INFLUENCE OF SILICON DIOXIDE NANOPARTICLES (SİO2 NPS) ON THE BIOLOGY OF MODEL INSECT, GALLERIA MELLONELLA (L.) (LEPIDOPTERA: PYRALIDAE)*

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Türkiye

Abstract: Today, the widespread use of silicon dioxide nanoparticles (SiO2 NPs) in many consumer products (toothpaste and skin care product etc.) increases the possibility of living beings being exposed to these NPs in nature. As a result, it brings with it the risks of toxic effects that may occur in biological systems. Due to their low cost of production, lack of ethical issues, and ease of culture in lab settings, model insect species such as Galleria mellonella (Lepidoptera: Pyralidae) are used as an alternative experimental model to vertebrate experimental animals in many fields such as nanotoxicity, medicine, and pharmacy. In this study, 22 nm-sized hydrophilic amorphous SiO2 NPs concentrations (2, 10, 25, 40, and 60 µg/10 µl) were force-fed to the sixth instar of G. mellonella larvae. Control group (0) larvae were force-fed with only ten µl of distilled water. The effects of SiO2 NPs on the pupal and adult developmental times, pupal and adult weights, adult longevity, and lifespan (pupal developmental time + adult developmental time + adult longevity) of G. mellonella were determined. Results showed that treating G. mellonella with 2 and 25 µg/10 µl SiO2 NPs significantly decreased the means of the adult developmental time. Also, the life span of G. mellonella significantly shortened in larvae exposed to the same concentrations of SiO2 NPs (2 and 25 µg/10 µl) compared to the control. Finally, statistically, no significant change was observed in the other biological parameters of the larvae (pupal developmental time, pupal and adult weights, and adult longevity) that were exposed to SiO2 NPs when compared to the control group.

Keywords: Biology, Galleria Mellonella, Nanoparticle, Silicon Dioxide

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