

## التأثير الوقائي لمستخلص اوراق نبات العرندس ضد سمية خلات الرصاص التي تحدث على اضطرابات هرمونية في اناث الارانب

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### الخلاصة

استخدمت الدراسة الحالية 16 انثى ارنب سليمة والتي وزعت عشوائيا إلى أربع مجاميع (كل مجموعة تتكون 4 اناث)، المجموعة الأولى مجموعة السيطرة والتي اعطيت الماء والغذاء فقط، المجموعة الثانية والتي جرعت خلات الرصاص لمدة شهر، المجموعة الثالثة والتي جرعت خلات الرصاص و 50غم من مستخلص اوراق نبات العرندس لمدة شهر، المجموعة الرابعة والتي جرعت خلات الرصاص و 100غم من مستخلص اوراق نبات العرندس لمدة شهر. الارانب التي جرعت خلات الرصاص اظهرت انخفاض مستويات هرمون الاستروجين، البروجيستيرون، الهرمون المحفز للجريبات (FSH) والهرمون اللوتيني (LH) والهرمون المحفز لدرقية (TSH) وهرموني T3 و T4 وارتفاع مستويات هرمون التستوستيرون، حيث اظهرت هذه المجموعة فروقات معنوية عالية ( $P < 0.05$ ) مقارنة مع مجموعة السيطرة. ولكن مستويات هرمون الاستروجين، البروجيستيرون، التستوستيرون، الهرمون المحفز للجريبات (FSH) والهرمون اللوتيني (LH) والهرمون المحفز لدرقية (TSH) وهرموني T3 و T4 قد كانت ضمن المستويات الطبيعية عند تجريب الارانب مستخلص اوراق نبات العرندس. يستنتج من هذه الدراسة أن مستخلص اوراق نبات العرندس له تأثير جيد في الوقاية من التأثيرات الضارة لخلات الرصاص على توازن الهرمونات في اناث الارانب.

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rats. They found after the treatment rats with lead the levels of FSH, LH, estrogen and progesterone showed significant decreased compare control group. While testosterone levels in female rats showed significant increased compare control group [15]. About the prolactin levels, Chandler et al. (1977) referred that the cadmium (heavy metals as lead) leads to decrease the levels of prolactin in rats [16], that is in agreement with results of present study. While, Sobhani et al (2012) referred that the cadmium leads to increase the levels of prolactin in rats. They suggest mechanism of cadmium toxicity on serum prolactin levels is not known [17]. El-Mehi, A. E. and Safaa A. A. (2012) referred that the pathogenesis of lead toxicity is multifactorial, as lead directly interrupts enzymeactivation, competitively inhibits trace mineral absorption, binds to sulfhydryl proteins (interrupting structural protein synthesis), alters calcium homeostasis, and decreases the level of available sulfhydryl antioxidant reserves in the body [18], as reported by Ercal et al., (2001) and Soltaninejad et al., (2003) suggested that lead-induced toxic effects may occur through free radical production and oxidative stress [19-20]. This point of view was supported by Abdollahi, (2001) who found that lead exposure causes the generation of reactive oxygen species and alteration of antioxidant defense systems in animals and occupationally exposed workers [21]. Also, Arrak, J. K. (2010) referred that lead acetate induces physiological and histological changes in the thyroid gland. Where, after administrated female rats with lead acetate, T4 and T3 levels showed significant de-

creased with control group [9]

The results of study showed the levels of estrogen, progesterone, LH, FSH, TSH, T3, T4 and testosterone still normal when the groups of rabbits administrated with lead acetate and *Eclipta alba* leaf extract together. The antioxidant effects of *Eclipta spp* was reported when 50mg/kg and 100mg/kg dose were fed orally into rats [22-23]. Its phytochemical constituents are: wedelolactone, 25-hydroxyverazine, demethyl-wedelolactone, stigmasterol, luteolin, terthienymethanol, desmethyl-wedelolactone-7-glucoside, apigenin and its glucoside, wedelic acid, ecliptine, nicotine, and an unnamed alkaloid [24]. In study of Nair et al (2012) referred that the extract of the leaves of *Eclipta alba* has protective effect in male reproductive. They administrated male rats with boric acid and then the levels of estrogen, FSH, LH and testosterone showed significant decreased compare with control group, but when they used leaves extract the levels of *Eclipta alba* hormones back to the normal ranges [25], that is in agreement with results of present study. *Eclipta alba* extract lead to protect the levels of prolactin, TSH, T4 and T3 that may back to the contents of plant especially steroids, triterpenes and flavanoids. Coumestans are known to possess estrogenic activity [26]. So, It was concluded that the *Eclipta alba* leaf extract may have a protective effect against the toxicity of lead acetate

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### TSH, T3 and T4

The level of TSH, T3 and T4 showed significant decreased ( $P < 0.05$ ) in group of lead acetate compared with control group. As shown in table (2). The significant decreased in the levels of hormones still in the group that administrated lead acetate and 50mg leaf extract compared with control group. The group that administrated lead acetate and 100mg leaf extract showed non-significant changes in the levels of hormones compared with control group.

Table (3): The levels of TSH, T3 and T4 in serum

Parameters Groups	(TSH (uu/l	(T3 (ng/ml	(T4 (ug/dl
(Control (4 rabbits	a $0.12 \pm 0.92$	a $0.18 \pm 1.97$	a $0.25 \pm 4.88$
(Lead acetate (4 rabbits	c $0.07 \pm 0.35$	b $0.24 \pm 1.17$	b $0.64 \pm 3.15$
(Lead acetate + 50mg extract) 4 rabbits	b $0.05 \pm 0.6$	ab $0.07 \pm 1.45$	ab $0.21 \pm 4.05$
(Lead acetate + 100mg extract) 4 rabbits	a $0.08 \pm 0.86$	a $0.11 \pm 1.82$	a $0.05 \pm 4.87$

### Discussion

Lead was used to induce an abortion, and effect of lead has been shown to result in infertility and miscarriage; women who live in lead-polluted areas have also shown a greater risk of miscarriages [12]. The results of this study showed that female rabbits administrated with lead acetate show decreased the levels of estrogen, progesterone, LH, FSH, TSH, T3, T4 and increased in the level of testosterone. Hormones levels showed high significant changes ( $P < 0.05$ ) compared with control group. In study of Hammed et al (2012) referred that the lead acetate lead to disorders in the balance of sexual hormones. Where, the administrated female rate with lead

acetate and after the period of experiment, they found that the lead acetate causes decreased in FSH and LH levels in the female rats. They suggest lead acetate causes reduction in ovarian function and fertility of female rats [13], that is in agreement with results of present study. Also, Sharma et al (2016) demonstrate that the lead acetate induces histological and hormonal changes in female rats. They found chronic lead exposure lead to decrease in the level of  $17\beta$ - estradiol and FSH while LH and progesterone levels showed no significant alteration in the blood of female [rats compare with control group] [14

Dumitrescu et al (2014) referred that the toxicity of lead acetate induces infertility in female

4. **D:** received lead acetate and 100mg root extract (orally) for month, and then killed all.

### Prepare of blood solution

Five ml of blood collected by cardiac puncture under anesthesia and put in test tubs. Then, the tubes (after clotting) were centerfigation 5000 cycle/min for 10 min to obtain sera. The sera were taken and 1 ml distal water added for it. Estrogen and progesterone measured by Enzyme Linked Immuno Sorbent (ELISA) method [10]. Testosterone, FSH, LH, prolactin, TSH, T3 and .[T4 measured by ELIZA kit [11

### Statistical analysis

Data were analyzed using a statistical Minitab program. A statistical difference between the means of the various groups was analyzed using .(one way analysis of variance (ANOVA

## Results

### Estrogen, progesterone and testosterone

The level of estrogen, progesterone and testosterone showed significant changes ( $P < 0.05$ ) in

group of lead acetate compared with control group. As shown in table (2), significant decreased in the levels of estrogen, progesterone and increased in the levels of testosterone compared with control group. The significant decreased in the levels of hormones still in the group that administrated lead acetate and 50mg leaf extract compared with control group. The group that administrated lead acetate and 100mg leaf extract showed non-significant changes in the levels of hormones compared .with control group

### FSH, LH and prolactin

The level of FSH, LH and prolactin showed significant decreased ( $P < 0.05$ ) in group of lead acetate compared with control group. As shown in table (2). The significant decreased in the levels of hormones still in the group that administrated lead acetate and 50mg leaf extract compared with control group. The group that administrated lead acetate and 100mg leaf extract showed non-significant changes in the levels of .hormones compared with control group

Table (2): The levels of FSH, LH and prolactin in serum

Parameters Groups	(FSH (IU /L	(LH (IU /L	(Prol (ng /dl
(Control (4 rabbits	a 0.15 ± 5.68	a 0.35 ± 3.45	a 0.35 ± 5.95
(Lead acetate (4 rabbits	c 0.5 ± 2.85	c 0.21 ± 1.95	c 0.21 ± 3.35
(Lead acetate + 50mg extract) 4 rabbits	b 0.28 ± 4.1	b 0.18 ± 2.52	b 0.35 ± 4.85
(Lead acetate + 100mg extract) 4 rabbits	a 0.46 ± 5.58	a 0.15 ± 3.6	a 0.3 ± 5.68

## Introduction

*Eclipta alba* (family: Asteraceae) is a perennial shrub which grows in moist tropical countries. Different uses have been reported for this shrub [1]. *Eclipta alba* means white which refers to the color of the flowers. *Eclipta alba* (L.) has been used in various parts of tropical and sub-tropical regions like south America, Asia, Africa [2]. *Eclipta alba* is rich in wadeolactone, furanocoumarins,  $\beta$ -amyryn, stigmasterol, desmethylwedelolactone and luteolin-7-glucoside [2-3]. Previous studies on this plant proved its usefulness in modification of immune function, cytological responses, serine proteinase inhibition, lipid lowering and liver function [4]. Also, *Eclipta alba* has other medical uses including; anthelmintic, antipyretic, anti-inflammatory, antihistaminic, hepatoprotective, anaemia, catarrhal jaundice, hyperacidity, gastritis and dysentery [5-6].

Lead is mineral which has been associated with human activities from the past 6000 years. Lead is known to adversely affect the various mammalian systems. Effect in women induces infertility, miscarriage, pregnancy hypertension, premature membrane rupture [7]. So, the aim of this study is to show the effect of Alcohol on the some hormones in rabbits female and the role of *Eclipta alba* extract in the treatment

## Materials & methods

### Animal model

Sixteen adult female rabbits (New Zealand), (wt 1-1.5 kg & age 8-12 mon) obtained from the

state company for drugs industry and medical appliances Samarra-Iraq (SDI). rabbits were kept on standard pellet diet and water for two weeks to be sure all animals without any diseases

### Preparation of aqueous plant extracts

The plant was collected locally from different places in Kirkuk city. After drying, the powdered leaf (500 g) of *Eclipta alba* was extracted using distilled water. The extract was filtered through a cotton plug and then concentrated by using a rotary evaporator at low temperature (40- 50°C). The extract was preserved in airtight containers and kept at 4°C until further use [8].

### Chemicals

Lead acetate powder was obtained from the Dept. of biology at Kirkuk University. The water solution was prepared as 1ml of solution contains 1mg of lead acetate (1gm/L) and each animal of treated groups received 1ml/kg of body weight [9].

### Experimental design

Sixteen female rabbits were used in this study and divided for four groups (each group consist of four female rabbits) as follow

1. **A:** control group received only normal saline for month, then killed all.
2. **B:** received lead acetate (orally) for month, and then killed.
3. **C:** received lead acetate and 50mg leaf extract (orally) for month, and then killed all.

## The protective effect of *Eclipta alba* leaf extract against the toxicity of lead acetate that induces hormonal disorders in female rabbits

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### Abstract

The present study was deigned to show the protective effect of *Eclipta alba* leaf extract against the toxicity of lead acetate. So, the study was used 16 female rabbits (New Zealand) that divide randomly to four groups (each group consist 4 rabbits), the first group was control group administrated only normal diet and water, the second group administrated with lead acetate for month, the third group administrated with lead acetate and 50mg leaf extract for month, the fourth administrated with lead acetate and 100mg leaf extract for month. The female rabbits that administrated with lead acetate show significant decreased ( $P < 0.05$ ) in the levels of estrogen, progesterone, LH (Luteinizing hormone), FSH (Follicle stimulating hormone), TSH (Thyroid stimulating hormone), T3 (Triiodothyronine), T4 (Thyroxin) and increased in the level of testosterone compared with control group. The levels of estrogen, progesterone, LH, FSH, TSH, T3, T4 and testosterone still normal when the groups administrated with lead acetate and *Eclipta alba* leaf extract together. The results suggested that the *Eclipta alba* leaf extract may have a protective effect against the toxicity of lead acetate.

Keywords: *Eclipta alba*; lead acetate; estrogen; progesterone; testosterone

