Comparative Analysis of Selenium and Quercetin Nanoparticles for their Antioxidant and Hepatoprotective Effects Against Acrylamide-Induced Liver Toxicity

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ABSTRACT

Acrylamide, a potential occupational carcinogen, is a naturally occurring by-product formed during the thermal processing of starchy foods and roasted coffee beans. Recent studies have highlighted the presence of elevated acrylamide levels in various thermally treated fast foods consumed in Saudi Arabia. This study addresses the urgent need for effective antioxidant therapies to counteract acrylamide-induced liver damage. By comparing the protective effects of selenium and quercetin nanoparticles, the research aims to identify the more potent nano-antioxidant, contributing to the development of safer and more efficient strategies for preventing chemically induced hepatotoxicity. Twenty adult male Albino Wistar rats were randomly assigned to four groups: control, acrylamide-treated, acrylamide combined with selenium nanoparticles (SeNPs), and acrylamide combined with quercetin nanoparticles (QNPs). Concurrently, there was a notable reduction in antioxidant markers such as glutathione (GSH) and superoxide dismutase (SOD) in liver tissues when compared to the control group. Treatment with SeNPs and QNPs effectively reversed these biochemical alterations and improved liver histopathological features. In conclusion, both selenium and quercetin nanoparticles demonstrated protective effects against acrylamide-induced liver toxicity in male Albino Wistar rats, indicating their potential application in mitigating liver damage caused by environmental toxins.

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