



Biological Active Compounds from Plants of Subarctic Origin

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Abstract

Algesia and inflammation are related with several pathological conditions. It is known that many drugs available for the treatment of these problems cause unwanted side effects. and body joints pain.

Keywords: Pathological Changes; tissues; organs

Background

Medicinal plants are popular remedies used by a majority of the world's population. The efficacy of medicinal plant in the management of diseases is indubitable. The World Health Organization estimated that 80% of the population of developing countries, continues to use traditional medicine in primary medical problems. Several plants are typically used without considering the toxicity and pharmacological aspects. The toxicity herbal preparation is usually unknown and the population does not care, believing that if the material has being used so far, it should be devoid of toxicity [1].

Results

Lethality and behavioral analysis

In this 14-days period of acute toxicity evaluation, rats given HAE from *Lampaya medicinalis* leaves in a single dose level of 3000 mg/kg body weight, showed no mortality and none of them showed any symptom of toxicity [2]. The behavioral pattern of animals was observed first 5 h, 12 h and every day for 14 days after the administration, and the animals in both vehicle treated and extract treated groups were normal and did not display significant changes in general behavior. This visual observation showed no significant changes in behavior, skin effect, breathing, defecation, postural abnormalities, impairment in food intake and water consumption and yellowing or loss of hair, compared to negative control group (rats not treated). Neither mortality, nor tremors nor convulsions were noted after 14 days of treatment.

Discussion

With the resurgence of the use of medicinal plants, scientific studies have become imperative to validate the folkloric use. In acute toxicity studies, a single dose of drug is given in large quantity to determine immediate toxic effect. These studies are commonly used to evaluate LD₅₀, signs of changes in behavior, effects on biochemical parameter and histopathology assessment of the essential organs as liver and kidney [3-6].

Lampaya medicinalis is a plant used in altoandean traditional medicine at northern Chile for the treatment of various ailments. The acute oral toxicity of hydroalcoholic extract from leaves of *Lampaya medicinalis* was determined in the present study. 12 healthy rats from both sexes were employed to observe the toxicity effects of HAE. In this study the results showed that in a single dose there are no adverse effects of HAE of *Lampaya medicinalis*, indicating that the medium lethal dose (LD₅₀) is higher than 3000 mg/kg for rats. All animals treated with HAE survived beyond the 14 days observation period. The results revealed that the weights of liver and kidney were not adversely affected throughout the treatment. Macroscopic analysis of target organs of treated animals did not show significant changes in color, volume and texture when

compared with the control group. Transaminases AST and ALT are well known enzymes used as biomarkers predicting possible toxicity. Increase in the level of AST and ALT in blood reflects the structural and functional dysfunction of hepatocellular membrane or cell rupture, and thereby indicate liver damage associated with tissue injury and reflection of hepatic toxicity. In the present study, AST and ALT levels were not affected by HAE, when is compared treated and controls animals. The lack of significant alterations in the levels of transaminases ALT and AST, good indicators of liver functions, suggests that acute ingestions of *L. medicinalis* extract does not alter the hepatocytes of the rats, and, furthermore, the normal metabolism of the animals.

Histological examination is the golden standard for evaluating treatment related pathological changes in tissues and organs. Histological analysis of liver, heart, kidney, sexual organs and lung (Figure 1) showed an indistinguishable cellular architecture of the animals treated and the control group not treated, indicating that the HAE of *Lampaya medicinalis* did not adversely affect the morphology of organs of rats. The liver is the main target organ of acute toxicity where exposed to the foreign compounds which may or not to be hepatotoxic to the rats. In this study, the histological examination revealed that there was no potential toxicity or cellular lesions. Furthermore no necrosis or inflammation reaction was observed and the cell arrangement was similar to the organs of the control rats and treated.

The inflammatory response is usually quantified by increase in paw size (edema) which is maximal around 5 h postcarrageenan injection. The results obtained from the carrageenan-induced paw edema shows that paw edema was markedly inhibited by the oral administration of the hydroalcoholic extract of *Lampaya medicinalis* (HAE) in dose - response relationship. The effect observed, which was time-dependent, lasted for at least 4 h with the two highest doses. The inhibitory values of edema at indicating that the extract is orally active at doses ranging from 37.5-300 mg/kg and can inhibit a acute inflammatory process [7,8].

Conclusions

Hydroalcoholic extract of *Lampaya medicinalis* Phil leaf up to the dose level 3000 mg/kg body weight did not produce any toxic effects or deaths; the extract was well tolerated by the rats. It did not alter body weight, feed and water consumption. The organ weight, biochemical and hematological analysis did not show changes in any of the parameters examined in animals of both sexes. The acute oral administration of the hydroalcoholic extract of *Lampaya medicinalis* Phil leaf was safe and not toxic in a single dose.

Methods

Plant material

Leaves and aerial parts of *Lampaya medicinalis* Phil were collected at Socaire



in Northern Chile (23° 36'40 s S; 67° 50'33 s W, 3230 m above sea level). The material was identified by Professor Roberto Rodriguez, Facultad de Ciencias Biológicas y de Recursos Naturales de la

Rat Paw Edema Assay

Sprague–Dawley rats of 180–220 g body weight divided into 6 groups with each group containing 6 rats. The control group and the reference group received normal saline (0.9% NaCl, 2 mL/kg) and indomethacin (10 mg/kg), respectively. While the test groups were treated with 37.5, 75, 150 and 300 mg/kg body weight of extract, respectively. Saline, extract and indomethacin were all administered orally.

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