

## Immune Response and Histological Alteration in the Crab *Carcinus aestuarii*, Due to Silver Nanoparticles

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**Abstract :** Silver nanoparticles (AgNPs), owing to their unique physical and chemical properties, have become one of the most widely used nanoparticles in consumer products. Despite the increased use of AgNPs in science and industry over the past twenty years, only relatively recently has concern been raised over their entering brackish and marine environments. However, data on their potential impact on marine organisms, especially invertebrates are very limited. This study aimed to examine the effects of 60 nm AgNPs (10, 100, 500 and 1000 µg/l) and silver ions (100, 1000 µg/l) on the Mediterranean green crab *Carcinus aestuarii* Nardo, 1847. The crab mortality was assessed during seven days of exposure. After the exposure, total haemocytes (THC) and differential haemocytes number (DHC) were counted (immune response), in addition to histological examination of gills stained with haematoxylin and eosin. The effect of AgNPs and silver ions resulted in a dose dependent mortality and destruction of gills epithelium with haemocytes infiltration in the gills lacuna. Total haemocyte count was greater with increasing concentration of AgNPs, at concentrations from 10 to 500 µg/l. Hyalinocytes were the most common immunological cells noted in the crab hemolymph, while granulocytes and semigranulocytes were suppressed with increasing concentration of AgNPs (500 and 1000 µg/l). Thus, as crabs are filter feeders, they are susceptible to uptake of AgNPs by direct accumulation in gills mucus or indirectly via circulation of haemocytes in their open vascular system. Results of this study on crabs add to knowledge of the effects of AgNPs in the marine environment.

**Keywords :** crab, immune response, histological alteration, silver nanoparticles

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