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Cocos nucifera L. oil alleviates lead acetate-induced reproductive toxicity in sexually-matured male Wistar rats

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Abstract

Objectives: Lead primarily affects male reproductive functions via hormonal imbalance and morphological damage to the testicular tissue with significant alteration in sperm profile and oxidative markers. Though, different studies have reported that *Cocos nucifera* L. oil has a wide range of biological effects, this study aimed at investigating the effect of *Cocos nucifera* L. oil on lead acetate-induced reproductive toxicity in male Wistar rats.

Methods: Twenty (20) sexually matured male Wistar rats (55–65 days) were randomly distributed into four groups (n=5). Group I (negative control)—distilled water orally for 56 days, Group II (positive control)—5 mg/kg bwt lead

acetate intraperitoneally (*i.p.*) for 14 days, Group III—6.7 mL/kg bwt *Cocos nucifera* L. oil orally for 56 days and Group IV—lead acetate intraperitoneally (*i.p.*) for 14 days and *Cocos nucifera* L. oil for orally for 56 days. Rats were sacrificed by diethyl ether, after which the serum, testis and epididymis were collected and used for semen analysis, biochemical and histological analysis.

Results: The lead acetate significantly increases ($p < 0.05$) testicular and epididymal malondialdehyde (MDA) levels, while a significant reduction ($p < 0.05$) in sperm parameters, organ weight, testosterone and luteinizing hormone was observed when compared with the negative control. The coadministration of *Cocos nucifera* oil with lead acetate significantly increases ($p < 0.05$) testosterone, luteinizing hormone, sperm parameters and organ weight, with a significant decrease ($p < 0.05$) in MDA levels compared with positive control. Histological analysis showed that lead acetate distorts testicular cytoarchitecture and germ cell integrity while this was normalized in the cotreated group.

Conclusions: *Cocos nucifera* oil attenuates the deleterious effects of lead acetate in male Wistar rats, which could be attributed to its polyphenol content and antioxidant properties.

Keywords: *Cocos nucifera* oil; lead acetate; reproductive system; Wistar rats.

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Introduction

There is a growing concern about the link between environmental exposure to heavy metals and the effects on the male reproductive system [1]. Individuals are exposed to toxic metals like lead, cadmium, and mercury through the intake of contaminated food and water [2]. Lead is a heavy metal increasingly present in our environment, especially in Nigeria, due to rapid industrialization and poor waste management system. Individuals working in and dealing with the motor vehicle assembly, panel beating, battery making, soldering, lead excavation and smelting, glass, plastics, printing, ceramics, and paint industries are on

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