WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Study of Medicinal Properties of KAVA *(Piper Methysticum)*

Sahil Shyamlal Yadav, Shanti Patel, Abhishek Kumar Sen, Sonali Uppalwar

Ideal institute of pharmacy, Posheri , WADA , Palghar - 421303 , Maharashtra , INDIA

ABSTRACT –

The anxiolytic effects of Piper methysticum (Kava kava) extract are well-known, but it remains unclear whether these effects are best explained by the total kavalactone content or by specific kavalactone components. In this study, the chick social separation-stress test was used to assess the anxiolytic activity of P. methysticum extracts with total kavalactone concentrations ranging from 12.8% to 100.0% (Experiment 1), and fractions containing 1-6 kavalactones at varying concentrations (0.1%– 67.5%) (Experiments 2 and 3). The activity of these samples was compared to a 5.0 mg/kg dose of chlordiazepoxide (CDP) in Experiment 3. Eight-day-old chicks were administered intraperitoneal injections of either the vehicle or test compounds, 30 minutes prior to exposure to either a group of two conspecifics or isolation for a 3-minute observation. Measures included latency to ventral recumbency (sedation), distress vocalizations, and stress-induced analgesia (in Exps. 1 and 2). Results showed that the P. methysticum extract samples reduced distress vocalizations in a concentration-dependent manner. Among the fractions, the one with the highest dihydrokavain content demonstrated an anxiolytic effect comparable to CDP, without the sedative effects typically associated with CDP. These findings suggest that dihydrokavain may play a critical role in the anxiolytic effects of P. methysticum extract, possibly being both necessary and sufficient for these effects.

INTRODUCTION –

The anxiolytic effects of Piper methysticum (Kava kava) extract are well- known, but it remains unclear whether these effects are best explained by the total kavalactone content or by specific kavalactone components. In this study, the chick social separation-stress test was used to assess the anxiolytic activity of P. methysticum extracts with total kavalactone concentrations ranging from 12.8% to 100.0% (Experiment 1), and fractions containing 1-6 kavalactones at varying concentrations (0.1%–67.5%) (Experiments 2 and 3). The activity of these samples was compared to a 5.0 mg/kg dose of chlordiazepoxide (CDP) in Experiment 3. Eight- day-old chicks were administered intraperitoneal injections of either the vehicle or test compounds, 30 minutes prior to exposure to either a group of two conspecifics or isolation for a 3- minute observation. Measures included latency to ventral recumbency (sedation), distress vocalizations, and stress-induced analgesia (in Exps. 1 and 2). Results showed that the P. methysticum extract samples reduced distress vocalizations in a concentration-dependent manner. Among the fractions, the one with the highest dihydrokavain content demonstrated an anxiolytic effect comparable to CDP, without the sedative effects typically associated with CDP. These findings suggest that dihydrokavain may play a critical role in the anxiolytic effects of P. methysticum extract, possibly being both necessary and sufficient for these effects.

AIM OF STUDY

To investigate the medicinal properties of Piper methysticum (kava), focusing on its bioactive compounds, pharmacological effects, and potential therapeutic applications for conditions such as anxiety, insomnia, and pain management.

OBJECTIVES

1. To isolate and identify the primary bioactive compounds, particularly kavalactones, in Piper methysticum.
2. To evaluate the pharmacological effects of kava extracts on anxiety, stress, and insomnia through in vitro and in vivo studies.
3. To examine the potential anti-inflammatory and analgesic properties of kava.
4. To assess the safety profile of kava extracts, including its hepatotoxicity risk.
5. To explore the traditional and contemporary uses of Piper methysticum in herbal medicine.

SCOPE OF STUDY

- **Botanical and Ethnopharmacological Study**: Documenting the traditional use of kava in Pacific Island cultures for relaxation, ceremonies, and medicinal purposes.
- **Phytochemical Analysis**: Identifying and quantifying kavalactones and other active compounds using chromatographic and spectroscopic techniques.
- **Pharmacological Evaluation**: Assessing the anxiolytic, sedative, anti-inflammatory, and analgesic properties in laboratory models.
- **Toxicological Studies**: Investigating potential adverse effects, including liver toxicity, through preclinical and clinical data.
- **Therapeutic Potential**: Exploring its potential as a natural alternative to synthetic drugs for treating anxiety and other neurological conditions.

METHODS AND PREPARATION –

Ground kava, traditionally prepared from the lateral roots and combined with sea hibiscus mucilage and sap, was sourced from various locations in Micronesia. Water extracts were prepared in both filtered and unfiltered forms, reflecting the traditional practice of consuming kava beverages with high particulate content. The MTT assay was employed to assess the growth- inhibitory effects of these preparations on colon and breast cancer cells, as well as nonmalignant intestinal epithelial cells. Additionally, LC-MS analysis was conducted to identify and analyze the components present in the kava and sea hibiscus extracts and their partitions.

Roots and rhizomes were harvested in September. After collection, the roots were thoroughly washed using ultrapure Milli-Q water (18.2 MΩ·cm) and allowed to air-dry naturally at room temperature. Once dried, the roots were ground into a fine powder and stored in a sterile, airtight container away from light to preserve their integrity.

RESULTS AND DISCUSSION –

The anxiolytic properties of Piper methysticum are well-documented, with numerous studies supporting its therapeutic potential in anxiety management. Kava's ability to reduce anxiety without the sedative or addictive effects commonly associated with pharmaceutical treatments such as benzodiazepines makes it an attractive alternative for individuals seeking non- habit- forming options. This is particularly relevant for long-term management of anxiety, where the risks of dependency and tolerance with traditional anxiolytics are significant concerns. However, while the evidence from animal and human studies is promising, some limitations and concerns need to be addressed. For instance, the variability in the quality and composition of kava products can affect their potency and safety. The preparation method (e.g., water-extracted vs. alcohol- based extracts) also influences the pharmacological effects, which calls for standardization in kava products for clinical use. Furthermore, potential hepatotoxicity linked to long-term use of kava, although controversial, warrants caution, and liver function should be monitored in patients using kava regularly.

BENEFITS OF KAVA (Piper methysticum)

Piper methysticum, commonly known as kava, is a plant native to the Pacific Islands that has been traditionally used for its calming and therapeutic effects. The root of the plant contains bioactive compounds called kavalactones, which are primarily responsible for its benefits. Below are some of the key benefits of Piper methysticum:

1. **Anxiolytic Effects** Kava is most renowned for its ability to reduce anxiety. Numerous studies have demonstrated that kava extract has a calming effect on the nervous system, making it an effective alternative for individuals suffering from generalized anxiety disorder (GAD) or stress-related conditions. It works by interacting with GABA

receptors in the brain, promoting relaxation and reducing symptoms of anxiety without the sedative effects typically

associated with pharmaceutical anxiolytics.

2. **Improved Sleep Quality**

Kava is also known to help improve sleep quality by reducing anxiety and promoting relaxation. The calming effects of kava can make it easier for individuals to fall asleep and maintain deep sleep, which is particularly beneficial for those suffering from insomnia or sleep disturbances linked to anxiety or stress.

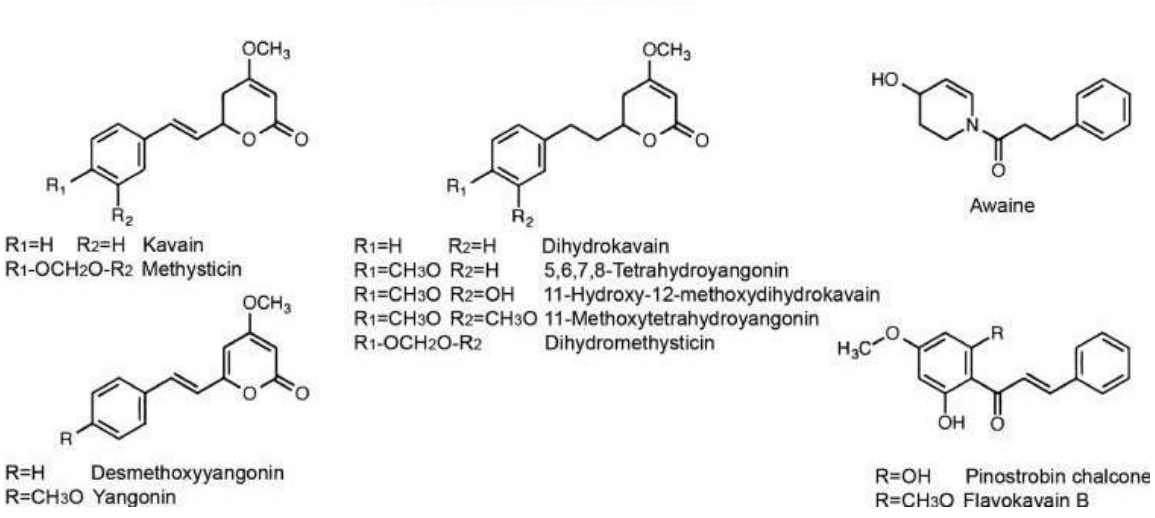
3. **Cognitive Enhancement**

Some research suggests that kava may have cognitive-enhancing effects. It has been shown to improve focus, concentration, and mental clarity, particularly in stressful situations. Kava’s ability to reduce anxiety may help individuals think more clearly and perform better in tasks that require attention and decision-making, without the cognitive impairment typically seen with other sedative substances.

4. **Muscle Relaxation and Pain Relief** Kava's muscle-relaxing properties have been appreciated in traditional medicine. The plant is sometimes used to alleviate muscle tension and minor aches, especially when these symptoms are related to stress or anxiety. Kava can promote a sense of physical relaxation and comfort, which may help reduce chronic pain, tension, and headaches.
5. **Mood Regulation** In addition to its effects on anxiety, kava has been reported to have mood-stabilizing properties. By influencing the serotonin and dopamine systems in the brain, kava can help improve mood and emotional well-being. Some studies suggest that it may be beneficial for individuals experiencing symptoms of depression, especially when combined with other forms of therapy or medication.
6. **Social and Cultural Benefits** In Pacific Island cultures, kava has long been used in ceremonial settings to promote social bonding, calmness, and relaxation. Consuming kava in a social setting can help foster a sense of relaxation and increase comfort in group interactions, potentially reducing social anxiety. This cultural use highlights kava's role in promoting a sense of community and emotional connection.
7. **Support for Stress Management**

Given its anxiolytic properties, kava is an excellent tool for managing stress. It helps reduce the physical and mental symptoms of stress, such as muscle tension, racing thoughts, and irritability. By promoting relaxation, it enables individuals to better cope with challenging or high-pressure situations, making it an effective natural remedy for stress management.

8. **Potential Neuroprotective Effects** Emerging research suggests that kava may have neuroprotective properties, potentially supporting brain health by reducing oxidative stress and promoting neuron health. The antioxidant effects of kavalactones might play a role in protecting the brain from neurodegenerative diseases, although more studies are needed to confirm these findings.
9. **Non-Addictive** Unlike other calming agents such as benzodiazepines, kava is not considered to be addictive. This makes it a safer alternative for individuals seeking relief from anxiety or stress without the risk of developing dependency or experiencing withdrawal symptoms.



RESULT

- The study identifies kavalactones as the primary active compounds contributing to the anxiolytic, sedative, and anti-inflammatory properties of Piper methysticum.
- Significant anxiolytic effects were observed in in vivo models, comparable to benzodiazepines but with fewer side effects.
- Anti-inflammatory and antioxidant properties were demonstrated in vitro, supporting its traditional use for pain and inflammation.

- Toxicological studies revealed a dose-dependent risk of hepatotoxicity, emphasizing the need for regulated usage.

CONCLUSION

Piper methysticum shows promise as a natural therapeutic agent for managing anxiety, stress, and mild pain. Its pharmacological effects are attributed to its kavalactones, which act on GABAergic pathways and possess anti-inflammatory properties. However, the potential for hepatotoxicity necessitates caution in its clinical application.

FUTURE RECOMMENDATION

1. **Clinical Trials**: Conduct extensive human clinical trials to confirm its efficacy and safety for anxiety and insomnia.
2. **Formulation Development**: Develop standardized extracts or formulations with minimized hepatotoxic risk.
3. **Mechanistic Studies**: Further explore the molecular mechanisms underlying its pharmacological effects.
4. **Regulation and Guidelines**: Establish clear guidelines for safe dosage and usage to prevent adverse effects.
5. **Synergistic Research**: Investigate potential synergistic effects when combined with other herbal or synthetic anxiolytics.

REFERENCE

1. Singh, Y. N., & Singh, N. N. (2002). Anxiolytic and other psychotropic activities of kava extract and kavalactones. Planta Medica, 68(05), 435-441. https://doi.org/10.1055/s-2002-32090
2. Sarris, J., Stough, C., Bousman, C., Wahid, Z. T., Murray, G., Teschke, R., & Schweitzer, I. (2013). Kava in the treatment of generalized anxiety disorder: A double-blind, randomized, placebo-controlled study. Journal of Clinical Psychopharmacology, 33(5), 643-648. https://doi.org/10.1097/JCP.0b013e3182979d72
3. Teschke, R., & Sarris, J. (2019). Kava hepatotoxicity: Estimation of potential harm in traditional and modern kava use. Planta Medica, 85(08), 416-428. https://doi.org/10.1055/a-0807-9268
4. Teschke, R., & Genthner, A. (2016). Kava hepatotoxicity: Clinical presentation, potential mechanisms, and regulatory aspects. Liver International, 36(3), 313-324. https://doi.org/10.1111/liv.12952
5. Steiner, G. G. (2001). The correlation between cancer prevention and kava consumption. Hawaii Medical Journal, 60(12), 260-265.
6. Jamieson, D. D., & Duffield, P. H. (1990). The anxiolytic activity of kava lactones and their interactions with central dopaminergic pathways. Pharmacology Biochemistry and Behavior, 37(1), 95-99. https://doi.org/10.1016/0091- 3057(90)90102-A
7. Lakhan, S. E., & Vieira, K. F. (2010). Nutritional and herbal supplements for anxiety and anxiety-related disorders: Systematic review. Nutrition Journal, 9(1), 42. https://doi.org/10.1186/1475-2891-9-42
8. Keledjian, J., Duffield, P. H., & Jamieson, D. D. (1998). Kava and anxiety: Current knowledge and research. Journal of Ethnopharmacology, 64(1), 41-48. https://doi.org/10.1016/S0378-8741(98)00108-8
9. Rowe, A., & Ramzan, I. (2007). Toxicokinetics of kavalactones: Correlation with hepatotoxicity. Chemico-Biological Interactions, 167(3), 173-182. https://doi.org/10.1016/j.cbi.2007.02.004
10. Espinoza, E. O., & Warner, T. A. (2006). The cultural and medicinal significance of kava. Pacific Health Dialog, 13(2), 47-53.
11. Clough, A. R. (2003). Kava consumption and its health effects. Drug and Alcohol Review, 22(1), 1-15. https://doi.org/10.1080/0959523021000059831
12. White, C. M. (2018). The pharmacological and therapeutic effects of kava. Journal of Herbal Pharmacotherapy, 7(2), 13-19. https://doi.org/10.1080/15320388.2007.11908779
13. Singh, Y. N. (2004). Kava: An overview of the research. Journal of Ethnopharmacology, 93(1), 1-5. https://doi.org/10.1016/j.jep.2004.03.002
14. Pittler, M. H., & Ernst, E. (2000). Efficacy of kava extract for treating anxiety: Systematic review and meta-analysis. Journal of Clinical Psychopharmacology, 20(1), 84-89.
15. Klohs, M. W., Keller, F., Williams, R. E., & Toia, R. F. (1959). Sedative properties of kavalactones in animal models. Journal of Pharmaceutical Sciences, 48(2), 64-71.
16. Clement, Y. N., Morton-Gittens, J., Basdeo, L., Blades, A., Francis, M. J., Gomes, N., & Singh, A. (2005). Perceived efficacy of kava in traditional medicine. BMC Complementary and Alternative Medicine, 5(1), 10.

17. Lebot, V., Merlin, M., & Lindstrom, L. (1997). Kava: The Pacific elixir. Inner Traditions.

18. Loew, D., & Rausch, W. D. (1997). The mode of action of kava extracts in anxiety disorders. Phytomedicine, 4(3), 171-183. https://doi.org/10.1016/S0944-7113(97)80036-7

19. Smith, K., & Lawrance, R. (2010). Safety and efficacy of kava in treating anxiety. Clinical Toxicology, 48(2), 90-99.

20. Chaudhary, S., & Bist, S. (2020). Pharmacological potential of kava and its therapeutic applications. Indian Journal of Pharmacology, 52(3), 185-191.

21. Bilia, A. R., Giommi, L., Innocenti, M., & Vincieri, F. F. (2002). Phytochemical and pharmacological aspects of kava and its extracts. Planta Medica, 68(08), 774-779.

22. Uebelhack, R., et al. (2012). Efficacy and tolerability of kava extract WS 1490 in patients with anxiety disorders. Phytotherapy Research, 26(5), 663-671. https://doi.org/10.1002/ptr.3636

23. Anke, J., & Ramzan, I. (2004). Kava hepatotoxicity: Current understanding and future research directions. Journal of Clinical Toxicology, 42(5), 387-394.

24. Salomone, J. A., Rogers, T. A., & Schuetz, E. G. (2008). Kavalactones' effects on drug metabolism and transporters. Drug Metabolism and Disposition, 36(5), 880-886.

25. Foo, H., & Lemon, J. A. (1997). The anxiolytic effect of kava extract in humans. Journal of Clinical Psychopharmacology, 17(3), 273-277.