5. SUMMARY

5.1 Penitrem A, a mycotoxin produced by *P. crustosum*, was isolated, purified and characterized.

5.2 The effects of different temperatures moisture contents and solid substrates in the form of food, on the production of penitrem A by the organism *P. crustosum* have been studied.

5.3 The toxic effect of feeding *P. crustosum* contaminated diet, crude toxin extract and pure penitrem A on liver, kidney, intestine and brain tissues of rats were studied by observing the histopathological variations.

5.4 Biochemical studies during toxicosis were made first by analysing the cellular constituents like total alkali extractable carbohydrates, glycogen, pyruvic acid, lactic acid, lipids, protein, DNA and RNA in rats. The results indicate that during toxicosis, the major alteration takes place in different aspects of carbohydrate metabolism.
5.5 As a continuation of the above observation, the activity of some important enzymes in carbohydrate metabolism was studied. Glycogen phosphorylase level was found to be significantly increased while the activity of glycolytic enzymes like hexokinase and aldolase were found to be lowered.

5.6 Gluconeogenic enzymes like G6Pase and FDPase showed a reduction thereby showing that the process of gluconeogenesis is suppressed. HMP shunt was stimulated showing that the G6P formed during glycogenolysis is shunted predominantly through the HMP pathway which is reflected in the elevated activity of glucose-6-phosphate dehydrogenase activity.

5.7 Since changes observed during metabolism may be primarily due to transport of metabolites through intestinal membrane, analysis of membrane bound enzymes like total ATPase, Na⁺-K⁺ dependent ATPase and alkaline phosphatase were made. The levels of all the above membrane bound enzymes were found to be lowered in the tissues only in case of intestine, indicating altered membrane permeability during penitrem A toxicosis.
5.8 Investigations on the in vivo uptake of \(^{14}\)C-amino acids (glycine, alanine, aspartic acid, methionine, lysine) and \(^{14}\)C-glucose by the intestine of rats during penitrem A toxicosis show lowered uptake there by indicating that the toxin affects the intestinal membrane.

5.9 Estimations of blood constituents like blood cell counts, haemoglobin, blood sugar, serum cholesterol, phospholipids and certain important enzymes, namely, lactate dehydrogenase, phosphatases, 5'-nucleotidase, aspartate transaminase were carried out. Blood glucose as well as serum enzymes were found to be significantly elevated during this toxicosis due to the cellular damage caused in the liver.

5.10 Since penitrem A, the major metabolite of \textit{P. crustosum} was found to be a potent neurotoxin, preliminary studies were carried out to assess the neurotoxic effect of penitrem A as well as feeding of \textit{P. crustosum} contaminated diet and crude extract on three regions of brain, cerebral hemisphere, cerebellum and medulla oblongata. The results obtained showed no significant variations in either acetylcholinesterase or
acetylcholine content of the brain. The results indicate the penitrem A toxicosis may not be interfering with the cholenergic nervous system. However the possibility of mycotoxin damaging the catecholamine and histamine neurons need detailed investigation.