

Chapter 5:

Summary and

Conclusion

- The role of *Aloe vera* gel to ameliorate different disease conditions including inflammation is well known in ethnic practices. However, the *efficacy* of naturally harvested unprocessed crude *Aloe vera* gel was not explored in detail in the inflammatory animal model-based studies. The present study extensively explores the *efficacy* of crude unprocessed freshly harvested orally consumable *Aloe vera* gel in different *in vitro* and *in vivo* models of inflammation and in the inflammatory arthritic animals.
- Along with the anti-inflammatory and anti-arthritic experiments, the toxicological properties of the orally consumable *Aloe vera* gel were also assessed. It has been found that the orally consumable doses of *Aloe vera* gel up to 5g/kg b.w. showed no toxic effects in model animals during acute toxicity test. *Aloe vera* gel of 4g/kg b.w has been safely administrated in model animals for 28 days during the sub-chronic toxicity study on a daily basis and was assessed as a safe amount of dose for the oral consumption for an extended period of time. The orally consumable doses of fresh *Aloe vera* gel for the anti-inflammatory studies were determined considering 25g and 50g (Low dose and High dose respectively) of plant gel were ideal for a person of 60 kg b.w. following the findings of toxicological experiments. The gel was prepared as aqueous homogenate and was prepared freshly every day before its use following harvesting and without any processing.
- In the *in vitro* anti-inflammatory tests, the experimental doses of *Aloe vera* gel (1000 µg/ml) showed potent lysosomal membrane stabilization against hypotonicity and heat; also inhibited the protein denaturation. In the *in vivo* anti-inflammatory tests, the orally consumable doses of *Aloe vera* gel efficiently inhibited carrageenan-induced paw swelling and reduced the granuloma formation following sub-cutaneous cotton pellet insertion in model animals.
- In the FCA-induced inflammatory arthritic rat models, the orally fed experimental doses of *Aloe*-gel ameliorated the arthritic swelling, improved the arthritic joint structure; hematological alterations like haemoglobin concentration, RBC and WBC counts were brought back to normal levels and serum biochemical properties, including total protein, total albumin, ceruloplasmin, creatinine, were restored following a 28 day-long treatment.

- When the gene expression of TNF- α and Cox-2 were observed in the FCA-induced arthritic animal models on 28th day following arthritis induction, it was observed that the expression of both the genes were down-regulated in the blood of the arthritic animals when fed with *Aloe vera* gel on a daily basis. The up-regulation of these genes in the arthritic animals are the key factors for the progression of inflammation.
- The use of the *Aloe vera* gel in its crude form is hence proved effective in inflammation and inflammatory disease conditions. The exploration of the gel constituents could open new opportunities for the discovery of novel drug-like compounds against inflammation. As a complementary medication, the *Aloe vera* gel seems to be a potent herbal agent and can contribute to the wellness of the patients suffering from inflammatory disease conditions especially inflammatory arthritic conditions.