Summary and Conclusion

In present study antidepressant activity of *Cuminum cyminum* and *Trachyspermum ammi* was investigated. Seeds of *Cuminum cyminum* and *Trachyspermum ammi* were extracted using solvent mixture of ethanol and water in ratio of 70:30 after defating with petroleum ether. Further Phytochemical Investigation was performed to ascertain presence or absence of various bioactive components in extract using various tests. Further to ascertain effect on depression animal models of depression were used. Models used were tail suspension test, forced swim test, and reserpine antagonism. Afterwards detailed study was done ascertain mechanism of action. Effect on DPPH scavenging, monoamine-mediated behavior, anxiolytic activity using Elevated Plus maze, and Apomorphine induced stereotype behavior was analysed. All animals studies were performed using either swiss albino mice or, albino wistar rats. Dose for study was selected on the basis of toxicity studies. OECD 423 guidelines were followed for toxicity assessment. Hydroalcoholic extract of both plants were tested on the dose range of 5 mg/kg, 50 mg/kg, 300 mg/kg and 2000 mg/kg. The data are expressed as Mean ± SEM and biostatical Interpretation was performed using Student’s t-test and one way analysis of variance (ANOVA) followed by Dunnett’s test. P < 0.05 was considered as level of statistical significance.

It was observed that both extract exerted significant antidepressant activity. Extracts were found to be non toxic upto the dose of 2000 mg/kg. Thus 2000 mg/kg was considered as NOAEL.

Pet ether extract of *Cuminum cyminum* was found to be having sterol and glycoside. HACC was rich in carbohydrates, glycoside, flavonoid, saponin, phenols and alkaloids. Similarly Hydroalcoholic extract of *Trachyspermum ammi* was also having glycosides, alkaloids, flavonoids, saponins and tannins. Thus both extracts were rich in bioactive components that are having good antioxidant and neuronal activity. Both plants extracts were not toxic up to the dose of 2000 mg/kg. As both of the components are one of the major parts of regular diet of human beings, thus safety was also confirmed on the basis of absence of any toxicity up to 2000 mg/kg.
In vitro antioxidant assay revealed IC 50 of 42.5 µg/ml, 36.57 µg/ml in DPPH assay for pet ether and Hydroalcoholic extract respectively of *Cuminum cyminum*. Nitric oxide scavenging activity was also found to be better in both extract of *Cuminum cyminum* with IC 50 of 15.76 µg/ml and 13.67 µg/ml respectively for pet ether and Hydroalcoholic extracts. Pet ether extract and hydroalcoholic extract of *Trachyspermum ammi* showed IC 50 of 23.08 µg/ml and 17.61 µg/ml respectively for DPPH scavenging property and 16.03 µg/ml and 15.89 µg/ml respectively for nitric oxide scavenging property. Tail suspension test revealed that pet ether extract of *Cuminum cyminum* showed better effect by decreasing immobility time at 400 mg/kg. Both extract i.e. pet ether and Hydroalcoholic were effective at both doses 200 mg/kg and 400 mg/kg. Even in forced swimming test pet ether extract of *Cuminum cyminum* was more effective at 400 mg/kg as compared to 200 mg/kg of pet ether and 200 mg/kg and 400 mg/kg of Hydroalcoholic extract. Apomorphine induced sniffing was also found to be significantly increased in both extract of *Cuminum cyminum* and here again pet ether extract at 400 mg/kg was more effective. Haloperidol induced catatonia is good measure for assessment of effect of test sample on dopamine receptor. Effect of pet ether extract of *Cuminum cyminum* was more prominent as compared to Hydroalcoholic extract. Time spent in open arm in elevated plus maze provided evidence that *Cuminum cyminum* extract provides significant effect on anxiety induced in elevated plus maze. In *Trachyspermum ammi* treated animals effects was again significant in all selected models. In *Trachyspermum ammi* treated animals duration of immobility was found to be significantly less in both doses of both extracts. Effect of Hydroalcoholic extract of *Trachyspermum ammi* was more effective in reducing duration of immobility as compared to pet ether extract. Even in forced swimming test effect of Hydroalcoholic extract at 400 mg/kg was more effective as compared to other treatments. In apomorphine induced sniffing test it was observed that effect of Hydroalcoholic extract was better as compared to pet ether extract. Duration of catatonia in both extract was found to decrease significantly. Effect of Hydroalcoholic extract of *Trachyspermum ammi* was found to be better in reducing anxiety as compared to pet ether treated animals.

Thus from present investigation it can be concluded that pet ether and
Hydroalcoholic extracts *Cuminum cyminum* and *Trachyspermum ammi* possess significant antidepressant activity. The effect of both plants extract would be mediated through presence of various bioactive components in extracts. Both extract significantly lowers depression in selected animal models of depression. Effect of extract many be mediated through presence of antioxidant potential in both extract which would have important role in monoaminergic transmission in brain by fighting against reactive oxygen species in brain. Effect of extract would also be mediated through various transmitters. Effect may be mediated through regulating dopamine, noradrenaline and serotonine. Further detailed investigation is required to ascertain exact mechanism of action for said activity. It is also required to isolate various active components present in test samples which can be assessed for their effect in depression. As both of selected plants are easily available and cheap one, they can work as good alternative for treatment of neurological disorders like depression. Thus it can be concluded that pet ether and hydroalcoholic extract of *Cuminum cyminum* and *Trachyspermum ammi* possess significant antidepressant activity.