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# The efficiency of *Zephranths candidia* in inhibited action of uranyl acetate toxicity on test of male rats

Amal K. Abbas

Department of Biology, College of science, Baghdad University, Baghdad, Iraq.
amalk.abbas50@yahoo.com

## Abstract

Thirty male mature sprage-Dawlley rats were divided into three equal group, control group administrated distilled water, treated group were administrated 75mg/kg/b.w of uranyl acetate and treated group administrated 75mg/kg/b.w of urany acetate with aquatic extract of *zephranthes candida* (5%). The rote of administration was oral intubation for every other day for 53 day. Animals were administrated 75mg/kg/b.w include: degeneration change were appeared as spermatogenic cells depilation and showed number of atrophied seminiferous tubules, necrosis compared with animal treated with *Z.C*. aquatic extract. Also recorded a significant decrease ($P<0.05$) in the number of spermatogonia and primary spermatocyte in two treated group, and it can be concluded that *zephranthes candida* aquatic extract contains material that ability to inhibit side effect of uranyl acetate. It is hoped that the plant will be studding the importance of addressing an alternative to chemical treatments.

Keywords: Uranly acetate, *Zephranthes candida*, Testis, Seminifers tubules.

## Introduction

Depleted uranium (DU) is a man-mad, radioactive heavy metal derived from uranium ore. It is chemically identical to natural and enriched uranium, although it is approximately 40% less radioactive than the naturally occurring metal(ECRR,2010). Uranyl acetate is one of the U salts, which is the most commonly associated with oxygen as the uranyl ion to form uranyl oxide ($UO_2$) (Lide,1992). The effects of exposure to uranium are not , of course, restricted to DU and passive weapons fallout. Uranium is increasingly contaminating the environment, near nuclear sites, near isotope separation plants, near fuel manufactories, near uranium mines and in atomic and thermonuclear weapons fission fallout, near and remote from the test sites. Uranium is increasing found in food and drinking water as it is significant component of agricultural fertilizer. It is therefore also found near fertilizer factories and phosphate mines and in the transportation of phosphate ore and its agricultural products (ATSDR,1990; CRAFT2004). Several previous investigation have been published concerning the effects of uranium salts on numerous organ such as bone, liver, lungs, kidney and blood (Whitnall *et al*, 2009; Alkaisy *at al.,* 2002; Alkasisy *et al*., 2005).

Several investigation have shown that uranium salts, such as uranyl nitrate and uranyl acetate, have the ability to induce several renal dysfunction and tubular necrosis (Domingo *et al.,* 2009*)*. In addition, several published results have U or DU causes decreased fertility, embryo/fetal toxicity including teratogenicity, and reduced growth of the offspring have been observed following uranium exposure at different gestation periods (Domingo *et al.,* 2009; Radulesen *et al.,*2009).

*Zephyranthes candida* (Lindl ) Herb (Family; Amaryllidaceae) is a perennial herb. The leaf is glossy deep green, liner and about 3mm wide. The flower is erect in perianth, the scape is slender and hollow and the flower is single born on top of scape. The bottom of the spathe-shaped involucrum is tubular. The capsule is nearly spherical and the seed is black and flat. The plant is widely cultured as an ornamental flower and used as a mainland china. The whole plants of *Z*. candida are used to treat infantile convulsions, epilepsy, and tetanus. .phytochemical studies on *Z. c.* have focused on the bulbs, leading to reports four ceramides and nine alkaloids (Chowdhury and Hubsten, 2006; Pettil, 1994). Luo *et al.* (2012) concluded that *Z.* extract contains materials which have cytotoxic activities against five human cancer cell lines and human bronchial epithelial cell line (Wu *et al.,* 2009) .

## Material and Methods

Thirty sexually mature laboratory males and Sprague-Dawley Albino rats of an average body weight of 230±3.565gm and 12-15 weeks old were obtained from animals house of the national center for censorship and curative researches in Baghdad. Animals divided into three equal groups, control group administrated distilled water, second group administrated 75mg/kg/b.w of uranyl acetate and third group administrated 75mg/kg/b.w with concentration 5% w/v of *Zephyranthes* aqueous extract the route of administration was oral intubation for every other day for 53 days.

Testes were taken for study of histopathological changes. the histological section were made according to Humson (1972), the organ was fixed by 10% formalin (10ml formalin + 90 ml 0.9% NaCl), then washed by tap water for several min. passing thought a serial concentration of alcohol (50%, 70%, 80%, 90% and 100%) for 2hrs. in each concentration, then cleared by xylol, saturated with paraffin at 60C$^{o}$ for 3hrs. embedded in pure paraffin; the blocks were cut into section with 5µm in thickness by using microtome. these section were held on glass slides using Myer's albumin; they were left for drying at 37C$^{o}$. Haematoxylin stain was used for 5-10min. washed by tap water then with acidic alcohol then washed by tap water. After that Eosin stain 15-30sec. and then washed by D.W. serial concentration of alcohol were then used (70%, 90% and 100%) for 2min. in each concentration, cleared by xylol for 10min; then Canada balsam was used, covered by cover slide and examined by light microscope.

## Results and Discussion

Several changes were observed in the testis of animals received UA and UA with *Z* compared with control animals .These changes include atrophied seminiferous tubules surrounded by normal ones presented even within the same microscopic field (figure1).

The degenerative changes in seminiferous tubules were varied from one damaged tubule to other, the degenerative changes were appeared as spermatogenic cell depletion, degenerate spermatocytes characterized (figures 2 and 3). Some degenerated tubules showing shrinkage, others were filled with necrotic cells (Figure 4), while the animals treated U.A with *Z. c.* observed some alteration as a compare with animals that treated UA alone, these alteration include blood congestion and giant cell were present of some degraded tubule (Figures 5 and 6).

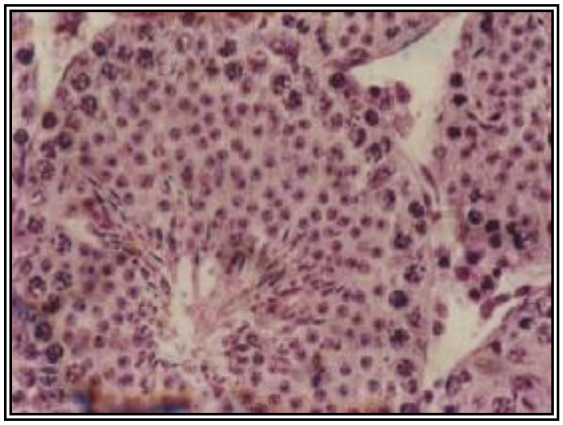

Figure (1): Section of rat testes(control group) showing various stages of maturation (H&E 400 X).

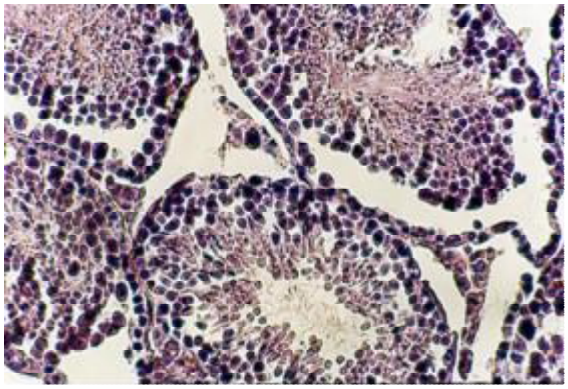

Figure (2): Section of rat testes treated with 75mg/kg uranyl acetate showing complete sloughing and atrophied seminiferous tubule and large interstitial space (H & E 200X).

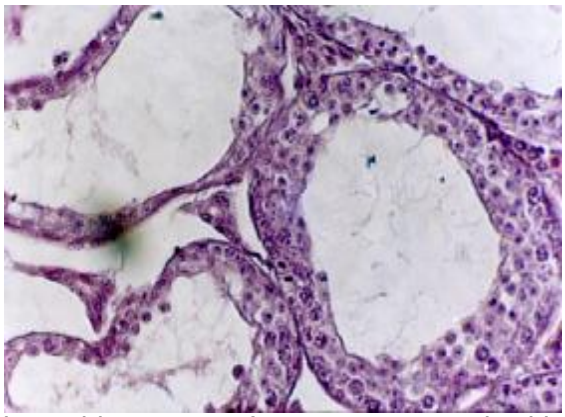

Figure (3): Section of rat testes treated with 75mg/kg uranyl acetate showing the degeneration of spermatocytes (H&E 200X).

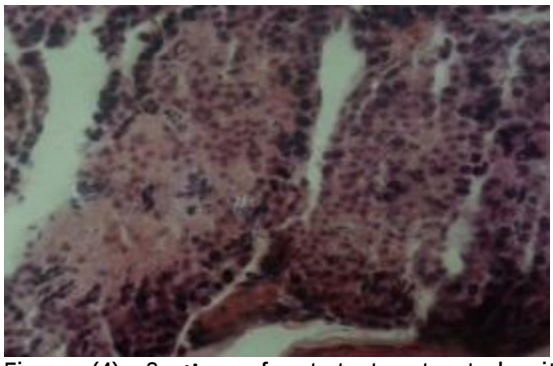

Figure (4): Section of rat testes treated with 75mg/kg uranyl acetate showing the degeneration & necrosis in seminefrace tubules (H&E 400X).

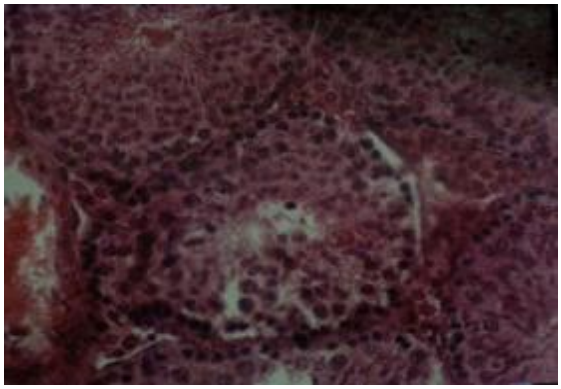

Figure (5): Section of rat testes treated with 75mg /kg uranyl acetate with *Z. c.* showing blood congestion & giant cell were present of some degraded tubule (H&E400X).

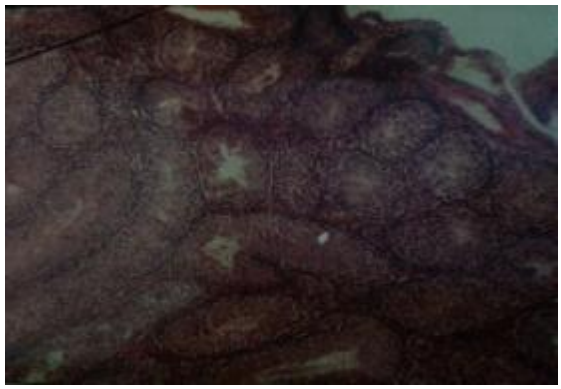

Figure (6): Section of rat testes treated with 75 mg / kg uranyl acetate with *Z. c.* showing normal structure in many tubules & blood congestion (H&E 100X).

The count of spermatogenic cell showed significant number of spermatogonia, primary spermatocyte and spermatids at P<0.05, while the decreasing in the number of sertoli cells was not significant in the two groups of experiment, as compare with the number of the same cell in control group (Table 1).

At the last years medical plants used for treatment many of diseases. Plants of family amaryllidaceae comprise ca. 85 genera and 1100 species that are distributed widely in tropical region of the world. More than 500 amaryllidaceaes alkaloid representing 18 skeletal types have been isolated and reported to have acetylcholinesterase (AChE) inhibitory, antibacterial, antifungal, antimalarial, antitumor, antiviral and cytotoxic activities (Chowdhury and Hubsten, 2006; Pettil, 1994).

Table (1): The number of spermatogenic cells and sertolic cells in the two administrated groups as compared with the control group.

| Number of cell | Control group | UA 75 mg/kg/b.w | UA 75 mg/kg/b.w+Z |
|---|---|---|---|
| No. of spermatogonia | 35 ± 0.23* | 29 ± 0.26* | 31 ± 0.34* |
| No. of primary spermatoids | 76 ± 0.56* | 66 ± 0.29* | 129 ± 0.50* |
| No. of spermatiods | 140±0.63* | 107 ± 0.38* | 129 ± 0.58* |
| No. of sertoli cell | 24 ± 0.28* | 22 ± 0.20* | 23 ± 0.22* |

No: 30, *Significant at P<0.05, Means ± SE

After administration of other chemical compound. Also this result are in agreement with (Rcharrd *et al*., 1997) who referred hat paractetamol many caused depletion and atrophy in several seminiferous tubules. The results are similar to other studies where uranium was administered orally or subcutaneously to mice. Effects such as, decreased number of fetuses embryo/fetal toxicity, increased rate of abortion (Paternain *et al.,* 1989). The histological section appear in the testicular while the histological section in the testicular tissue of the treated group with aquatic extract of *Z. c*. appeared to the normal structure in many tubules although of degenerative in some region maybe its cussed to the ability of saponin and tannins in habited the activity of uranyl acetate fast of the cellular reversible (Maasoura *et al.,* 1999).

The count of spermatogenetic cells showed significantly decreasing in number of round spermatid and primary spermatocyte in both experimental animals ,on the other hand the histological examination revealed that the degenerative changes were presented among all stage of spermatogenetic cell and these change were noticed as spermatogenetic cell depletion and sloughing of some degenerated spermatocytes.

These result arrangement with (Creasy, 2001) who said that different germ cell population of spermatogonia, spermatid were displayed their own sensitivity to different toxicants.

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