10th International Conference on
Future Pharma and Innovations
March 24-25, 2026 | Amsterdam, Netherlands
Volume : 13

Cardioprotective Potential of Terminalia Arjuna Bark Extract in Isoproterenol-induced Myocardial Infarction in Rats

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Background & Aim: Myocardial infarction (MI) is a leading cause of morbidity and mortality, primarily linked to oxidative stress and myocardial necrosis. Experimental administration of isoproterenol (ISO), a β-adrenergic agonist, induces MI in rats that closely mimics human cardiac injury. *Terminalia arjuna* bark, a traditional cardiotonic herb in Ayurveda, is known for its antioxidant, anti-inflammatory, and lipid-regulating properties. This study aimed to evaluate the cardioprotective potential of *T. arjuna* bark extract against ISO-induced myocardial infarction in rats.

Objective: To assess the effects of *T. arjuna* extract on serum cardiac biomarkers, lipid profile, antioxidant enzyme levels, and histopathological changes in rat myocardium following ISO-induced myocardial injury.

Methods: Wistar albino rats were divided into five groups (n = 6): Group I—normal control; Group II—ISO control (isoproterenol 85 mg/kg, s.c., two consecutive days); Group III—standard (propranolol 10 mg/kg, p.o.); Groups IV and V—*T. arjuna* bark extract (250 and 500 mg/kg, p.o., 21 days). MI was induced on days 20 and 21 using ISO. Serum cardiac biomarkers (CK-MB, LDH, SGOT, SGPT), antioxidant enzymes (SOD, CAT, GSH), and histopathological changes in heart tissue were evaluated.

Results: ISO administration significantly increased serum cardiac biomarkers and lipid peroxidation, while reducing antioxidant enzyme activity. Pretreatment with *T. arjuna* extract markedly normalized these biochemical parameters ($p < 0.05$). Histopathology revealed preservation of myocardial structure, reduced necrosis, and minimal inflammatory infiltration, particularly at the higher dose (500 mg/kg), comparable to propranolol-treated rats.

Conclusion: *Terminalia arjuna* bark extract demonstrates significant cardioprotective activity against ISO-induced myocardial infarction in rats, likely through antioxidant and membrane-stabilizing mechanisms. These findings support its traditional use as a cardiotonic and indicate potential therapeutic application in cardiac disorders.

Keywords: *Terminalia arjuna*, cardioprotection, isoproterenol, myocardial infarction, antioxidant activity, cardiac biomarkers, herbal medicine, Wistar rats

Biography 1: Ms. K. Baby Madhavi is a postgraduate scholar in Pharmacology at Sri Venkateswara College of Pharmacy. Under the guidance of Ms. N. Rajeswari, M.Pharm (Pharmacology), she has been actively involved in experimental research focusing on cardioprotective and herbal therapeutics. Her research interests Cardioprotective Potential of Terminalia Arjuna Bark Extract in Isoproterenol-induced Myocardial Infarction in Rats.

Biography 2: Ms. N. Rajeswari, M.Pharm (Pharmacology), is an Assistant Professor at Sri Venkateswara College of Pharmacy with over 6 years of academic and research experience. Her interests include experimental pharmacology, toxicology and herbal drug research, with a focus on integrating traditional medicine with modern therapeutics.

Abstract received : August 19, 2025 | Abstract accepted : September 10, 2025 | Abstract published : October 10, 2025