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Abstract:

The plant of *Moringa oleifera* has been taken part in many therapeutic functions. The helpful oil from *Moringa* seeds has its profitable sides to the people who have this tree in their neighborhoods.

To evaluate whether addition of 10, 20 and 30% *M. oleifera* oil has defensive potential against Potassium bromate, which was generated from nephrotoxicity in rats.

Male Wistar rats were nominated and devided into five groups. Each group consists of five rats. Those rats were injected a single intra-peritoneal of potassium bromate at a dose level 125 *mg /kg* body weight. That lasted on either normal diet or diets enriched with *Moringa oleifera* oil at many levels of concentrations for 6 weeks. At the last, after (45 days), the rats were given up to get blood samples for biochemical analyses.

$KBrO_3$ showed losing weight in rats, caused powerful rising in the levels of plasma, liver enzymes, creatinine, and uric acid and increased the oxidative stress on rats. In contrast, plasma liver enzymes, creatinine, uric acid levels ameliorated by the addition of *M. oleifera* oil to diets. Morever, *M. oleifera* oil especially at level 20% to diets was a reason in great increase ($p<0.5$) in SOD, GPX and GST, while caused serious decrease ($p<0.5$) in MDA levels.

It was recongnized that addition of *M. oleifera* oil at level 20% to diet supported powerful defense against $KBrO_3$-generated nephrotoxicity.

Introduction:

Kidneys are ones of the most important organs in your body. The main task of your kidney is to balance your body´s chemicals. For sorry alot of environmental xenobiotics and drugs have their effects on these tasks **(Fatima *et al*., 2004)**. The gap in the level of prooxidant-/antioxidant equilibrium defines Oxidative stress. That gap has tendency towards the prooxidants. That may cause DNA sugar serious illness, lamina lipid peroxidation and mutagenesis **(Sun, 1990; International Agency for Research on Cancer, 1999).**

Such as USA, some countries use Potassium bromate as a food preservative in flour maturation in the bread-making process and as a dough improver. In addition that we can use Potassium bromate in cosmetics and food products and also in water depuration (**Kurokawa *et al*., 1982**). Potassium ($KBrO_3$) is a bromate of potassium and its form like white crystals or powder. Potassium bromate is a renal oxidant and a sponser of carcinogenesis in both female and male gendre of rats in large quantity (**Kurokawa *et al*., 1990; Umemura *et al*., 1995).** Potassium bromate generates oxidative stress. It leads to carcinogenesis whether it is alone or perform as tumor supporter in carcinogen-initiated animals. Reinforcement in cellular proliferation in kidney is one of consequences $KBrO_3$-mediated oxidative stress. After long-term of displaying compound Renal cell tumours were revealed in both male and female rats (**Umemura *et al*., 1995**).

Rising 8-hydroxydeoxyguanosine up is a sign of oxidative DNA ruining and lipid peroxidation in male rats` kidneys drafting by $KBrO_3$ (**Ballmaier *et al*., 1995**). Lately, renal oxidative stress in Wistar rats have been shown that it was originated by $KBrO_3$ promotes N-diethylnitrosamine (**Khan *et al*., 2001**).

Detoxificants, anti-carcinogens and antiinitiators are performed in Plants, fruits, common beverages and herbal constituents (**Alam *et al*., 2000**). Examining crude extracts of numerous edible plants produced the tool of many different compounds, which are acted with each other in extra, synergistic or antagonistic attitude to put down the tumour formation (**Saleem *et al*., 2000**).

Moringa oleifera is a member of a monogenic family of shrubs and trees moringaceae. *Moringa oleifera* (the original tree at the north of India) is a kind of the genus Moringa, which are the most widely planted. It was informed that the leaves of this plant have several biological functions, counting hypocholesterolemic, antidiabetic, hypotensive agent and anti-tumor agents (**Pal *et al*., 1995; Tahiliani and Kar, 2000; Mehta *et al*., 2003; Kar *et al*., 2003**). Not only the leaves, but also the seeds ,flowers, roots, gums and fruits are very useful for recovering from infection (**Ezeamuzle *et al*., 1996**), cardiovascular activity , liver disease (**Rao and Misra, 1998**), cancer (**Costa-Lotufo *et al*., 2005**) and hematological, hepatic and renal activity (**Mazumder *et al*., 1999**). Morever, the seeds of *Moringa oleifera* have the ability to to depurte water (**McConnachie *et al*., 1999**), antimicrobial material (**Filgona, 2005**) and edible oils. *M. oleifera* Seed kernels are famous with moving away iron and cadmium ions from corrupt water (**Sajidu *et al*., 2005**). Favorably, almost all Moringa parts are used for treating a lot of diseases (**Babu and Chaudhuri, 2005**; **Jaiswal *et al*., 2009 and Verma *et al*., 2009**).

It`s known that *Moringa oleifera* seeds hold about 33% and 41% w/w of vegetable oil (**Sengupta and Gupta, 1970**). *Moringa oleifera* oil is rich with 70% oleic acid. Commercially, *Moringa oleifera* is familiar with ‘‘ben oil” or ‘‘behen oil”, as a result of contenting behenic (docosanoic) acid, owns great struggle against oxidative reduction (**Lalas and Tsaknis, 2002**) In addition , *Moringa oleifera* has many medical functions and has massive nutritional profit (**Anwar *et al*., 2007**).The oil of Moringa seed (yield 30-40% by weight), which known as ben oil, is a sweet non-sticking, non-drying oil that fights rancidity. It is widely used in salads, for fine engine greasing, and in making sprays and hair care materials (**Tsaknis *et al*., 1999**).

In spite of using the leaves of *Moringa oleifera* in common treatment of renal disorders, no one has checked their nephroprotective activity yet. *Moringa oleifera* is able to obstruct many disorders, especially those, which perform reactive oxygen species. That`s why; it is supposed that it may perform as a great antioxidant against renal oxidative stress and hyperproliferative feedback settled by *Moringa oleifera*. What`s more; the current study was approved to check the

effectivness of conjoined *Moringa oleifera* with $KBrO_3$ in preserving rats from the harmful effects of KBrO3 (inserting oxidative stress).

Materials and Methods

Materials:

Moringa seeds: ***Moringa Olivera*** seeds were gathered from the National Research Center, Giza, Egypt.

Potassium bromate ($KBrO_3$): takes the form of white crystals or powder, purchased from El-Gomhoria Co., Cairo, Egypt.

Animals: Twenty five male albino rats, *Sprague Dawley* strain, weighting (110±10*g*), were gotten from the animal house of Agriculture Research Center, Giza, Egypt.

Process steps:

Extraction of *M. oleifera* oil: *Moringa oleifera* oil was extracted according the method of **Rashid *et al*. (2008).**

Determination of fatty acid*:* The fatty acid profile of ethanolic extract of pumpkin seed oil was determined according to ISO 5508 (1990) and ISO 5509 (2000) by gas chromatography (GC) as described by (**Nath, 1996).**

Experimental design:

The experiment was performed in animal house in the Institute of phthalmology, Giza. All rats were fed for one week till the beginning of the experiment on basal diet (BD), after that they were thrown into 2 groups, the first group (n= 5 rats) was fed on the BD only as a non-positive control (–ve) normal rats. The rats of second main group (n= 20 rats) were injected a single intra-peritoneal of ($KBrO_3$) at a dose level 125 *mg /kg* body weight **(Kahan and Sultana 2004)** and fed on basal diet (BD) then divided into 4 sub-groups (each 5 rats) as follows:

Sub-group (2): received $KBrO_3$ and fed with BD only and considered as a positive control (+ve).

Sub-group (3): received $KBrO_3$ and fed with 10% *Moringa oleifera* oil supplemented diet.

Sub-group (4): received $KBrO_3$ and fed with 20% *Moringa oleifera* oil supplemented diet.

Sub-group (5): received $KBrO_3$ and fed with 30% *Moringa oleifera* oil supplemented diet.

Daily food intake was estimated. Weekly the body weight gain was stated. At the end of the experiment, biological evaluation of the tested diets was performed by determining total food absorption (FI) and body weight gain (BWG). Food and protein capability ratio (FER & PER) were calculated according to **(Chapman *et al.*, 1950)**. After a period of (45 days), the rats were ready to give blood samples.

Biochemical analysis:

Determination of hemoglobin and packed cell volume: Heparenized blood was analyzed for estimation of hemoglobin (HB) and packed cell volume (PCV) as mentioned in **Drabkin (1949)** and **Mc Inory, (1954),** in consequence.

Determination of liver enzymes: Serum alanine and aspartae aminotransferase (ALT, AST) and alkaline phosphates (ALP) enzymes, were estimated as stated in **Reitman and Frankel (1957) and Kind and King (1954),** in consequence.

Determination of kidney functions: Serum creatinine and uric acid were determined in agreement with the steps mentioned by **Hare (1950) and Fossati *et al*. (1980)**, in consequence.

Determination of antioxidant enzymes: Plasma superoxide dismutase (SOD), glutathione peroxidase (GPX), glutathione S-transferase (GST) and malondialdehyde (MDA) as mentioned in **Beuchamp and Fridovich (1971), Weiss *et al*. (1980), Ellman (1958)** and **Uchiyama and Mihara (1978),** in consequence.

Statistical analysis:

The great contrast between the two groups were figured out using Dunnet's *t*-test followed by analysis of variance (ANOVA) and $p<0.05$ **(Snedecor and Cochran, 1967).**

Results and Discussion

Moringa oleifera oil:

During extraction, it was found that Moringa seeds contain 35% w/w oil, that is according to the past literature (**Anwar *et al.*, 2005**).

Current researches focus on the sterol, tocopherol and flavonoid content of crude M. oleifera oil (**Anwar *et al*., 2005; Lalas and Tsaknis, 2002** a). The oil of oleifera had an acid value of 2.9, which is essencial for acid pre-treatment prior to base-catalyzed transesterification. The parent oil`s kinematic viscosity was 29.63 mm2/s. It`s claimed that the cloud point of M. oleifera oil was 5°C and the pour point was 4°C. The stable oxidative level per Rancimat test was 15.32 h. (standard deviation = 1.29 h), getting along with the presence of antioxidants happening naturally in this oil (**Lalas and Tsaknis, 2002** b).

Fatty Acids Profile and Chemical Composition of Egyptian Moringa Oleifera Seed Oil:

What`s more ,The oil content ranging from 35 to 41 % and is a rich source of omega-9 fatty acids, determined by GC and recorded (Palmitic 7.0 , Palmitoleic 2.0, Stearic 4.0, Oleic 78.0, Linoleic 1.0, Linolenic - and Arachidic 4.0) according to **Da Silva *et al*. (2010)**. In this context the MO oil has bis-allylic methylene carbons with the fatty acid chains (just 1.0% of linoleic acid and the absence of linolenic acid), that may provide advantages in terms of the oxidative stability (**Knothe, 2006**).

Highlight the fact that Moringa oil is performed by a high content of oleic acid (71%) and it is also considered one of the oleic acid oil family **(Sonntag, 1982)**. Moreover the oil seeds of Moringa oleifera could be applied strongly as a source of edible oil for human consumption (**Lalas and Tsaknis, 2002b**). As far as we know the fatty acid composition of *M. oleifera* seed oil reveals that it belongs to the team of high-oleic oils (C18:1, 67.90%–76.00%) according to **Anwar *et al*. (2007)**.

Body weight gain of $KBrO_3$ nephrotoxic rats fed on Moringa oil for six weeks:

It was shown in Table 2 the influence of *Moringa oleifera* oil on body weight gain (BWG), food absorption (FI) and feed effectiveness ratio (FER) of $KBrO_3$ nephrotoxic rats after the experiment period. A significant decrease ($p<0.5$) in body weight gain (44.30 ± 7.71 *g*), food intake (14.20 ± 2.17 *g/day*) and FER (0.051±0.002) were observed in nephrotoxic rats without treatment (+ve control) compared to normal control group (-ve control). Body weight gain recorded 80.57 ± 8.17, 91.08 ± 10.22 and 90.92 ± 11.11 *g*, while FI scores were 15.90 ± 2.11, 16.35 ± 2.91 and 16.55 ± 2.18 *g/day* in nephrotoxic rats groups treated with *Moringa oleifera* oil at doses 10, 20 and 30%, respectively. Meanwhile FER recorded 0.084 ± 0.003, 0.092 ± 0.001 and 0.091 ± 0.001, respectively. So it could be observed that oral administration of *Moringa oleifera* oil at doses 10, 20 and 30% caused significantly increasing ($p<0.5$) in body weight gain.

Measurement of body weight and/or organ weight may be used to evaluate toxic events due to exposure to a toxicant. Alteration in body weight and/or organ to body weight ratio has been shown to imply toxicity arising from exposure to a toxicant (**Adeyemi *et al*., 2012 and Orisakwe *et al*., 2007**). No appreciable weight change was recorded for all groups given NiSO4 and treated with *M. oleifera* (**Adeyemi and Elebiyo, 2014**).

Effect of Moringa oil on blood cell parameters on $KBrO_3$ nephrotoxic rats:

Data represented in Table 3 showed that oral administration of KBrO3 nephrotoxic rats on *Moringa oleifera* oil increased significantly ($p<0.5$) hemoglobin (Hb) blood level and packed cell volume (PCV) in blood, in a dose dependant manner compared to (+ve control) group. Memoglobin levels recorded 10.14±1.4, 10.55±1.98 and11.11±2.01 *mg/dl*, while PCV levels recorded 33.79±3.47, 34.14±4.01 and 36.71±4.11% in the blood of nephrotoxic rats treated with *Moringa oleifera* oil at doses 10, 20 and 30%, respectively. Meanwhile, the positive control group recorded 7.99±1.39 and 29.81±3.55, respectively. This results due to the higher iron content in *Moringa oleifera* oil.

Regarding the result of *M. oleifera* leaf extract on Hb, PCV, RBC and WBC values in male Wistar rats, it was noted that Hb count was getting high in significant way ($p<0.05$) in the groups 1% and 10%. Despite this increasing, it was well-documented the slight decreasing in Hb count of the group given 5% *M. oleifera*. Packed cell volume count highlighted a common increase in all the groups while comparing it with their control group. This increase was only great ($p<0.05$) in the 5% and 10% held groups (**Otitoju *et al*., 2014**). **Adedapo *et al.* (2009**) claimed a modest increase in Hb count among rats treated with 400 *mg/kg* body weight of *M. oleifera* leave extract .The lowest (1 *mg/kg*) concentration of *Moringa oleifera* carried about the highest Hb count, however there was a common increase in Hb count. In the light of their recent result, it also shows that PCV count increased insignificantly if it put in comparison with the control group.

Effect of Moringa oil on liver function on $KBrO_3$ nephrotoxic rats:

As demonstrated in Table 4, $KBrO_3$ nephrotoxic rats increased significantly ($p<0.5$) in the serum levels of liver enzymes aspartate aminotransferase, alanine aminotransferase(ALT) and alkaline phosphatase if it is compared with (-ve control) rats group. Oral administration of *Moringa oleifera* oil at different doses seriously lowered ($p<0.5$) AST serum levels, ALT and ALP enzymes comparing to (+ ve control) group. AST recorded 49.37±6.01, 51.41±8.10 and 48.21±6.15 *µ/ml*, while ATP recorded 15.71 ± 1.81, 16.28 ± 2.01 and 18.13±3.51 *µ/ml*. Also data showed that ALP scores were 37.80 ± 4.11, 38.73±4.37 and 38.34 ± 5.01 *µ/ml*, respectively.

In comparing Potassium bromate to the control rats group, it significantly caused elevation in TRG, ALP, AST, CAT concentrations. Afterwards, it was realized great low in TRG, ALP, AST, and CAT on dose-dependent basis by the 20% and 40% *Moringa oleifera* extracts (**Oseni *et al*., 2015).**

Effect of Moringa oil on kidney function on $KBrO_3$ nephrotoxic rats:

At this point,the stated data in Table 5 reflected the influece of *Moringa oleifera* oil at different doses 10, 20 and 30% on kidney function on KBrO3 nephrotoxic rats. Serum levels of creatinine and uric acid wereis increasingly becoming ($p<0.5$) in (+ ve control) group in case of

comparing it to normal control group. Oral administration of nephrotoxic rats on *Moringa oleifera* oil at doses 10, 20 and 30% caused significant increase ($p<0.5$) in creatinine level (0.99±0.02, 0.88±0.12 and 0.75±0.13 *mg/dl*) and uric acid levels (2.11±0.81, 2.41±0.77 and 2.17±0.67 *mg/dl*), respectively on nephrotoxic rats compared to creatinine and uric acid levels of (+ ve control) group as recorded 1.95±0.11 and 4.41±1.01 *mg/dl*, respectively. In accordance with the data, Plasma levels of creatinine and urea are among the major biochemical indices widely used to evaluate renal activities (**Gross *et al.*, 2005; Adeyemi and Akanji, 2012**). Increasing creatinine levels indicate kidney is damaging. Under ordinary physiological case the amount released every day is constant and connects with body mass (**Gross *et al.*, 2005**). At variance with, if the level of creatinine goes up because of retention in the blood, it might be used to sort glomerular filtration rate (**Adeyemi and Akanji, 2012**).

On the other side, Urea`s main task is the excretory waste of human beings. As a result of amino acid metabolism, many nitrogeneous wastes like ammonia. As ammonia is toxic to human body when retained, it is coverted into urea by the liver. Urea is also called as carbamide. Urea , the main excretory product formed in the liver is carried away by the blood to kidneys (**Gross *et al.*, 2005; Adeyemi and Akanji, 2012**). In case of eating food having different levels of M. oleifera to rats stopped the elevation of the indices for renal dysfunction (**Adeyemi and Elebiyo, 2014**). Using different doses of Moringa oil (MO) as treatment reduced the upcreasing levels of serum urea and creatinine in dose dependent manner. The elements of MO can protect the integrity of kidney. It also helps in increasing its regenerative and reparative capacity (**Ouedraogo *et al.*, 2013**).

Morever, it has been shown the Polyphenolic compounds retrograde oxygen species in nephrotoxicity (**Wongmekiat *et al.*, 2008**). The animation or alteraion of the rat plasma creatinine to stander level associated with increasing *M. oleifera* doses in the diets given to rats (**Adeyemi and Elebiyo, 2014**).

Effect of Moringa oil on antioxidant parameters on $KBrO_3$ nephrotoxic rats:

As realized in Table 6, the positive control group showed a significant decrease ($p<0.5$) in plasma superoxide dismutase (SOD),

glutathione peroxidase (GPX) and glutathione S-transferase (GST), while a significant increase ($p<0.5$) in malondialdehyde (MDA) compared to (-ve control) group. Treatment with *Moringa oleifera* oil caused significant increase ($p<0.5$) in SOD, GPX and GST, while caused significant decrease ($p<0.5$) in MDA levels compared to (+ ve control) group. It could be observed that oral administration of nephrotoxic rats on *Moringa oleifera* oil at dose 20% improved the kidney antioxidant enzymes activity compared to 10 and 30% *Moringa oleifera* oil doses as caused significant increase ($p<0.5$) in SOD, GPX and GST (131.25±22.61, 118.41±11.18 and 3.45±0.97 *µ/mg*), while showed significant decrease ($p<0.5$) in MDA (9.11±2.16 *nmol/g*) of nephrotoxic rats.

Furthermore, antioxidants enzymes are considered as body's leading guard, which task is to stop biological macromolecules from oxidative ruin and to move peroxides away, free radicals and superoxide anion generated within the cell. What's more , Glutathione peroxidase (GPx) and catalase have been identified as the senior enzymes that can remove hydrogen peroxide produced by superoxide dismutase in cytosol and mitochondria by oxidizing GSH to GSSG (**Park *et al.*, 1994**). Another key thing to remember that our study approves earlier reported antioxidant function of M. oleifera in vitro and in vivo, against hydroxyl radicals generated by Fenton reaction (**Rao *et al.*, 2001; Kumar and Pari, 2003**). It has been informed that *M.O* contain different antioxidants including Vitamin C (**Siddhuraju and Becker, 2003**) which performs as an antioxidant molecule and its great influence could be applied to its ability to form a poorly ionized but soluble complex with toxic metal/metalloid (**Flora, 2002**).

Gupta *et al.* (2007) study the pointed out that administration of *M. oleifera* highly safed SOD, catalase and GPx functions by directly scavenging ROS as well as by holding down lipid peroxidation, suggesting antioxidant options of *M. oleifera* seed powder. Morever, many debates and researches assured that *M. oleifera* leaves help stromgly in the recovery from hepatic illness induced by antitubercular drugs or acetaminophen.

For your surprise, we find that *M. oleifera* renew the function of the decreased glutathione (GSH). This glutathione was found shrinked following administration of the damaging agent. Morever, GSH is a

qualified hunter of free radicals which is considered a reason of oxidation of GSH to oxidized glutathione (GSSG). That GSSG leads to weaken the stores of GSH (**Ahmed and Khater, 2001; Ashok Kumar and Pari, 2003; Pari and Ashok Kumar, 2002**). Furthermore, the leaves` aqueous ethanol extract of M. oleifera has the ability to scavenge peroxyl, superoxyl, and 1,1-diphenyl 2-picrylhydrazyl (DPPH•) radicals (**Siddhuraju and Becker, 2003**). By taking all above results into consideration, it was reported that the phytochemical constituents in MO could take part in its antioxidant function and so, nephroprotection (**Verma *et al*., 2009**).

In general, the more decreased activities of SOD, CAT and GPx in plasma, liver and kidney of $KBrO_3$- treated rats, the more reduced synthesis of enzymes or oxidative inactivation of the enzyme proteins will be **Fischer *et al*. (2012)** and **Linjawi and Roshdy (2015**).

Conclusion

Before interpreting our results, we would just like to restate our main aims. This exploratory study has drawn our attention on its ability to show the nephrotoxic influence of potassium bromate and nephroprotective potentials of *Moringa oleifera* oil. Co-administration of *M. oleifera* oil with $KBrO_3$ have been reported as great protectors against oxidative stress induced by $KBrO_3$ in rats. *Moringa oleifera* oil at level 20% was the best addition which significantly enhanced the antioxidant enzymes in nephrotoxic rat.

Table (1): Fatty acid *profile* of *Moringa oleifera* oil

Component	Value
Oleic acid	22.11
Linoleic acid	11.14
Linolenic acid	1.51
Palmitic acids	7.37
Palmitoleic acids	2.10
Arachidic acid	1.34
Behenic acid	2.07
Stearic acid	3.83
Myristic acid	1.84
gadoleic acid	1.71

Table (2): Effect of Moringa oil on body weight gain (BWG), feed intake (FI), feed efficiency ratio (FER) and protein efficiency ratio (PER) of $KBrO_3$ nephrotoxic rats fed on Moringa oil for six weeks

Groups / Parameters	-ve control group	+ve control group	10% moringa oil	20% moringa oil	30% moringa oil
Initial weight (*g*)	110.55±3.67[a]	110.41±3.50[a]	109.14±2.45[a]	108.33±2.99[a]	110.22±3.11[a]
Final weight (*g*)	203.47±13.01[a]	154.71±12.13[b]	189.71±11.22[a]	199.41±13.78[a]	201.14±12.35[a]
Weight gain (*g*)	92.92±11.33[a]	44.30±7.71[b]	80.57±8.17[a]	91.08±10.22[a]	90.92±11.11[a]
Feed Intake (*g/d*)	16.65±2.11[a]	14.20±2.17[a]	15.90±2.11[a]	16.35±2.91[a]	16.55±2.18[a]
FER	0.093±0.001[a]	0.051±0.002[b]	0.084±0.003[a]	0.092±0.001[a]	0.091±0.001[a]
PER	0.46±0.03[a]	0.25±0.01[b]	0.42±0.03[a]	0.46±0.02[a]	0.45±0.04[a]

Mean ± SD with the same letter is insignificantly different.

Table (3): Effect of Moringa oil on blood cell parameters on $KBrO_3$ nephrotoxic rats

Groups / Parameters	-ve control group	+ve control group	10% moringa oil	20% moringa oil	30% moringa oil
HB (*gm/dl*)	12.08±2.18[a]	7.99±1.39[b]	10.14±1.4[a]	10.55±1.98[a]	11.11±2.01[a]
PCV %	38.61±3.82[a]	29.81±3.55[b]	33.79±3.47[b]	34.14±4.01[ab]	36.71±4.11[a]

Mean ± SD with the same letter is insignificantly different.

Table (4): Effect of Moringa oil on of liver enzymes; aspartate aminotransferase (AST), alanine aminotransferase (ALT) and alkaline phosphatase (ALP) on $KBrO_3$ nephrotoxic rats

Groups / Parameters	-ve control group	+ve control group	10% moringa oil	20% moringa oil	30% moringa oil
AST (*µ /ml*)	41.17±5.81[b]	72.39±9.61[a]	49.37±6.01[b]	51.14±8.10[b]	48.21±6.15[b]
ALT (*µ /ml*)	13.35±1.12[b]	28.55±3.35[a]	15.71±1.81[b]	16.28±2.01[b]	18.13±3.51[b]
Alk–Pho (*µ /ml*)	30.17±5.66[b]	50.38±5.81[a]	37.80±4.11[b]	38.73±4.37[b]	38.34±5.01[b]

Mean ± SD with the same letter is insignificantly different.

Table (5): Effect of Moringa oil on serum levels of creatinine and uric acid on $KBrO_3$ nephrotoxic rats

Groups / Parameters	-ve control group	+ve control group	10% moringa oil	20% moringa oil	30% moringa oil
Creatinin *mg/dl*)	0.77±0.01 [b]	1.95±0.11 [a]	0.99±0.02 [b]	0.88±0.12 [b]	0.75±0.13 [b]
Uric acid (*mg/dl*)	1.83±0.26[c]	4.41±1.01 [a]	2.11±0.81[b]	2.41±0.77 [b]	2.17±0.67 [b]

Mean ± SD with the same letter is insignificantly different.

Table (6): Effect of Moringa oil on superoxid dismutase (SOD), glutathione peroxidase (GPX), glutathione transferase (GST) and malondialdehyde (MDA) on $KBrO_3$ nephrotoxic rats

Groups / Parameters	-ve control group	+ve control group	10% moringa oil	20% moringa oil	30% moringa oil
SOD (*µ /mg*)	140.81±21.17 [a]	35.81±3.81[b]	110.15±11.15 [a]	131.25±22.61 [a]	118.82±17.34 [a]
GPX (*µ /mg*)	121.33±17.13 [a]	29.14±4.19 [c]	89.59±7.95 [b]	118.41±11.18 [a]	114.38±13.21 [a]
GST (*µ /mg*)	4.14±0.66 [a]	1.51±0.19 [c]	2.99±0.88 [b]	3.45±0.97 [a]	3.29±0.77 [a]
MDA (*nmol/g*)	9.45±1.98 [b]	19.34±3.14 [a]	10.14±2.61 [b]	9.11±2.16 [b]	10.33±1.69 [b]

Mean ± SD with the same letter is insignificantly different.

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التأثير الوقائي للكلى باستخدام زيت المورينجا ضد التسمم ببرومات البوتاسيوم لدي فئران التجارب

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يعتبر نبات المورينجا اوليفيرا من النباتات الهامة لما له من وظائف علاجية متعددة ،حيث يمثل الزيت المستخلص من بذور النبات اهمية كبيرة للشعوب المهتمة بزراعة هذا النوع من الاشجار

يهدف البحث الي تقييم ما اذا كان اضافة زيت بذور المورينجا بنسب ١٠، ٢٠، ٣٠% له تاثير وقائي ضد برومات البوتاسيوم المتسببة في احداث التسمم الكلوي لدي فئران التجارب حيث حقنت هذه الفئران فرديا داخل الغشاء البريتوني ب ١٢٥ملجم /كجم من وزن الجسم من مادة برومات البوتاسيوم مع تناول الوجبة الاساسية ثم قسمت المجموعات الي مجموعة ضابطة سالبة واخري موجبة وثلاث مجموعات دعمت وجباتها بزيت بذور المورينجا بنسب ١٠،٢٠،٣٠% لمدة ٦ اسابيع .وبعد انتهاء فترة التجربة تم إجراء التحاليل البيوكيميائية لعينات دم الفئران

أدت إصابة الفئران ببرومات البوتاسيوم إلى فقدان الوزن في الفئران، وارتفاع ملحوظ في انزيمات الكبد، والكرياتينين، وحمض اليوريك وزيادة الضغوط التأكسديه على الفئران .في المقابل، أدى تغذي الفئران على الوجبات الغذائية المدعمه بزيت المورينجا أوليفيرا وخاصة بنسبة ٢٠% إلى ارتفاع نسبة الانزيمات المضاده للأكسده مثل السوبر أكسيد ديسميوتيز، والجلوتاثيون بيروكسيديز، والجلوتاثيون ترانسيفيريز مع انخفاض في نسبة المالوندالدهيد في فئران التجارب.

تم التوصل إلى أن إضافة زيت مورينجا أوليفيرا بنسبة ٢٠٪ للوجبة دعم من قدرة الجسم الدفاعيه ضد التسمم الكلوي الحادث بفعل برومات البوتاسيوم.