CHAPTER 4

CONCLUSION

4.1 CONCLUSION

The following conclusions were drawn from the results of the present study:

- *Centrosema pubescens* is being reported to exhibit anti-cancer activity. The study has identified a novel source for potential anti-cancer molecules/drugs.

- The study has further identified and reported for the first time, an anti-cancer-molecule Lupenone from CPME of this plant, whose activity is significantly potent against lung cancer.

- Upon isolation, although no enrichment of anti-proliferative effect was observed, a significant enrichment in the inhibition of cell cycle arrest markers was observed. This indicated that more than one molecule is responsible for the observed anti-cancer activity of *C. pubescens*.

- Bioactive molecules isolated from CPDE did not exhibit a considerable anti-proliferative activity when compared with whole extract (CPDE) the possible reason for this might be its synergistic activity. Since CPDE played a significant role in the
treatment of cancer in both *invitro* and *invivo* models it can be used as a nutraceutical.

- *C. pubescens* extracts and its bio-active molecule is a promising alternative to synthetic substances as natural compound with high anti-proliferative activity, with capability to induce apoptosis through intrinsic pathway via inhibition of inflammatory effectors and cell cycle arrest in the treatment of lung cancer models.

- *C. pubescens* extracts are capable of arresting cell cycle in both G1/S and G2/M phases effectively so that the cancer cells proliferation is controlled.

- The mechanism of action of the anti-cancer activity of the isolate has been deciphered. Dual activity was observed for the isolate, of simultaneously inducing both apoptosis as well as cell cycle arrest.

- Experimental treatment of Swiss albino mice with CPDE and CPME confirmed its non-toxic nature by histopathological studies in liver and lung.

- *C. pubescens* is capable of inducing cell cycle arrest in both *in vivo* and *in vitro* lung cancer models.

- Our results also suggest that *C. pubescens* showed two different activities at high (IC$_{50}$) and low (1µg/ml) concentrations viz., cell cycle arrest, apoptosis in Lung cancer and redifferentiation followed by cell cycle arrest and apoptosis in Leukemic cancer cells respectively.
To conclude, it is inferred from *invitro* and *invivo* analysis that CPDE, CPME and Lupenone could be validated as an anti-cancer therapeutic agent for controlling the proliferative potential and triggering apoptosis by inducing cell cycle arrest, redifferentiation and inhibiting inflammatory mediators.

*Centrosema pubescens* successfully helps in the treatment of cancer by regulating and controlling its hall marks such as evading apoptosis, limitless replicative potential, dedifferentiation and insensitivity to anti-growth signals and thus can serve as an effective drug with multiple mechanisms of action for cancer treatment.

### 4.2 SCOPE FOR FUTURE WORK

There is a vast experience-based evidence for use of many plant derived products in medicine, especially in the field of cancer. Pharmaceutical companies are still tapping the natural source for an ideal molecule that could cure cancer and from that prospective the crude extracts and the active compound can be considered for various other key molecular targets and clinical trials. In future, this molecule can be used as a template for the production of novel leads for treatment of cancer. QSAR studies can be performed to study the structure activity relationship with known CDK inhibitors to further understand the action of the lead compound. Thus, if found successful, could help in realizing the bench to bedside concept. Newer approaches utilizing traditional knowledge and modern technology in combination with established biotechnological tools will yield a better medicine in the near future for improving health especially among people who do not have access to the use of costlier western systems of medicine.