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Effect of Ammonia Stress on the Genomic DNA of *Macrobrachium nipponense* Collected from Al Qurna City, Iraq.

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ABSTRACT

Macrobrachium nipponense, decapod crustaceans belonging to Palaemonidae family, is an important nutritionally economically species. Ammonia is a major pollutant in the aquatic environment, and adversely affect the health of *M. nipponense* and other associated commercial species. Here, the animal of interest was exposed to acute toxicity levels of ammonia at 3, 3.5, 4, 4.5, 5, and 6mg/ L for a duration of 72 hours. DNA damage served as an indicator for ammonia toxicity in the current study. Fragmentation occurring in DNA of the animal as a result of ammonia toxicity was substantiated using the comet assay and expressed as a percentage of tail DNA. The results showed an increase in the DNA damage at ammonia concentrations of 4.5 and 5mg/ L for a duration of 72 hours, with the tail DNA percentage reaching 14 and 19%, respectively. While the highest DNA damage occurred at ammonia concentration of 6mg/ L for a duration of 72 hours, the tail DNA recorded 23%. These findings suggested that exposure to ammonia caused damage in the DNA of *M. nipponense* which reflects its effect on the physiological functions and threaten this economically important animal.

INTRODUCTION

The origin of *M. nipponense* (De Hann, 1849) is China, and it has been observed in Taiwan and Japan **(Cai & Ng, 2002)**, Ozbakstan **(Mirabdullaev & Niyazov, 2005)**, Singapore and the Philippines **(Cai & Shokita, 2006)**, as well as North Iran **(De Grave & Ghane, 2006)**. Its first recorded presence in Iraq was at Garmmat Ali River, near the Al-Hammar Marshes **(Salman *et al.*, 2006)**. This species is economically important and cultured worldwide **(Fu *et al.*, 2012)**. The animal is sensitive to ammonia, which is a major environmental pollutant. Increasing concentrations of ammonia may include toxic influences. For instance, elevated ammonia can cause susceptibility to pathogens, leading to inhibited growth, decreased osmoregulation, increased molting frequency, and mortality **(Jiang *et al.*, 2004)**. Rapid elevation or transient increases in ammonia levels cause toxic effects on shrimp **(Chen *et al.*, 1990)**. The detoxificantion of ammonia by molecular mechanisms is still unclear. Few studies have inestigated the molecular and