PRELIMINARY EVALUATION OF TOXICITY PROFILE OF 7-CHLORO-4-(PHENYLSELANYL) QUINOLINE-LOADED NANOCAPSULES

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INTRODUCTION: 7-chloro-4-(phenylselanyl) quinoline (4-PSQ) is an organoselenium compound with anti-inflammatory and antinociceptive effects. But it is also recognized for its high lipophilicity can negatively impact its overall bioavailability. The incorporation of 4-PSQ into nanostructured systems is a promising alternative to overcome such restriction. Therefore, the polymeric nanocapsules containing 4-PSQ were developed. However, no information is known about the nanotoxicology associated with this formulation. OBJECTIVE: The study aimed to evaluate the acute toxicity of 4-PSQ in free form or associated with polymeric nanocapsules. MATERIALS AND METHODS: Biocompatibility of the 4-PSQ in free or nanoencapsulated forms was evaluated by hemolysis assay using human erythrocytes (CAEE: 82837124.4.0000.5346). Survival rate and behavior analysis, such as head thrashes, touch response, defecation cycle, and pharyngeal pumping, were evaluated in the *Caenorhabditis elegans* exposed to 4-PSQ in free and nanoencasulated forms (50 - 300 µg/mL). Male and female Swiss mice (CEUA: 9085–2021) received the free or nanoencapsulated 4-PSQ (1 mg/Kg; intragastric route) every 48 h, totaling seven administrations in 14 days. Euthanasia was performed on the 14th day, and the plasma fraction was obtained to determine ureia levels, and aspartate (AST) and alanine (ALT) aminotransferase activities. Oxidative status was determined in liver and kidney samples (reactive oxygen species (ROS), thiobarbituric acid reactive species (TBARS), and nitrate and nitrite (NOx) levels. RESULTS AND CONCLUSION: Exposure to free 4-PSQ significantly decreased the number of live nematodes. In contrast, 4-PSQ in nano-encapsulated form did not affect the survival of *C. elegans*. Regarding the behavior evaluations, the free 4-PSQ decreased head thrashes, the response to touch, and the defecation cycle. Nanoencapsulation attenuated the toxicity effect of 4-PSQ in *C. elegans*. The evaluation of 4-PSQ's hemolytic capacity showed that the free compound induced hemolysis in a concentration-dependent manner. However, nanoencapsulation abolished the compound's toxicity. *In vivo* evaluations showed no alteration in ALT and AST activities and urea levels. In addition, the TBARS, ROS, and NOx levels did not change significantly after repeated administrations with 4-PSQ in free or nanoencapsulated form compared to the control group. Therefore, the 4-PSQ-loaded nanocapsule suspensions showed no toxicity in the evaluated assays, indicating its biocompatibility.

Keywords: Selenium; Nanoparticles; Hemocompatibility; Alternative methods; Oxidative markers.

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