

## **Abstract:**

**Background:** Cadmium (Cd) is one of the causative agents of oxidative damage in the testicle. People in the community may be exposed to this metal through food, drinking water, inhalation of gases, particles in dust and smoke. Coenzyme Q10 has a nutritional value and various medicinal properties, and the antioxidant properties of Alfatocopherol have been proven.

**Objective:** The purpose of this study was to investigate the antioxidant effects of Coenzyme Q10 nanoemulsion and Alfatocopherol nanoemulsion on cadmium-induced oxidative damage on testis in rats and their effects on oxidative stress indices, changes Histopathology and morphology of testicular tissue, as well as examination of sperm parameters.

**Materials and Methods:** 36 male rats were randomly divided into six groups(1) control group(2) cadmium chloride (1mg / kg bw, IP), group (3) Coenzyme Q10 nanoemulsion (20mg / kg bw,IP) with cadmium (1mg / kg bw, IP), group(4) Alfatocopherol nanoemulsions (20 IU / kg bw, IP) with cadmium group(5) Coenzyme Q10 nanoemulsions and Alfatocopherol nanoemulsions with cadmium. All injections were performed within 16 days and with a time interval of 48 hours. Animals were sacrificed on the 17th day and sperm count, sperm viability, Weight of the testicles and epididymis, MDA levels, SOD and CAT enzymes in rats were measured. Then tissue sections of the testicles were prepared for histological studies and cell count.

**Results:** Coenzyme Q10 nanoemulsion and Alfatocopherol nanoemulsion were able to significantly improve the damaging effects of cadmium on reducing testicular weight, reducing epididymis weight, decreasing the number of sperms and reducing their survival percentage ( $P < 0.05$ ). Also due to antioxidant properties, it significantly decreased MDA and increased activity of SOD and CAT enzymes compared to cadmium group ( $P < 0.05$ ). In histological studies, Coenzyme Q10 nanoemulsion and Alfatocopherol nanoemulsion improved cadmium-induced damage, as well as the diameter of the seminal tubes and the number of spermatogonial cells, spermatocytes, adult and immature adult spermatids, and sertoli in comparison with the cadmium group in many cases Were significantly increased ( $P < 0.05$ ).

**Discussion:** Treatment with Co Q10 and Alfatocopherol reversed Cd-induced alterations of antioxidant defense system and significantly prevented Cd induced testes damage. These results suggest that both CoQ10 and Alfatocopherol function as a potent antioxidant in protection of rats testes against the oxidative stress induced by Cd.

**Keywords:** Coenzyme Q10, Alfatocopherol, nanoemulsion, Cadmium, Oxidative Stress, Spermatogenesis, Male Rat



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**Compare Effect of coenzyme nano-emulsions of Q10 and alpha  
tocopherol on oxidative damages induced by cadmium pollution in  
testicle of mature rats**

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