Myocardial infarction is the commonest single cause of death in many parts of the world. It is well recognized that myocardial infarction is a complex phenomenon affecting the mechanical, electrical, structural and biochemical properties of the heart. Despite this complexity, impressive recent progress has been achieved in advancing our understanding and appreciation of the cellular process and mechanism underlying cardiac dysfunction associated with myocardial infarction and most importantly, in applying this knowledge to therapeutic interventions.

Traditional and folklore medicine bequeathed from generation to generation is rich in domestic recipes and communal practice. Encompassing concepts and methods for the protection and restoration of health, traditional medicine served as a fount of alternative medicine, new pharmaceuticals, and health care products. Developed countries in recent times, are trying to use traditional medicinal systems that involve the use of herbal drugs and remedies.

The focus of the present dissertation was to evaluate the cardioprotective effects of *Muntingia calabura* L. a common tree in and around Trichirappalli, for its membrane stabilizing, antioxidant, antihyperlipidemic and antihyperglycemic properties during experimentally induced myocardial injury. Myocardial infarction induced by isoproterenol, a β-adrenergic agonist, showed many metabolic and morphologic aberration in the myocardium of experimental animals similar to those observed in human MI.

In the present study, Isoproterenol administration caused a statistically significant (p<0.05) increase in serum AST, ALT, LDH and CK and uric acid with a concomitant decrease in their activity in heart tissue. The reversal of marker enzymes to near normalcy may be due to the prevention of leakage of the intracellular enzymes by the membrane stabilizing activity of *Muntingia calabura* L.

A significant increase in lipid peroxide levels and a parallel decline in the activities of antioxidant enzymes like SOD, catalase, GPx, GST, and GR in heart with
isoproterenol-induced myocardial necrosis were also observed. The inhibition of lipid peroxidation and enhancement of antioxidant enzymes might be due to the direct free radical scavenging activity which could attributed to the antioxidant potential of various ingredients present in the extracts of *Muntingia calabura* L.

Isoproterenol treated rats showed a significant increase (p<0.05) in the levels of total cholesterol, triglycerides, phospholipids, LDL and VLDL with a significant decrease in HDL in serum. There was also a significant increase (p<0.05) in the levels of total cholesterol, triglycerides, phospholipids and free fatty acids, and a decrease in the concentration of phospholipids in the heart of ISO-treated rats. The activities Na⁺/K⁺ ATPase and Mg²⁺ ATPase were decreased significantly (p<0.05), and the activity of Ca²⁺ ATPase was increased significantly in the heart of ISO-treated rats. Pretreatment with *Muntingia calabura* L. extracts showed a significant (p<0.05) effect and maintained the levels of lipids; lipoproteins and membrane bound ATPases in ISO-treated rats which may be due to the antioxidant potential of *Muntingia calabura* L.

ISO-induced myocardial injury resulted in decreased ATP content and activities of TCA cycle enzymes, respiratory enzymes, mitochondrial antioxidant enzymes and increased level of lipid peroxidation. Pre-co-treatment with the extracts of *Muntingia calabura* L. effectively counteracted the alterations in mitochondrial enzymes and antioxidant defense system. Protective effect of *Muntingia calabura* L. is may be related to its ability of maintaining the myocardial energy status (ATP) at higher level as well as bringing back the activities of TCA cycle enzymes and respiratory marker enzymes to near normalcy, also due to its free radical scavenging ability which lead to the prevention of myocardial necrosis.

Isoproterenol given rats showed a significant increase in the levels of cathepsin-D and activities of lysosomal enzymes. Pretreatment with *Muntingia calabura* L. extracts significantly prevented the lysosomal integrity, which could be mediated possibly through its antioxidant effect as well as the attenuation of oxidative
stress. A statistically significant decrease in the activities of myocardial hexokinase and glucose-6-phosphate dehydrogenase and a significant increase in the activities of glucose-6-phosphatase and fructose-1, 6-bis phosphatase were observed in ISO-induced animals. Alterations in the activities of these glucose-metabolizing enzymes were reversed to near normalcy upon Muntingia calabura L. pretreatment.

Administration of Muntingia calabura L. to normal rats did not have any significant effect on any of the parameters studied. Among the different doses and extracts administered (100, 200 and 300mg/kg of aqueous leaf, bark and wood extracts and 1.5, 3.0 and 4.5 ml/kg of fruit juice), activity of 300mg/kg of aqueous bark extract was more pronounced and offered maximum protection to the myocardium. This was further confirmed by histological and ECG studies.

Results of the preliminary screening of various extracts of MC showed the presence of flavonoids, saponins, tannins, glucosides, coumarins. The GC-MS analysis of bark extract revealed the presence of β-Methyl- (d) -glucoside and menthol. Cardioprotective potential of MC bark extract might be due to the synergistic effect of all these phytoconstituents.

In the present dissertation it is concluded that various extracts and fresh juice of Muntingia calabura L. possessed good cardioprotective efficacy. Pretreatment with aqueous bark extract at the dose level of 300mg/kg proved to be more beneficial. It alleviated the myocardial injury by its anti-oxidative, anti-hyperlipidemic, antihyperglycemic and anti-arrhythmic properties as well as its membrane stabilizing ability which is chemically supported by the presence of Zn, menthol and β-Methyl-(d) -glucoside.