

Is Aqueous Bark Extract of *Cinnamomum zeylanicum* Effective in Alleviating Doxorubicin-Induced Inflammation and Apoptosis in Myocardial Tissues?

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Although doxorubicin is a highly effective anti-cancer drug, its' chemotherapeutic efficacy is precluded by oxidative-stress, inflammation and intrinsic apoptotic pathways induced by doxorubicin. It is widely reported that medicinal plants with high antioxidant, anti-inflammatory and anti-apoptotic activities have significant effects on the myocardial tissues to protect against damage. Therefore, objective of this study was to investigate the anti-inflammatory and anti-apoptotic effects of *Cinnamomum zeylanicum* aqueous bark extract to alleviate doxorubicin induced cardiac damage in Wistar rats. Treatment groups of rats used in the study were as follows. Group 1: control; group 2: plant extract control (2.0 g/kg lyophilized plant extract, 14 days); group 3: Doxorubicin control (received dH₂O 14 days, doxorubicin (18 mg/kg) on 11th day); group 4 was administered with lyophilized plant extract (2.0 g/kg) 14 days, doxorubicin (18 mg/kg) on 11th day; group 5: positive control (dH₂O 14 days, dexrazoxane (180 mg/kg) 0.5 h before doxorubicin (18 mg/kg). All animals were sacrificed on day 15, serum myeloperoxidase (MPO) activity was measured and inflammatory (TNF- α) and apoptotic markers [caspase-3, Bcl2 and terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) assay] were analyzed in myocardial tissues using an immunohistochemical staining and area of expression was quantified. Results indicated that MPO activity (285.32 $\pm$ 1.64) and expression of TNF- α are significantly higher ($p < 0.001$) in doxorubicin control compared to the normal control. Pre-treatment with plant extract showed a significant reduction ($p < 0.001$) of above inflammatory markers compared to the doxorubicin control group. Expression of caspase-3 and TUNEL positive nuclei were significantly increased ($p < 0.05$) while Bcl-2 expression was weaker in doxorubicin control. Pre-treatment with aqueous bark extract has the potential to significantly reduce caspase-3 activity and TUNEL positive nuclei while Bcl-2 expression is significantly increased ($p < 0.05$). Therefore, *Cinnamomum zeylanicum* aqueous bark extract has the potential to alleviate doxorubicin induced inflammation and apoptosis in Wistar rats.

Keywords: Doxorubicin, Inflammation, Apoptosis, *Cinnamomum zeylanicum*, Wistar rats

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