ABSTRACT

Stress is an integral part of living organisms, which is counteracted by homeostatic mechanism of the body to keep internal environment within normal physiological limits. However if stress is extreme, unusual or chronic, the normal homeostatic mechanism will be disturbed leading to well-known stress related diseases such as peptic ulcer, hypertension, depression, stroke, cancer, diabetes etc. Various medicinal plants have shown antistress activity such as Ashwagandha, Ginseng, and Tulsi. Polyherbal formulations like Geriforte have been developed for antistress action. But still the need of effective antistress agents to combat noxious stressful situations of life is high. So the present work was planned with the following objective.

**Aim:** Evaluation of antistress activity of *Vitis vinifera* and *Cichorium intybus* in albino rats and albino mice.

**Method:** The ethanolic extracts of *Vitis vinifera* seeds and *Cichorium intybus* roots were prepared and subjected to qualitative phytochemical studies, as described by the well-established methods. An acute toxicity study was conducted for *Vitis vinifera* and *Cichorium intybus* extracts, as per guidelines set by Organization for Economic Co-operation and Development (OECD guideline No. 425) received from CPCSEA. Parameters of observation were mortality, moribund status of mice and gross behavior. Gross behavior observations were behavior, neurological and autonomic responses. Behavioral observations were Awareness, Mood and Motor activity. Neurological observation were Central excitation, Motor in coordination, Muscle tone and Reflexes. Autonomic profile was Optical signs, Secretory signs and General signs.

Evaluation of antistress activity of *Vitis vinifera* seed and *Cichorium intybus* root extracts was done by using seven stress methods with different parameters. The antistress activity of *Vitis vinifera* and *Cichorium intybus* was demonstrated at two different doses, so that plants could later be used for stress related disorders in human beings. Swimming endurance test is widely used method to evaluate antistress activity of drugs. In this method, the antistress effect of pretreated extracts for ten days was evaluated by determining the improvement in swimming endurance period of the animals, when subjected to swim in restricted space like water vessel. Swimming survival time for each animal was noted and data obtained was subjected to statistical
analysis. In another model, the effect of antistress agent on CNS was determined with narcosis test in mice. In this method, the antistress effect of extracts was evaluated by determining their (Adaptogen) ability to synergize with CNS depressant such as barbiturates, and it could be the mechanism of antistress activity. Loss of righting reflex and its regain was observed in albino mice after administration of pentobarbitone sodium. The data obtained was subjected to statistical analysis.

To further investigate effect and mechanism of plant extracts on CNS, lipid peroxidation of brain due to stress was determined. In Cold and restraint stress method, albino rats were subjected to stress by immobilizing and keeping animal at cold temperature. Effect of stress and pretreated plant extracts for a period of twenty one consecutive days were determined by estimating malondialdehyde in brain using spectrophotometer as described by the well-established method of Ohkawa H. The data obtained was subjected to statistical analysis.

To determine effect and mechanism of plant extracts on peripheral system, chronic forced swimming stress induced ulcer was carried out. In this model rats were forced to swim in restricted space of water vessel at normal room temperature. The effect of stress and pretreated plant extracts for a period of ten consecutive days was determined by examining ulcer number, ulcer severity score, ulcer index, percentage of ulcer protection, gastric secretion pH and histopathological studies. The data obtained was subjected to statistical analysis. Adrenocortical activity in stress induced rats was determined, to establish the link between central and peripheral system; that is hypothalamic pituitary adrenal axis during stress and antistress treatment. In this model acute stress was accomplished by allowing albino rats to swim in the cold water. The effect of stress and pretreated plant extracts was determined by measuring plasma corticosterone level and Adrenal gland weight. The data obtained was subjected to statistical analysis.

To determine effect of stress and antistress agent on metabolism, glycogen in liver of albino rats was determined. In this method albino rats were loaded with steel weight and forced to swim restricted space of water vessel at normal room temperature. The effect of stress and pretreated plant extracts for a period of ten consecutive days was determined by estimating liver glycogen using spectrophotometer as described by the well-established method of Montgomery. In this method effect of pretreated plant extracts on stress induced behavioral despair in
animal was also determined. The data obtained was subjected to statistical analysis. Finally the effect of stress and pretreated plant extracts on immune system was evaluated. In this method effect of pretreated plant extracts on both stress immunosuppression and drug induced myelosuppression in albino rats was determined. The effect of restraint stress, Cyclophosphamide induced myelosuppression and pretreated plant extracts for a period of ten consecutive days was determined by evaluating haematological parameter viz; total leucocytes count, differential leucocytes count, RBC count, haemoglobin content & platelet count. The data obtained was subjected to statistical analysis.

**Results:** Qualitative studies have shown the presence of carbohydrates, proteins, phenolic compounds, Flavonoids and fixed oils in seeds extract of *Vitis vinifera*. Whereas *Cichorium intybus* root extract exhibited presence of carbohydrates, proteins, phenolic compounds, phytosterols and triterpenoids. In acute toxicity study, *Vitis vinifera* and *Cichorium intybus* extracts have shown wide margin of safety up to the dose of 5000 mg per kg body weight of animal. The swimming endurance of mice was increased by *Vitis vinifera* and *Cichorium intybus* extracts, there by showing antistress activity of this plant extracts. *Vitis vinifera* and *Cichorium intybus* extracts have the capacity to depress the CNS along with other CNS depressants.

Pretreatment of albino rats with *Vitis vinifera* seeds and *Cichorium intybus* roots extracts have prevented rise of lipid peroxidation in brain on chronic stress. *Vitis vinifera* and *Cichorium intybus* on pretreatment have shown significant protective effect for stress induced ulcers in albino rats, through nonspecific rise in resistance. The protective effect of *Vitis vinifera* and *Cichorium intybus* extracts on plasma corticosterone level and weight of adrenal gland during stress, justifies their use as antistress agents. The observed antistress effect of *Vitis vinifera* and *Cichorium intybus* extracts was found to be through hypothalamic pituitary adrenal axis of the animal.

Pretreatment with *Vitis vinifera* and *Cichorium intybus* have prevented stress induced depletion of liver glycogen and also behavioral despair. Pretreatment with *Vitis vinifera* and *Cichorium intybus* have prevented immunosuppression in albino rats due to stress as well as by myelosuppressive drug. Both the plant extracts were found to resist the adverse consequences of different variety of stress by increasing body’s nonspecific resistance through different mechanism of action.
The present work justifies use of *Vitis vinifera* and *Cichorium intybus* extracts as potential antistress agents to combat noxious stress situation of life and to avoid stress related diseases.

**Conclusion**: On the basis of results it was concluded that *Vitis vinifera* and *Cichorium intybus* possess protective effect to combat stress induced adverse consequences by increasing body’s nonspecific resistance through different mechanism of action. The present work justifies use of *Vitis vinifera* and *Cichorium intybus* extracts as potential antistress agents and to avoid stress related diseases.