



**Cairo University**  
**Faculty of Veterinary Medicine**



# **Pathological and Immunohistochemical Studies on the Protective Effect of Spirulina Platensis Against Reproductive Arsenic Toxicity in Rats**

A thesis submitted by

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Supervision Sheet

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**Abstract**

Arsenic (As) is currently one of the most important environmental global contaminants and toxicants, particularly in the developing countries. The aim of this study was to investigate the effect of arsenic (As) on the male and female reproductive organs, liver, kidneys, lungs, heart and brain and to assess the effect of *Spirulina platensis* (Sp) as an ameliorating agent in the arsenic-induced toxicity and exploring its pathway in protection. 120 male and female albino rats were divided into four equal groups, 30 rats in each group (15 males and 15 females): Control group and three treatment groups that daily received As, Sp and Sp+As respectively, Ten rats (5 males and 5 females) from each group were euthanized monthly during the experimental period (3 months). Results showed that the body weight in male and female rats was significantly reduced in As-treated groups compared to the control one, while the co-treatment with Sp significantly recovered the body weight in comparison with As-treated

groups. Arsenic significantly increased serum aspartate aminotransferase (AST), alanine aminotransferase (ALT), creatinine, malondialdehyde (MDA) and significantly reduced serum glutathione (GSH) activities, testosterone and estradiol in comparison with the control groups. Sp co-treatment significantly recovered AST, ALT, GSH, testosterone and estradiol levels and significantly reduced MDA in comparison to As-treated groups. Histopathologically, testes, uterus, ovaries, liver, kidneys, lungs, heart and brain of As-treated groups showed various degenerative and inflammatory changes which were relieved with the Sp co-treatment. Immunohistochemistry revealed increased apoptosis and explore the role of Nrf2 in the arsenic-induced toxicity. In conclusion, As-induced toxicity in rats could be ameliorated by *Spirulina platensis* co-administration, this with the expression of nrf2 and pro-apoptotic caspase 3 which indicating that *Spirulina platensis* is combating the generated oxidative stress in As-induced toxicity in albino rats.

**Key words:** Arsenic, *Spirulina platensis*, Pathology, Immunohistochemistry, Rats.

# *Dedication*

*To souls of my father and mother,  
to my wife and my sons Maryam, Sama & Malek  
for their constant support and unconditional love.  
I love you all dearly.*



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