Effect of Garlic and Celery Extracts on Lead Toxicity in Male Mice

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Abstract

The present study aimed to use some plants extracts, such as celery and garlic in reducing the toxicity of dosed lead in white mice. The study included several experiments: the first included the progressive concentrations of lead in addition to control group (distilled water). The second and the third group were given only three progressive concentrations of plants, in addition to the control group which included a concentration of 6 mg/kg lead nitrate with DW. The results of statistical analysis at the p-value <0.05 showed a strong effect of the extracts used to reduce the toxicity of lead in male mice. Hence we can use the plants in the current study to improve the fertility of living organism, including humans because of their antioxidants.

Keywords: *Lead, garlic, celery, male mice, sperm parameters.*

Introduction

In spite of the fact that the general commitment of natural exposures to fruitlessness is obscure, the accessible writing proposes that introduction to different ecological elements, both in utero and neonatally, could drastically influence grown-up fertility[1]. Investigations of different contaminant-uncovered untamed life populaces propose that numerous instruments add to changes in gonadal advancement, development of germ cells, preparation and pregnancy, specifically, the endocrine procedures supporting these occasions. Significant levels of fatherly lead presentation seem to lessen fruitfulness and to expand the dangers of unconstrained premature birth and diminished fetal development (preterm conveyance, low birth weight)[2]. Lead may influence pituitary film capacity and cause adjustments in receptor official and secretory system (s) of pituitary hormones. This might be a significant factor in the pathogenesis of infertility[3]. Celery extraction has a defensive job in the testicles and intensifies the sperm parameters. This report is conflicting with the creator's report, on the grounds that Kerishchi et al. revealed that celery at certain portions has impact on sperm parameters and pituitary-gonadal axis[4]. In this regard, an exceptional consideration was paid to garlic extraction. This plant is utilized for quite a while both in cooking and as a restorative plant[5]. Broad contemplates have been completed on garlic (Allium sativum L.) have revealed the nearness of two primary classes of cancer prevention agent segments, specifically flavonoids and sulfur-containing mixes (diallyl sulfide, trisulfide and allylcysteine). These are probably going to assume a significant job in the broadly exhibited organic impacts of garlic, which incorporate antitumor, hypolipidemic, antiatherosclerotic and cancer prevention agent[6].

Materials and Method

Plant Material Collection: The leaves of celery and garlic plant were collected during April 2018, from Al-dewaniyah city from park. Plant has been diagnosed in the herbarium Faculty of Sciences/University of Babylon by the professor Dr. abdalkarim Khudair Albiermana.

Preparation of Aqueous Garlic Extract: Thirty gm of garlic added to 100 ml refined water were squashed and squeeze was acquired utilizing an organic product juice extricating machine. The resultant homogenized blend was sifted multiple times through a cheddar fabric. At that point, centrifuged at 200 g for 10 min, the reasonable supernatant was immediately gathered and kept in bottles until used[7].

Preparation of hydro-alcoholic extraction of celery: The leaves were then dried in the shade and processed; before long. Powders were put away in a

fridge until extraction. So as to get ready 50 g of hydro-alcoholic concentrate, the orally administrable celery were broken down in 200 ml of 70% ethanol and the arrangement was kept at room temperature for three days. During these three days the arrangement was mixed a few times to isolate the concentrate, and following 72 hours, the blend separated with a channel paper. The concentrate arrangement was spread on a glass surface at room temperature to dissipate the dissolvable. The dried concentrate powder was acquired by scratching them from the glass surface, and afterward put away at 4°C until the utilization. fixations were set up from the powder of celery leaf extricate, utilizing refined water as a solvent[7].

Animals and Housing: Forty five develop male mice (*Mus musculus*) matured 12-18 weeks were utilized in the present study. Male mice were permitted to adjust to the creature house condition before start of the test. Creatures were housed in polypropylene confines inside a well-ventilated room. Each enclosure comprise of five mice. they were benefited from the standard chow and drinking water not obligatory all through the analysis. Room temperature was kept up at 23±2ºC, and the light-dim cycle was on a 12h light/dim cycle with light on at 06:00 a.m. what's more, off at 06:00 p.m. during the trial time frames.

Experimental Design:

Lead groups:

- Group 1: The animals were givenDW as a control group for 30 days
- Group 2: The animals were given lead 2 mg/kg as single oral dose for 30 days.
- Group 3: The animals were given lead 4 mg/kg as single oral dose for 30 days.
- Group 4: The animals were given lead 6 mg/kg as single oral dose for 30 days.

After the statistical analysis we found the concentration of lead 6 mg/kg B.W its effect more than another concentration.

Celery Extraction Group s:

- Group 1: The animals were given 6 mg/kg of lead with DW for 30 days (control group).
- Group 2: The animals were given lead 6 mg/kg and 1000 mg/kg celery extraction as single oral dose for 30 days.
- Group 3: The animals were given lead 6 mg/kg and 2000 mg/kg celery extraction as single oral dose for 30 days.
- Group 4: The animals were given lead 6 mg/kg and 3000 mg/kg celery extraction as single oral dose for 30 days.

Garlic Extraction Group s:

- Group 1: The animals were given 6 mg/kg of lead with DW for 30 days (control group).
- Group 2: The animals were given lead 6 mg/kg and 60 mg/kg garlic extraction as single oral dose for 30 days.
- Group 3: The animals were given lead 6 mg/kg and 120 mg/kg garlic extraction as single oral dose for 30 days.
- Group 4: The animals were given lead 6 mg/kg and 180 mg/kg garlic extraction as single oral dose for 30 days.

Sperm Determination: The level of motile spermatozoa was evaluated by light microscopy at an amplification of 40× . At any rate 200 spermatozoa were evaluated per suspension bead. A drop of the sperm suspension was put on a glass slide and a smear was readied. The smear was fixed in ethanol for 1h, recolored with Giemsa recolor for 15–20min, washed, dried, and inspected with a light magnifying instrument at 100×magnification. In any event 500 spermatozoa were checked and the percent-period of irregular sperm decided. Morphologic variations from the norm of spermatozoa incorporate augmented, undersized, disfigured, or twofold heads, and curled, short, or twofold tails.

Statistical Analysis: Analysis of variance (ANOVA) was performed on all the data obtainedin this study and Least Significant Differences (LSD) and Mean±SD ($P<0.05$) by using the SPSS program 2010.

Results

Lead Groups: The present study showed that there is effect of lead at different doses on sperm parameters by decreasing of [sperm (x 10^6/ml), count motility (%), viability (%), abnormal head morphology (%) and abnormal tail morphology (%)] in male mice compared with control group. The highest significant toxicity of lead was in 6mg/kgfollowed by 4mg/kgand then least affected was 2mg/kgcompared with the control group (table 1).

Table 1: Effect of lead on spermparameters of males mice.

Parameters	Lead concentration (mg/kg)				LSD
	Control (D.W)	2	4	6	
Sperm (x 10^6/ml)	14.974±0.02a	11.276±0.02b	9.738±0.03c	7.416±0.06d	0.125
Count motility (%)	57.964±0.04a	43.588±0.2b	35.452±0.2c	30.982±0.19d	0.321
Viability (%)	82.558±0.2a	70.144±0.04b	64.97±0.1c	51.4±0.19d	0.214
Abnormal head morphology (%)	6.76±0.05d	8.792±0.03c	9.344±0.009b	11.432±0.05a	0.251
Abnormal tail morphology (%)	1.328±0.008d	1.632±0.01c	1.948±0.01b	2.358±0.01a	0.321

The different letters denote to significant at P<0.05

Plant Groups: The results of the current study showed that there is a direct effect of extracted plant celery on sperm [sperm (x10^6/ml), count motility (%), viability (%), abnormal head morphology (%) and abnormal tail morphology (%)]of male mice and in different doses given to animals compared with control group. The highest significant effect of celery plant extraction was in 3000 followed by 2000 and then least affected was 1000 compared with the control group(table 2).Also the present study showed that there is a direct effect of extracted plant garlic was significant differences on sperm (sperm (x 10^6/ml), count motility (%), viability (%), abnormal head morphology (%) and abnormal tail morphology (%)in male mice and at different doses given to animals compared with control group. The highest significant effect of garlic plant extraction was in 180 mg/kg followed by120 mg/kg and then least affected was 80mg/kg compared with the control group(table 3).

Table 2: Effect of celery on spermparameters of males mice.

Parameters	Celery concentration (mg/kg)				LSD
	Control (6 mg/kg lead)	1000	2000	3000	
Sperm (x 10^6/ml)	14.89±0.05d	16.306±0.01c	17.804±0.02b	18.516±0.1a	0.012
Count motility (%)	57.916±0.07d	61.784±0.06c	65.79±0.04b	70.94±0.2a	0.123
Viability (%)	82.566±0.1d	81.944±0.03c	84.956±0.2b	86.06±0.05a	0.21
Abnormal head morphology (%)	6.76±0.05a	5.804±0.02b	4.336±0.1c	3.474±0.04d	0.05
Abnormal tail morphology (%)	1.322±0.005a	1.12±0.04b	0.936±0.05c	0.74±0.008d	0.014

The different letters denote to significant at P<0.05

Table 3: Effect of garlicon spermparameters of males mice.

Parameters	Garlic concentration(mg/kg)				LSD
	Control (6 mg/kg lead)	80	120	180	
Sperm (x 10^6/ml)	14.93± 0.04d	15.284±0.02c	16.816±0.1b	17.61±0.03a	0.025
Count motility (%)	57.892±0.05d	64.098±0.06b	60.226±0.2c	62.958±0.1a	0.03
Viability (%)	82.686±0.05b	81.686±0.2c	82.042±0.1b	83.148±0.02a	0.014
Abnormal head morphology (%)	6.764±0.10a	5.912±0.02b	4.922±0.05c	3.944±0.005d	0.024
Abnormal tail morphology (%)	1.33±0.01a	1.202±0.03b	0.97±0.001c	0.834± .005d	0.025

The different letters denote to significant at P<0.05

Discussion

Throughout the years, a few examinations have explored the impacts of lead introduction on different parts of wellbeing, specifically the conceptive system[8]. Frequently the outcomes from these investigations are clashing and opposing, due, partially, to the utilization of various types of creature models[9,10]. Our examination inspected the impacts of lead on various parts of the male conceptive framework in explicitly develop. Adding to the perplexity of the information is the finding that the seriousness of lead harmfulness has all the earmarks of being subject to the length of introduction

and the portion regulated. The information from our examination exhibit that the harmful impacts of lead are coordinated essentially on sperm inside the epididymis of the grown-up male mouse in a portion subordinate way. Organization of lead caused as light diminishing in the quantity of sperm inside the epididymis at low portion gathering and a critical decline in the quantity of sperm at high portion gathering.Different examines have additionally detailed a huge decline in sperm number inside the epididymis following introduction to lead utilizing distinctive creature models[11,12,13]. The present investigation recommended that celery remove rolls out huge improvements in the trial bunches when contrasted and control gathering, with the goal that oral organization of 2, 4 and 6mg/kg of concentrate to male mice for 30 days. this concentrate might be successful by influencing the pituitary organ and expanding the sex hormones. Besides, given that the procedure of spermatogenesis and the capacity of regenerative organs are identified with sex hormone emission, the absorptive and secretory elements of the testicles and epididymis could be enhanced[14,15]. This may clarify the expanded number of spermatozoids in the cauda epididymis and the expansion in epididymal weight at a high portion of the concentrate, notwithstanding increments in estimate and number of cells in the testicles.

Since the sperm check is impacted by any adjustment in the absorptive and secretory elements of the testis and epididymis, the expansion in this record is viewed as normal. In an investigation by[16] hydroalchoholic concentrate of celery leaves, it was indicated that infusion of celery concentrate can lessen male regenerative hormones in mice. The present investigation was directed of the impacts of garlic on fruitfulness. When all is said in done, numerous examinations were audited. Thirteen examines were led on the impact of garlic on ripeness treatment. Because of the absence of reactions, just as containing flavonoids, nutrients, fructose and sulfur mixes, garlic can help with killing free radicals[13]. Sulfur mixes in garlic, with an immediate impact on the digestion of cytochrome P450 and glutathione-s-transferase, protectively affect spermatogenesis.Notwithstanding sulfur mixes, garlic has cancer prevention agent properties and can build richness by diminishing lipid peroxidation[17]. Given the previously mentioned components, garlic is suggested for the treatment of fruitlessness. In an investigation by Asadpour *et al*[18]it was demonstrated that garlic has cancer prevention agent movement because of quality of nutrient E, which averts oxygen peroxide. Additionally, the consequences of concentrate by Nasr indicated that garlic cancer prevention agent properties can lessen the lethality of unsafe medications on the testicles and increment the spermatogenesis and richness in men [19].

Hammami and Abdelmalik[20] reasoned that garlic contains phytoestrogens, which directly affect estrogen. It is an antecedent to testosterone creation, so it is conceivable that garlic animates the sexual cells and sex hormones[20,21].The outcomes in the examination by Oi et al showed that garlic supplementation helps luteinizing hormone (LH) from the pituitary organ, and this invigorates testosterone discharge from the balls [21]. In any case, it was prescribed that the cooked garlic has better remedial impacts and, while influencing the multiplication of the sexual cells in testicles and epididymis, improves spermatogenesis.

Conclusion

Finally, we recommend from the present study that lead has a poisonous and lethal effect on animals and that the extracted plants are very important in terms of eliminating the toxicity of lead by acting as antioxidants, therefore we recommend to expand the following studies on these plants.

Conflict of Interest: The authors declares no conflict of interest.

Ethical Clearance: The protocol of this study was approved by the scientific committee the Department of Environmental Pollution Ethics at Al-Qasim Green University/College of Environmental Sciences.

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