ABSTRACT

For the thesis titled ‘Biochemical, pharmacological and toxicological investigations on the plant Cuscuta reflexa in experimental animals’

Importance of herbs is escalating in therapeutics in these days. Cuscuta reflexa is a parasitic plant with several claims of its usefulness in clinical conditions of liver diseases, and inflammatory states along with pain according to the literature. The study ‘Biochemical, pharmacological and toxicological investigations on the plant Cuscuta reflexa in experimental animals’ was initiated with the objective of investigation of analgesic, anti-inflammatory, antioxidant and hepatoprotective activities of extracts of Cuscuta reflexa along with isolation and characterization of the constituents responsible for the pharmacological effect produced by extracts.

The analgesic activity of Cuscuta reflexa was determined using conventional experimental animal models with thermal stimulus such as hot plate analgesia and using chemical stimulus like acetic acid and formalin for producing nociception. The anti-inflammatory activity of Cuscuta reflexa was determined using the acute inflammatory models like-carrageenan, serotonin and histamine-induced paw edema models along with cotton pellet induced granuloma. Effects of administration of extracts of Cuscuta reflexa in animal models of arthritis induced by Freund’s complete adjuvant and formaldehyde were investigated in these models. Probable mechanism involved in the antiinflammatory effect was evaluated with various tests like ulcerogenicity
test; acetic acid induced vascular permeability test, leukocyte migration test and human RBC's stabilization test.

The antioxidant activity of extracts of *Cuscuta reflexa* was evaluated by *in vitro* methods like DPPH scavenging assay, Griess method, along with *in vivo* methods like estimation of lipid peroxidation and estimation of reduced glutathione. Hepatoprotective property of extracts of *Cuscuta reflexa* was investigated in CCl₄ induced hepatotoxicity in rats. For the purpose of statistical significance, each value represented the mean ±SEM readings. Analysis of variance was used for determining the level of significance in the comparison of different means. Test of Dunnet was used as a past test. Results of the toxicity study indicate that the LD50% is more than 2000 mg/kg and administration of extracts for chronic periods in rats did not produce any mortality, behavioral toxic effects and do not have toxic effect on vital organs and hence the extracts can be regarded as safe for animal experimentation.

PECR, MECR and AECR (200 and 300 mg/kg p.o.) significantly (p< 0.05) increased latency against thermal stimulus, decreased the acetic acid-induced writhing responses and licking times of the second phase in the formalin test. Moreover, MECR exhibited significant (p<0.01) and dose dependent antiinflammatory effect against carrageenan and mediator-induced paw edema. The granuloma formation which was stimulated by implantation of cotton pellet was significantly (p<0.01) inhibited by MECR. Extracts were also found to have significant protection against arthritis induced by FCA and Formaldehyde.
Pretreatment with the extracts of *Cuscuta reflexa* inhibited ulcerogenic effect, vascular permeability, leukocyte migration and heat induced lysis of HRBC’s.

Extracts of *Cuscuta reflexa* also possess significant antioxidant and hepatoprotective activities.

These experimental results suggest that the plant possess significant analgesic, antiinflammatory and antioxidant potential. The MECR possess hepatoprotective activity attributed to the presence of flavonoid quercetin in the plant.