimuli: An	Evaluation of the antiemetic activity of V. trilobata (50 and 100 mg/kg of body weight) by using the chick emesis model. Different emetogenic stimuli such as, copper sulphate (CuSO4, oral), fresh juice of Brasica compestris (oral) and cisplatin (I.V) were used to induce emesis in 10-15 days old chicks of either sex.	V. trilobata showed a significant antiemetic activity ($p<0.05$), when compared with standard antiemetic drugs, metoclopramide, domperidone and chlorpromazine.	Musaddique Hussain et al. Assessment of antiemetic potential of crude extract of Vigna trilobata (Linn.) against different emetogenic stimuli; an in vivo study. Indo American Journal of Pharm Research.2015:5(04).

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	In Vivo Study			
7	Hepatoprotective and antioxidant activity of Phaseolus trilobus, Ait on bile duct ligation induced liver fibrosis in rats	Hepatoprotective activity of methanol and aqueous extract of Phaseolus trilobus was evaluated by bile duct ligation induced liver fibrosis and antioxidant activity was evaluated using in vitro and in vivo antioxidant models viz anti-lipid peroxidation assay, super oxide radical scavenging assay and glutathione estimation in liver.	Methanol and aqueous extracts of Phaseolus trilobus reduced elevated level of alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), lactate dehydrogenase (LDH), bilirubin and hydroxyproline significantly ($p<0.01$) in bile duct ligated Wistar rats, proving hepatoprotective activity comparable with Silymarin. Both the extracts were found to reduce the elevated levels of serum thiobarbituric acid reactive substance (TBARS) and elevate superoxide scavenging radical activity proving antioxidant activity comparable with ascorbic acid. The reduced level of glutathione was found to be elevated in liver proving antioxidant activity comparable with Silymarin.	Fursule RA, Patil SD. Hepatoprotective and antioxidant activity of Phaseolus trilobus, Ait on bile duct ligation induced liver fibrosis in rats. J Ethnopharmacol. 2010 Jun 16;129(3):416-9. doi: 10.1016/j.jep.2010.04.021. Epub 2010 Apr 27. PMID: 20430092.
8	Effect of *Phaseolous trilobus* Seeds on the Paracetamol Induced	role of methanol extract of *Phaseolous trilobus* (*P. trilobus*) seeds (Fabaceae) in regulating the sodium pump, in hepatic injury induced by paracetamol. Alteration in sodium pump was induced	Histopathological evaluation with evidence of swelling, hydrophobic degeneration and necrosis of hepatocytes. These	S.D. Patil and R.A. Fursule, 2008. Effect of *Phaseolous trilobus* Seeds on the Paracetamol Induced Liver Damage in Rats. Journal of Pharmacology and Toxicology, 3:485-492.

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	Liver Damage in Rats	by chronic administration of paracetamol, at the dose of 500 mg kg^{-1} b.wt. p.o. for 28 days. Serum marker enzymes alanine aminotransferase (ALT), aspartate aminotransferase (AST), lactate dehydrogenase (LDH), alkaline phosphatase (ALP), Bilirubin, liver glutathione, Na^+-K^+ ATPase estimation and histopathology of liver were studied in Wistar albino rats.	changes were reversed with simultaneous administration of paracetamol and different doses of methanol extract of *P. trilobus* seeds at the dose 125, 250, 500 mg kg^{-1} b.wt. p.o., for 28 days. Results were comparable with reference standard drug Silymarin. Reversal of level of serum marker enzymes, Na^+-K^+ ATPase, glutathione and restricted hepatic damage in simultaneously administered methanol extract of *Phaseolous trilobus* seeds in Wistar albino rats confirmed the hepatoprotective effect of methanol extract of *P. trilobus* seeds.	

Discussion

The available experimental evidence indicates that *Vigna trilobata* possesses multifunctional pharmacological activities including sedative, antioxidant, anti-inflammatory, antibacterial, antiemetic, antidiabetic, hepatoprotective, and possible neuroactive effects. These findings scientifically support many of its traditional Ayurvedic indications. However, despite promising results, the majority of available studies are preclinical and limited to in vitro or animal models. Standardization of extracts, identification of active principles, toxicity profiling, pharmacokinetic studies, and well-designed clinical trials are still lacking. Future research should focus on molecular mechanisms, formulation development, dosage standardization, and human clinical validation to establish *Vigna trilobata* as an evidence-based medicinal plant. Thus, the review article suggests that *Mudgaparni* is a promising medicinal herb with substantial pharmacological potential, warranting further advanced experimental and clinical investigations.

Conclusion

Vigna trilobata (*Mudgaparni*) exhibits significant pharmacological potential, with experimental studies supporting its antioxidant, anti-inflammatory, antidiabetic, hepatoprotective, antibacterial, and neuro-active

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properties, validating several traditional *Ayurvedic* uses. However, current evidence is primarily preclinical, and further studies on standardization, safety, bioactive compounds, and clinical efficacy are required. Therefore, advanced experimental and human clinical research is essential to establish *Vigna trilobata* as an evidence-based medicinal plant.