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Green tea polyphenols: extraction and beneficial effects against toxicological alterations induced during scorpion envenomation pathogenesis

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Abstract

Polyphenols extracted from green tea (*Camellia sinensis*), are reported to exert anti-inflammatory and antioxidant activities. Scorpion envenomation is a serious health problem in Algeria. The ability of scorpion venom to produce profound toxic alterations in several tissues was established.

The aim of this study is to evaluate the protective effects of green tea polyphenols, which were obtained by alcoholic extraction, against toxicological effects induced by scorpion venom in tissues. They were, therefore, administered to mice by gavage for 6 days before the injection of a sublethal dose (13 µg / 20g) of *Androctonus australis hector* (*Aah*) venom. The alterations were evaluated 24 hours after envenomation by histopathological analysis and by the evaluation of edema formation and metabolic parameters levels.

Our results showed that *Aah* venom causes severe alterations in cardiopulmonary and hepatorenal tissues marked by interstitial edema, thickening of the inter-alveolar septa, hemorrhages, congestions of the central lobe veins, dilation of sinusoidal spaces and necrosis. These disorders are accompanied with an increase in the index of edema formation, hyperglycemia and some metabolic enzymes. The pretreatment with the alcoholic extract of green tea prevented the formation of hemorrhages in the heart tissue. In the lungs, the alveoli seem to be enlarged with the disappearance of some alterations including edema, hemorrhage and a significant reduction in the thickening of the inter-alveolar walls. It was also observed a prevention of central lobe veins congection and a greater reorganization of the glomeruli and tubules structure. These observations were concomitant with reduction of edema formation index, blood glucose levels, lactactate dehydrogenase and aspartate aminotransferase activities.

The preventive effects of polyphenols extracted from the green tea, against the histological toxic effects induced by the venom seem to be due to the increase in anti-oxidant defense induced by antioxidant substances such as catechins known for their benefecial effects against immuno-inflammatory disorders.

Keywords: Green tea polyphenols, Scorpion envenomation, Toxicological effects, Hepatorenal tissue, Cardiopulmonary tissue.