

Paper No. 3

Title: Graviola leaves extract ameliorating the renal alterations induced by food additive "mono-sodium glutamate" in male albino rats

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ABSTRACT

The protective effects of *Annona muricata* Linn leaf extract (Graviola) against the possible nephrotoxicity induced by oral administration of the Monosodium glutamate (MSG) for 4 weeks in male albino rats (*Rattus albus*) was investigated. The rats were divided into 4 groups. Control (group I) received 1ml of distilled water daily for 4 weeks. Treatment (group II) received Graviola leaf extract in a daily dose of 100 mg/kg., body weight for 4 weeks. Initiation (group III) received monosodium glutamate dissolved in distilled water in a daily dose of 4mg/kg., body weight for 4 weeks. Therapeutic (group IV) received monosodium glutamate for 4 weeks followed by Graviola leaf extract for another 4 successive weeks. The kidney tissues were examined for the histopathological and histochemical observations. Total carbohydrates content was determined by PAS method and total proteins by Bromophenol blue staining method. The alterations in BcL-2 and Caspase-3 protein expression were determined by immunohistochemical methods. The present study showed that, MSG treatment led to histological and histochemical alterations in the kidney tissues where inflammatory cellular infiltration in interstitial tissues and associated focal areas of glomerular atrophy were noticed. Dilatation and focal hemorrhage between the renal tubules were seen. Total carbohydrates depletion was much more observed in the glomerular tuft and the basement membrane as indicated by decreasing in the stain ability of PAS-positive materials. Also, a marked reduction of the protein content in the renal tubular cells was observed. In addition, MSG treatment was found to up-regulated BcL-2 and Caspase-3 expression as an apoptotic features, which were significantly increased ($p < 0.05$). In sum, the present findings confirmed the protective and therapeutic effects of *Annona muricata* LINN leaf powder (Graviola) on MSG induced alterations in the kidney tissues in male albino rats.

Keywords: Monosodium glutamate (MSG), Graviola, kidney, histopathology, PAS, Bromophenol blue, immunohistochemistry, BcL-2, Caspase-3