



**University of Zabol**  
**Graduate School**  
**Faculty of Veterinry**  
**Department of Basic Science**

**The Thesis Submitted for the Degree of M.Sc**  
**(In the field of Veterinary)**

**Title:**

**Effect of nanoemulsions of caffeine and scorpion venom on oxidative stress in brain  
tissue of rats**

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## **Abstract:**

Caffeine is a bitter substance in the form of white powder, which is taken from plants such as coffee and cocoa. Today, due to the many properties of caffeine such as its antioxidant properties, it has been studied and used in the production of some drugs. It is toxic in high doses and can compromise oxidative defense. Scorpion venom is a collection of peptides that is used for defense by scorpions. But today, the proteins in scorpion venom are important in pharmacy.

Nanotechnology is an emerging science that has many applications in various fields of medicine, pharmacy, nutrition, etc. In pharmacy, it increases the solubility and bioavailability of the drug in the body and increases the effectiveness of the drug. Due to the many applications of scorpion venom and caffeine, on the other hand because these substances also have toxic properties, this study was conducted to investigate the effect of using nanotechnology on the use of scorpion venom and caffeine in toxic doses. Because nanoparticles can reduce the toxicity of these substances by increasing their bioavailability and solubility. In this study, 30 rats were used and divided into five groups including: Group (1): Control, Group (2): Mesobutus Aureus scorpion venom recipient for 16 days 0/1mg/kg/day-IV, Group (3): Mesobutus Aureus scorpion venom Nano emulsion recipient for 16 days 0/1 mg/kg/day-IV. Group (4): received caffeine for 60 days (IO-50mg/kg/day), group (5): administered caffeine Nano emulsion for 60 days (IO-50mg /kg/day). At the end of the administration period, blood samples were taken and animals were euthanized, then tissue sampling was performed. The amount of Malondialdehyde, catalase and superoxide dismutase activity in brain tissue were measured. For histopathological examination, tissue samples were cross-sectioned and stained. The results showed that scorpion venom was toxic at low doses. caffeine at a dose of 50 mg/kg per day also had toxic effects during this period by reducing the amount of catalase and superoxide dismutase activity and increasing malondialdehyde. The use of Nanoparticles in these materials lowered toxicity of caffeine and scorpion venom and differences were significant in comparison to control groups ( $p < 0/05$ ). Also in the histopathological examination, the number of tissue lesions in the group of scorpion venom Nanoemulsions and caffeine Nano emulsions was significantly reduced compared to the scorpion venom and caffeine groups.

**Keywords:** Nanoemulsion-Caffeine-Scorpion venom-Oxidative stress-Brain-Rat