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## Pharmacological evaluation of *Lactuca sativa* and formulation design and optimization of microsphere loaded sustained release anti-inflammatory gel

Roshni Thapa

Kathmandu University, Nepal

Over the past several years, great advances have been made on development of novel drug delivery systems for plant actives and extracts. The variety of novel herbal formulations like polymeric nanoparticles, nanocapsules, liposomes, phytosomes, nanoemulsions, microsphere, transferosomes and ethosomes have been reported using bioactives and plant extracts. The novel formulations are reported to have remarkable advantages over conventional formulations which include enhancement of solubility, bioavailability and enhancement of pharmacological activity, improved stability, sustained delivery and protection from physical and chemical degradation. The present work highlights the pharmacological evaluation of methanolic extract of *Lactuca sativa* which includes anti-inflammatory, anxiolytic anti-microbial action along with anti-oxidant property and hence development of microsphere loaded topical gel to achieve sustained release anti-inflammatory action. The study includes formulation design and development of microsphere by sonication and solvent evaporation techniques. The effect of surfactant and varying polymeric concentrations were the variables used for optimization of formulation and their effect on entrapment efficiency of microsphere as well as drug release from the formulation were analyzed using MINITAB 16. The optimized formulation was loaded into gel for topical application which was subjected to ex vivo permeability study and biological activity was assessed in animal model. The results of final formulation were compared to standard marketed preparation and methanolic extract of the plant. It was concluded that *Lactuca sativa* possesses potent anti-inflammatory, anti-microbial, anxiolytic and anti-oxidant properties.

[roshni.thapa@ku.edu.np](mailto:roshni.thapa@ku.edu.np)

## How important is pharmacognosy for doctors and dentists?

Abdelaziz Ghanemi

Chinese Academy of Sciences, China

Pharmacognosy is a biological science with therapeutic aspects that is an important part of the teaching content for pharmacists, but this knowledge is not always taught to other medical health professionals such as doctors and dentists. Doctors and dentists mainly have knowledge about modern pharmacology and prescribe conventional drugs within the contexts of pharmacology and toxicology. However, because doctors and dentists must manage the health status of their patients and prescribe drugs, they should consider factors that could influence the effects of prescription drugs including natural compounds and the active ingredients these compounds may contain. By natural compounds, we refer to products used as traditional, herbal or natural therapies as well as diet products. In fact, the active ingredients of natural compounds may influence the physiological and pathological status of patients and may interact with therapies when they are taken together. Furthermore, a variety of drugs have been developed from natural products indicating that compounds derived from natural products can have strong biological and pharmacological activities. Indeed, different pharmacological properties have been linked to natural compounds and have been proposed as potential candidates for the development of therapeutic agents. Therefore, as clinicians who prescribe medicines, doctors and dentists should be aware of these factors to select the best therapeutic approaches. In addition, they must guide their patients to avoid or at least minimize the interactions between natural compounds and prescribed drugs. Natural compounds may influence drug effects not only by interacting with a drug but also by modifying a drug's targets such as membrane receptors. In addition, even in patients who are not prescribed therapy, doctors and dentists should explain the risks related to the use of natural products by clarifying that natural products are not guaranteed to be safe and that foods and beverages can have pharmacological or toxicological effects. Thus, patients who consume natural compounds should pay attention to factors such as the timing, quantity and frequency that they take these products with respect to prescribed drugs and with respect to their physiological or pathological status. As a related point, natural compounds can also influence the results of biomedical analyses on which prescriptions may be based because the chemicals in natural compounds may interact with cells or with laboratory reagents and lead to false results. In conclusion, the study of the pharmacological and toxicological properties of natural compounds is no less important for doctors and dentists than it is for pharmacists. More attention should be paid to topics regarding natural compounds within the faculty of medicine.

[ghanemiabdelaziz@hotmail.com](mailto:ghanemiabdelaziz@hotmail.com)