Investigating the Biological Activities of Peltophorum pterocarpum Extracts Using Preclinical Animal Models

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Abstract:

Back ground: - Peltophorum pterocarpum, is a plant widely used in herbal medicine. The plant is reported for its antioxidant, antifertility, anxiolytic and antimicrobial activities. Hence an attempt is made to anti-inflammatory, analgesic and diuretics activities in different models of animals like mice and rats.

Materials and Methods: - Aqueous extract:

The whole plant will be dried under shade, coarsely powdered and subjected to cold aqueous extraction, carried out by maceration for 10 days at room temperature (25±2°C) with 10 ml of chloroform used as preservative. The solvent extracted will be filtered and dried over hot water bath maintained at low temperatures i.e., <50ºc.

Alcoholicextract:

The coarsely powdered and dried crude drug was packed in a Soxhlet apparatus and was extracted with 95% alcohol at 60-80°C for 18 hours (until the solvent in the siphon tube of the Soxhlet apparatus get decolourised / becomes pale coloured). The obtained extract was concentrated on water bath at 45°C to get a solid mass Anti-inflammatory activity of AQEPP and ALEPP evaluated in different experimental animal models like Carrageenan, and Formalin induced paw Edema in rats. Diclofenac used as a standard reference. In Analgesic activity of AQEPP and ALEPP evaluated in different experimental animal models like Hot-plate and Tail immersion method in mice. Diclofenac used as a standard reference and Diuretic activity of AQEPP and ALEPP evaluated in different experimental animal models like Lipschitz test. Method in rats. Furosemide used as a standard reference. The AQEPP and ALEPP extracts shows significant effect in all these models.AQEPP and ALEPP were subjected for preliminary phytochemical investigation. AQEPP is identified with Carbohydrates, Steroids, terpenoids and flavonoids whereas ALEPP is identified with carbohydrates, steroids, terpenoids, flavonoids and saponins.Phytoconstituents present in both the extracts might be responsible for both the anti-inflammatory, analgesic and diuretics activities. AQEPP and ALEPP showed a significant anti-inflammatory, analgesic and diuretics activities.

Introduction:

Inflammation, pain, and disorders associated with abnormal fluid balance are among the most common health conditions affecting people worldwide and are major contributors to reduced quality of life. Persistent inflammation is closely associated with several chronic diseases, including rheumatoid arthritis, osteoarthritis, diabetes mellitus, cardiovascular diseases, neurodegenerative disorders, and cancer, while pain remains one of the most frequent symptoms requiring medical intervention. Similarly, disturbances in fluid and electrolyte balance may result in edema, hypertension, congestive heart failure, and kidney disorders that often require diuretic therapy.
Although synthetic anti-inflammatory, analgesic, and diuretic drugs are widely used in clinical practice, their long-term administration may produce adverse effects such as gastrointestinal irritation, renal impairment, electrolyte imbalance, cardiovascular complications, and drug dependence. Consequently, there is increasing interest in

identifying safer and more effective therapeutic agents from natural sources. Peltophorum pterocarpum, a medicinal plant belonging to the Fabaceae family, has been traditionally used for the treatment of inflammatory conditions, pain, wounds, fever, and urinary disorders. Phytochemical studies have shown that the plant contains several bioactive constituents, including flavonoids, phenolic compounds, tannins, glycosides, and terpenoids, which are known to possess a variety of pharmacological properties. In view of its traditional medicinal importance and promising phytochemical profile, the present study was undertaken to evaluate the anti-inflammatory, analgesic, and diuretic activities of Peltophorum pterocarpum extracts using established preclinical animal models and to provide scientific evidence supporting its therapeutic potential.

Biography:

Sumnima Ghimire is a Research Associate in the Department of Energy and Climate Change at the Asian Institute of Technology (AIT), based in Thailand. Originally from Nepal, Sumnima completed her master's degree in Climate Change and Sustainable Development at AIT in May 2025. Her professional experience includes impactful roles, including internships with renowned organizations like the Rockefeller Foundation (ARO-Bangkok). Her interests are centered on conducting technical climate research and policy analysis.

Results:

AQEPP and ALEPP extracts were subjected for preliminary phytochemical evaluation for identification of various phytoconstituents. AQEPP is identified with carbohydrates, steroids, terpenoids and flavonoids where as ALEPP is identified with carbohydrates, steroids, terpenoids and saponins.Both the extracts AQEPP and ALEPP are subjected for LD50 studies up to the maximum dose level of 2000 mg/kg body weight in mice. No behavioural abnormality or mortality was observed at the highest dose tested. From the maximum LD50 dose tested for each extract 1/20th, 1/10th, 1/5thdoses selected as low, medium and high and are used for various experimental studies in this thesis work.

Conclusion:

Preliminary phytochemical investigation of both AQEPP and ALEPP extracts were noted with phytochemicals like flavonoids, tannins, saponins, glycosides, carbohydrate, proteins, steroid and triterpenes. In acute toxicity study LD50(as per OECD Guidelines No.420) with both AQEPP and ALEPP no mortality or abnormal behavior were recorded in mice even at the highest dose tasted of 2000 mg/kg, p.o.The anti-inflammatory activity of both the extracts where evaluated by using carrageenan induced inflammatory in rats modules Standard drug Diclofenac 5mg/kg has exhibited a significant anti-inflammatory activity in carrageenan and formalin induced inflammatory in models in rats.From the study it can concluded that ALELPP and AQELPP showed a significant anti- inflammatory activity. The medium and higher doses of both the extracts ALELPP and AQELPP (200 and 400 mg/kg) treated groups showed better anti-inflammatory activity as compared to 100 mg/ kg dose with both the extract.

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