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Protective effects of molokhia leaves against lead toxicity in rat

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LIST OF ABBREVIATIONS

AAS	atomic absorption spectrometry
AECO	aqueous extract of *C.olitorius* leaves
A.O.A.C	Association of Official Analytical Chemists
ALT	Alanine amino transferase
AST	Aspartate amino transferase
ASV	anodic stripping voltam-metry
BPb	Blood Pb
BWG	body weight gian
CN	control negative
CP	control positive
CVD	Cardiovascular disease
FER	Feed efficiency ratio
FI	Feed intake
FMRI	Functional Magnetic Resonance Imaging
GAE	gallic acid as an equivalent
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
GFR	glomerular filtration rate
GOT	Glutamyl oxaloacetic transaminase
GPT	Glutamic pyruvic transaminase
HGB	hemoglobin
HPLC	High performance liquid chromatography
ICP-MS	Inductively coupled plasma mass spectrometry
LDL	Low density lipoprotein cholesterol
MECO	Methanol extract of the leafy vegetable,

	Corchorus olitorius
Mg / dl	Milligram per deseliter
MSF	Medecins Sans Frontieres
PPM	parts per million
SD	standred diet
SPSS	Statistical package for the social science
TPC	total polyphenol content
UV	Ultraviolet

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ABSTRACT

Lead (Pb) is considered to be a multi-target toxicant and is a toxic metal that is widespread in the environment from natural and anthropogenic sources, the present study has been undertaken to determine the effect of *C.olitorius* leaves on lead toxicity in (Pb-acetate) in rats at concentrations (5%,10%,15% and 20%). first main group (7 rats) were fed on standard diet (SD) (negative control). Second main group (35rats) fed on basal diets plus 5% Lead powder to infect rats lead toxicity and then divided to 5 subgroup (n= 7), for each subgroup (1): fed on (SD) + 5% Pb-acetate (positive control). (2): fed on (SD) + 5% Pb-acetate + 5% powdered leaves of *C.olitorius*. (3): fed on (SD) + 5% Pb-acetate + 10% powdered leaves of *C.olitorius.* (4): fed on (SD) + 5% Pb-acetate + 15% powdered leaves of *Corchorus olitorius.* (5): fed on (SD) + 5% Pb-acetate + 20% powdered leaves of *C.olitorius*. The results were statistically analyzed, the results showed asignificant reduction in serum blood, liver functions. Moreover, decreased uric acid, urea nitrogen and creatinine as compared to control. The results showed that the better result to concentrate (20%), (15%), (10%) then (5%) respectively from leaves of *C.olitorius.* The leaves of *C.olitorius* are rich in antioxidants, and they might be responsible for the treatment of lead-induced toxicities.

Keywords: leaves of *Corchorus olitorius*, Lead toxicity, antioxidants, liver functions.

1-Introduction

Lead is a heavy metal, used in industries for manufacturing paints. Ingestion and inhalation are the main routes of absorption. When absorbed, around 99% of lead is retained in the blood for nearly 30-35 days and is subsequently disseminated and accumulated in other tissues such as liver, renal cortex, aorta, brain, lungs، spleen and bones. Lead poisoning can present with nonspecific signs and symptoms such as abdominal pain, constipation, irritability and anaemia **(Akshatha *et al.*, 2014).**

Lead can still be found in paint used in older homes, polluted soil, household dust, drinking water pumped through leaded pipes, lead crystal, airplane fuel, and some toys.. Until 1978, lead paint was commonly used on the interior and exterior of homes and including gasoline and this exposure to lead greately affects human health **(Cao *et al.*, 2015).**

Children are vulnerable to the neurotoxic effects of lead, and even low levels of exposure can cause serious neurological damage. Lead exposure is estimated to

account for 0.6% of the global burden of disease, with the highest burden in developing areas**(WHO, 2010).**

Considering lead toxicity as one of the serious problems worldwide, its specific and safe treatment still remained unknown. Various medicinal plants with high antioxidant properties have created increased interest for their therapeutic potential in reducing free radical-induced tissue injury. In recent years, attention is focused worldwide on the potentiality of dietary antioxidants in reducing free radical-induced cellular impairment during stress. Many plant products exert their protective effects against oxidative stress-mediated diseases by getting rid of free radicals **(Sheikh *et al.*, 2014).**

Molokhia (*Corchorus olitorius)*, generally known as "Jute," is a member of Tiliaceae family and is a widespread vegetable found in Egypt, Sudan, Malaysia, Philippines, tropical Africa and South America **(Oyedeji & Bolarinwa , 2013).** The leaves of which are rich in antioxidants, such as vitamin C, vitamin E, β-carotene, α-tocopherol, glutathione and phenols . The leaves also contain fatty acids, minerals, other vitamins and polysaccharides **(Yokoyama *et al.*, 2014).**

Leaves from different Jute species have been used in folklore medicine for treatment diabetes mellitus and hypertension. As reported for *Corchorus olitorius*, the mechanism could be due to α-amylase and α-glucosidase inhibitory effect of some phenolic compounds such as caffeic acid **(Ademiluyi *et al.* , 2014).**

Jute has been used in medicine against different ailments including pains, fever, dysentery, gastroenteritis, diabetes and tumors. Earlier studies revealed that *C. Olitorius* leaves possess significant protective role against arsenic induced augmented oxidative stress in different tissues **(Dewanjee *et al.* , 2013).** Therefore, the present study has been undertaken to determine the effect of *C. olitorius* leaves on lead toxicity in (Pb-acetate) in rat.