CHAPTER III
AIM AND OBJECTIVES

3.1 AIM
To study the antidiabetic activities of some medicinal plants in streptozotocin induced diabetic rats. Naturally occurring phytochemicals are of main scientific attention in current scenario. They occur in small amounts in all groups of plants and in all parts of plants such as seeds, roots, stems, barks, woods, leaves, flowers, fruits, pods, and pollens. India has a gold mine of well-recorded and traditionally well-practiced knowledge of herbal medicine. A lot of herbs have been used traditionally to treat diabetes, and a few have been tested for such effects. Among these herbal resources, \textit{A.\,monilifer} from Tamil Nadu have been selected for the present investigation for their antidiabetic activities in wistar albino rats.

3.2 OBJECTIVES
In order to achieve the study of antidiabetic activities \textit{A.\,monilifer} in streptozotocin induced diabetic rats, the present research work was designed with following objectives.

- To select and identify the medicinal plant \textit{A.\,monilifer}
- To collect and extract the whole plant of \textit{A.\,monilifer} for the study.
- To find out the phytoconstituents present in the various extracts of \textit{A.\,monilifer}
- To analyze the chemical constituents of the various extracts of \textit{A.\,monilifer} using GC-MS
- To evaluate the antioxidant activity of different extracts of whole plant of \textit{A.\,monilifer} using different \textit{in vitro} models such as DPPH assay, nitric oxide radical scavenging activity, iron chelating activity, hydroxyl radical scavenging activity, superoxide radical scavenging activity, total antioxidant activity, total phenol and flavonoid content.
To evaluate the effect of extracts on various pharmacological parameters in wistar albino rats such as;

1. Estimation of the fasting blood glucose level
2. Estimation of body weight, plasma glucose and Urine sugar.
3. Estimation of plasma insulin.
4. Estimation of Oral glucose tolerance test
5. Hematological studies for the different extracts of *A. monilifer* in streptozotocin-induced diabetic rats will be assessed by the following parameters.
   - Haemoglobin (Hb) in blood
   - Glycosylated Haemoglobin (HbA1C)
   - Total white blood cell (WBC) count
6. Liver function test for the different extracts of *A. monilifer* in streptozotocin-induced diabetic rats will be assessed by the following parameters.
   - Serum alkaline phosphatase (ALP) activity
   - Serum bilirubin
   - Serum glutamate pyruvate transaminase (SGPT) activity
   - Serum glutamate oxaloacetic transaminase (SGOT) activity
7. Kidney function test for the different extracts of *A. monilifer* in streptozotocin-induced diabetic rats will be assessed by the following parameters.
   - Serum creatinine
   - Serum urea
   - Uric acid
8. Streptozotocin-induced diabetic rats will be assessed by the following parameters.
   - Serum α-Amylase activity
   - Liver glycogen
9. Changes in the level of lipid peroxidative markers (thiobarbituric acid reactive substances, lipid hydroperoxides and conjugated dienes) in liver, kidney and pancreas.
10. *Invivo* enzymatic antioxidant potential of different extracts of *A. monilifer* in streptozotocin-induced diabetic rats will be assessed by the following parameters.
    - Superoxide dismutase (SOD) activity in blood and tissues
    - Catalyse (CAT) activity in blood and tissues
    - Gluthathione peroxidase (GPx) activity in blood and tissues
    - Gluthathione reductase (GSHRx) activity in tissues
a. Glutathione S-transferase (GST) in tissues.

11. *Invivo* non-enzymatic antioxidants potential of different extracts of *A. monilifer* in streptozotocin-induced diabetic rats will be assessed by the following parameters.
   - Vitamin C in plasma, liver and kidney
   - Vitamin E in plasma, liver and kidney
   - Reduced glutathione in plasma, liver and kidney.

12. Changes in the levels of membrane bound ATPase such as Na\(^+\) ATPase, Mg\(^{2+}\) ATPase and Ca\(^{2+}\) ATPase in erythrocytes and tissues (liver and kidney).

- Histopathological changes in liver, kidney and pancreas
- Isolation of the active ingredients from methanolic extract of whole plant of *A. monilifer* by column chromatographic method.
- Characterization of isolated compounds using FTIR, \(^{13}\)C NMR, \(^1\)H NMR and Mass Spectrometry.
- To elucidate the structure of the isolated compounds.