CHAPTER – 4
SUMMARY & CONCLUSIONS
**Summary:**

Worldwide, depression is a very common illness, it was estimated that 350 million people are affected from this illness. Everyday life’s mood fluctuations i.e. usual and short-lived emotional responses to challenges, can not be called as depression. Depression is generally long lasting and with moderate to severe intensity. Depression is one of the serious health conditions. Suicides can be result of the depression. It has been estimated that every year, approximately 1 million deaths occurs due to depression.

Depression is commonly treated with antidepressant medications. Selective serotonin reuptake inhibitors (SSRIs) are generally preferred types of antidepressants. The examples of SSRIs are Citalopram, Escitalopram, Fluoxetine, Paroxetine and Sertraline. The most common side effects of antidepressants associated with SSRIs and SNRIs include, Agitation, Nausea, Headache, Sleeplessness or drowsiness, reduced sex drive, problems having and enjoying sex that can be persist men and women, both. Side effects like Blurred vision, Bladder problem, Constipation, Drowsiness, Dry mouth, Sexual problems are associated with tricyclic antidepressants.

From centuries, St. John's wort has been used as folk and herbal remedies. It is being used commonly to treat mild to moderate depression. In traditional Chinese and Indian medicine, practitioners used green tea to improving mental processes and health. Dating back more than 4,000 years, as per Chinese tradition, Chinese green tea can cure anything from depression, body aches, headaches, pains to constipation.

In the present study plant parts of *Camellia sinensis* (Tea, Chia) have been be evaluated for antidepressant activity. As literature shows that traditionally this plant is being use in the treatment of depression.

The plants materials *C. sinensis* used for the present studies were commercially procured from local market of Indore India. Solvents i.e. petroleum ether, chloroform, ethanol and distilled water were used in the extraction process.
The leaves, fruits, marketed tea, flowers and roots were dried, reduced to coarse powder and extracted successively with petroleum ether, chloroform, and ethanol using soxhlet apparatus. The dried mark of these parts were macerated with warm distilled water and filtered. The extractives were evaporated under reduced pressure. Water extractives were obtained by evaporation of water extractives on hot plate in china dish.

Different extractives of leaves, fruits, marketed tea, flower and roots were subjected to physical evaluation to detect their colours, chemical constituents and antidepressant activity.

*Albino* mice were used for the antidepressant activity. The animals were selected at random (male and female). The petroleum ether, chloroform, ethanol and water extractives were subjected to antidepressant studies obtained from Leaves, fruits, marketed tea, flower and roots of *C. sinensis*. Dried extractives were suspended Tween 80 (2-5%) and then were suspended in distilled water. The standard drug, Imipramine was taken as the standard drug.

The *Porsolt swim test* (PST) or *forces swim test* (FST) and *Tail suspension test* were used for screening of antidepressant drugs. The drug, imipramine (10 m.g./kg, orally) and various extractives in the doses of 100, 200, 300 and 400 m.g./kg were administrated 30 minute prior to the experiment.

The experiments consisted of a group of minimum six animals. The data is expressed as average immobility time ± Standard Error of Average. All the extractives were compared with control and imipramine (standard) separately using one way analysis of variance followed by Dunnett's Method. Results at P<0.001 were considered statistically significant.

Ethanol extractives of leaves, fruits and marketed tea have shown significant reduction in total immobility time in mice in both the animal models at the doses of 100, 200, 300 and 400 m.g./kg. However, antidepressant activity was as follows, in leaves extractives > marketed tea extractives > fruits extract. Ethanolic extractives of
leaves shown antidepressant activity was comparable to standard drug i.e. Imipramine (10 m.g./kg).

As reported earlier, tea plant contains more than 4000 bioactive compounds. The major parts of these compounds are flavonoids, polyphenols and catechins. All these are the biologically active compounds. Other compounds are amino acids, carbohydrates, chlorophyll, alkaloids (caffeine, theophylline and theobromine), fluoride, proteins, volatile organic compounds, aluminum, minerals and trace elements. Polyphenolic compounds present in tea are mostly flavonoids. The polyphenols, group contains catechins. The health benefits of the tea may be due to presence of flavonoids and catechins.

Major catechins are epigallocatechin gallate, epicatechin, epicatechin gallate and epigallocatechin. Green tea contains most abundant and active catechin as epigallocatechin – 3 – gallate. Green tea contains relatively higher contents of these catechins as compare to black tea.

The antidepressant activity of the deferent extractives may be due to polyphenols (flavonoids and catechin) compounds.

Conclusions:

During this research work, it is reported that ethanol extractives of leaves, fruits and marketed tea have shown significant antidepressant activity in the both animal models. Further it is suggested to more research work for development of suitable drug formulation for the human use. It is also suggested to conduct human clinical trials for collection of more strong evidences for antidepressant activity of Camellia sinensis and to establish its drug safety or toxicity profile.