The 6th international- 20th Arabic conference for Home Economics
Home Economics and Educational quality assurance December 23rd -24th, 2018

Journal of Home Economics

http://homeEcon.menofia.edu.eg **ISSN 1110-2578**

Effect Of Ethanolic Extract Of *Psidium Guajava* And *Moringa Oleifera* Leaves On Acute Renal Injury In Experimental Rats

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Abstract

This study was carried out to investigate the effect of ethanolic extracts of *Psidium guajava* and *Moringa oleifera* leaves on acute renal injury in experimental rats. Thirty albino rats weighing 200 ± 20 g used in this study and divided into two main groups, one was the first main group (5 rats) who kept as a control –ve group, while another was the second main group (25 rats) , was injected intraperitoneally(IP) with a single dose of cisplatin (CP) (7ml / kg B.Wt.) to induce acute renal

injury. After induction, the rats in the second main group were divided into five groups (each group consisted of 5 rats) , one group was kept as (+ ve) control group, while others given administration of ethanolic extract of *Psidium guajava* leaves (EEPGL) and ethanolic extract of *Moringa oleifera* leaves (EEMOL) (100 and 200 mg/kg)] orally for six weeks. Biological evaluation including feed intake (FI), body weight gain % (BWG %) and feed efficiency ratio (FER) were carried out. Serum creatinine, Serum urea and serum uric acid were measured. Antioxidant levels in kidneys tissues (Super Oxide Dismutase (SOD) , Glutathione Peroxidase (GPX) , Catalase (CAT), Malondialdehyde (MDA) and Nitric oxide(No) were estimated. Blood glucose was determined . Also, histopathological changes for kidney, were examined. The obtained results concluded that using EEPGL and EEMOL improve FI, BWG % and FER, Serum creatinine, Serum

urea and Serum uric acid, antioxidant enzymes and blood glucose level. The best results found by using high doses (200mg / kg) of EEPGL and EEMOL . According to the results, EEPGL and EEMOL could be used for improving kidney functions and curing acute renal injury .

Introduction

Kidney is important organ in the body which play vital role in execration **(Naqvi , 2017).** Acute kidney injury (AKI) is a common disorder that spread in hospital and associated with excess morbidity and mortality. AKI is major problem which is developed to increase the risk of chronic kidney disease **(Moore *et al.,* 2018).** Cisplatin contributed with reactive oxygen species (ROS) causing renal cell death, and lead to acute kidney injury which represent one complication of cisplatin chemotherapy **(Sonia *et al.,* 2018).**

Guava *(Psidium guajava ,L.)* leaves have been used for several diseases in traditional medicine . Vivo and vitro researches demonstrated the possible effect of the extracts from the leaves for the co-treatment of different diseases **(Díaz-de-Cerio *et al.,* 2017)** . Guava *(Psidium guajava , L.)* is a tree with nutritional values and has phytochemical compounds which contains alkaloids, carotenoids , anthocyanins, vitamin-C, and triterpenes **(Jayachandran *et al.,* 2018) .** Recent studies indicated that ethanolic extract of *Psidium guajava, L.* leaves has renal protective effects **(Mohan *et al.,* 2014).**

Moringa oleifera, Lam. (*M. oleifera*) has nutritional value which high content in proteins, vitamin A, minerals, essential amino acids, antioxidants, flavonoids, and isothiocyanates. *M. oleifera* extracts have pharmacological activities including anti-inflammatory, antioxidant, anti-cancer, hepatoprotective, neuroprotective and hypoglycemic activity **(Kou *et al.,* 2018)** . *Moringa oleifera* leaves extract play a vital role in reducing oxidative stress and kidney damage depending on its ntioxidant compounds (**Arafat,Nagah *et al.*,2018)**

Therefore, this study aimed to investigate the potential effects of ethanolic extract of *Psidium guajava* leaves (EEPGL)

and ethanolic extract of *Moringa oleifera* leaves (EEMOL) against cisplatin – induced acute renal injury in male rats.

Meaterials And Methods

Plant Material

Dried leaves of *Moringa oleifera* and *Pesiduim guajava* were purchased from the local company for medicinal plants and herbs, Cairo Governorate, Egypt.

Extraction of Plant Material

The dried leaves were ground using a milling machine to obtain fine powder. The active ingredients were extracted by using 95% ethanol. Briefly, 100 g of each leaf powder was added to 900 ml of 95% ethanol. The mixture was covered and shaken every 30 min. for 6 h, and then allowed to stand for 48 h for extraction. The mixture was then separated by passing through Whatman's No 1 filter paper, after which the filtrate was evaporated to dryness under air pressure. The dried crude extracts were stored in the refrigerator (at 40 °C) under aseptic conditions for subsequent use **(Eze *et al*., 2013).**

Drug and dose

Cisplatin, [cis-PtCl2 (NH3)2], was obtained from Pharmacy in Tanta City (0.5 mg/ml cisplatin in 0.9% sodium chloride).Cisplatin was injected as single dose 7 mg/kg of body weight intraperitoneally (IP).

Animals:

Thirty male albino rats of Sprague Dawley strain (200 ± 20 g) were obtained from the animal colony, Helwan farm, Vaccine and Immunity Organization, Ministry of Health, Cairo Governorate, Egypt.

Experimental Design

A total of 30 matured male rats weighing between 180-220g were housed in clean metabolic cages. The rats adaption lasted for one week before the beginning of the experiment. The rats fed on basal diet (B. D.) according to **Reeves *et al* ., (1993)** and divided into two main groups as follow:

The first main group (5 rats)

This main group was fed on basal diet and kept as a control (- ve) group.

The second main group (25 rats)

This main group was fed on basal diet and injected with cisplatin as single dose (7 mg/kg b.wt.) to induce acute renal injury according to **Ozyurt *et al.*, (2004).** After that, the rats in the second main group (25 rats) were divided into five groups (each group consisted of 5 rats) as a following:- **Group 1:** Fed on B.D. and treated with cisplatin and Kept as control (+ ve) group. **Group 2:** Fed on B.D. and treated with one dose oral daily of 100 mg/kg b.w EEMOL.

Group 3: Fed on B.D. and treated with one dose oral daily of 200 mg/kg b.w EEMOL.

Group 4: Fed on B.D. and treated with one dose oral daily of 100 mg/kg b.w EEPGL.

Group 5: Fed on B.D. and treated with one dose oral daily of 200 mg/kg b.w EEPGL.

Biological evaluation

Body weight& feed consumption were measured twice a week and total feed intake of the experimental period (6 weeks) calculated according to **(Chapman *et al*., 1959).** The feed efficiency ratio was calculated according to the following equation as mentioned by **Hosoya (1980).**

Kidney functions parametrs

Serum creatinine, serum urea and serum uric acid were determined according to **Murray and Kaplan, (1984); Kaplan, (1984) and Fossati *et al*., (1980)**, respectively.

Blood glucose

Blood glucose was determined according to **Brăslasu *et al*., (2007).**

Antioxidant enzymes

Glutathione peroxidase (GPx), Malondialdehyde (MDA), (Super Oxide Dismutase (SOD), Catalase (CAT), and Nitric oxide (No) were determined acoording to the methods of **Paglia and Valentine, (1967) ; Ohkawa *et al*., (1979); Nishikimi *et al* .,**

(1972); Aebi, (1984) and Montgomery and Dymock, (1961), respectively .

Histopathology investigation

The rat kidney was fixed in 10% buffered neutral formalin immediately following excision from animals. Fixed tissues were subsequently processed for histopathology examinations as previously described by **Adeyemi and Akanji, (2012)**.

Statistical analysis

Statistical analysis was carried out using one way analysis of variance (ANOVA) test followed by Duncan test through the program of statistical packages for the social science (SPSS) version 16. Results were expressed as mean± SD. The differences among means at $p \leq 0.05$ are considered significant **(Snedecor and Cochran, 1989).**

Results

Results

Table (1) results show the changes in feed intake, body weight gain % and feed efficiency ratio in control and experimental groups of rats. These parameters deteriorated in cisplatin (+ control) while improved in treatment groups specially high dose. The highest improvement recorded for the group which treated with 200 mg/kg b.wt. EEMOL followed by the group treated with 200 mg /kg b.wt. EEPGL.

Table (2) result show the non- significant changes in relative kidney weight in cisplatin (+ control) group, as compared to the negative control group and all treated groups. However, group treated with EEMOL at dose 200 mg/kg b.wt. was closed to normal control group.

Table (3) results show the high significant increase in kidney function parameters (creatinine, urea and uric acid) in cisplatin (+ control) group. On the other hand, these parameters decreased in all treated groups specially at high extract doses. The highest improvement was recorded for the groups which treated with 200 mg/kg b.wt. of EEMOL followed by the group treated with 200 mg /kg b.wt. of EEPGL.

Table (4) results indicated that cisplatin (+ control) showed a significant increase in blood glucose, while, all treated groups observed significant decreases compared to control positive group . The best results were recorded for high doses from EEMOL and EEPGL 200mg/kg b.wt. which improved blood glucose level and were closed to normal control.

Data presented in table (5) indicated that SOD, GPX and CAT levels diminished in control (+) grouop. While, MDA and NO levels were increased control (+) grouop. However , the reverse recorded for treated rats, in particular for EEMOL 200 mg/kg group , followed by that of EEPGL 200 mg/kg group. Histopathological investigation (Figure 1) confirmed all biological and biochemical results (Tables 1 – 5).

The results obtained from histological sections of kidney illustrated in (Fig. 1). Kidney, shows normal histological picture of glomeruli and tubules in Normal (- control) group (A). However, kidney from Cisplatin (+ control) group showed shrunken glomeruli (thick arrow), hydropic degeneration in tubular epithelium (arrowheads) and tubular necrosis (thin arrow) (B) ,while mild hydropic degeneration in tubular epithelium (arrowhead) observed in Cisplatin + EEMOL(100mg/kg) group (C), and congested blood vessels (arrow) observed in Cisplatin + EEMOL(200mg/kg) group and Cisplatin +EEPGL (200 mg/Kg) groups (D&F). While , retained normal histological picture of glomeruli and tubules observed in Cisplatin +EEPGL (100 mg/Kg) group (E) . H&E

Table (1) : Effects of ethanolic extracts of MOL and PGL on feed intake, body weight gain and feed efficiency ratio in nephrotoxic rats induced by cisplatin (mean±SD, n=5)

Groups	FI(g)	BWG(%)	FER
Normal (- control)	929±6.72 ^{a}	5.14±1.19^{a}	0.01±0.003^{a}
Cisplatin (+ control)	495±3.00^{f}	-35.30±2.22^{c}	-0.17±0.009^{d}
Cisplatin+ EEMOL(100mg/kg)	772±1.82^{d}	-33.47±4.15^{c}	-0.11±0.007^{c}
Cisplatin + EEMOL (200 mg/kg)	827±2.30^{b}	-19.01±2.89^{b}	-0.05±0.006^{b}
Cisplatin +EEPGL (100 mg/Kg)	738±2.70^{e}	-32.91±5.13^{c}	-0.10±0.014^{c}
Cisplatin + EEPGL (200 mg/kg)	792 ± 4.15^{c}	-23.44± 5.77^{b}	-0.07± 0.013^{b}

Means in the same column with completely different letters are significantly different at $p \leq 0.05$.

Table (2): Effects of ethanolic extracts of MOL and PGL on relative kidney weight in nephrotoxic rats induced by cisplatin (mean±SD, n=5)

Groups	Relative kidney weight %
Normal (- control)	0.72±.0.2^{c}
Cisplatin (+ control)	0.79±0.1ab^{c}
Cisplatin + EEMOL(100mg/kg)	0.88±0.09^{a}
Cisplatin + EEMOL (200 mg/kg)	0.77±0.04b^{c}
Cisplatin +EEPGL (100 mg/Kg)	0.80±0.04^{abc}
Cisplatin + EEPGL (200 mg/kg)	0.85±0.08^{ab}

Means in the same column with completely different letters are significantly different at p≤0.05.

Table (3): Effects of ethanolic extracts of MOL and PGL on kidney functions in nephrotoxic rats induced by cisplatin (mean±SD, n=5)

Groups	Creatinine (mg/dl)	Urea (mg/dl)	Uric acid (mg/dl)
Normal (- control)	0.39±0.01^{d}	15.67±2.16^{d}	1.39±0.02^{f}
Cisplatin (+ control)	1.80±0.24^{a}	94.67±15.20^{a}	2.90±0.16^{a}
Cisplatin+ EEMOL(100mg/kg)	0.96±0.06^{bc}	48.67±5.31^{b}	2.10±0.016 ^{c}
Cisplatin + EEMOL (200 mg/kg)	0.74±0.04^{d}	21.33±3.49^{d}	1.64±0.05 ^{e}
Cisplatin +EEPGL (100 mg/Kg)	1.06±0.15^{b}	53±9.90^{b}	2.27±0.015^{b}
Cisplatin + EEPGL (200 mg/kg)	0.89±0.05^{d}	37.67±1.78^{c}	1.86±0.03 ^{d}

Means in the same column with completely different letters are significantly different at p≤0.05.

Table (4) : Effects of ethanolic extracts of MOL and PGL on blood glucose in nephrotoxic rats induced by cisplatin (mean±SD, n=5)

Groups	Glucose (mg/dl)
Normal (- control)	91.4±10.85 ^{b}
Cisplatin (+ control)	114.8±13.88^{a}
Cisplatin + EEMOL(100mg/kg)	103±13.62^{ab}
Cisplatin + EEMOL (200 mg/kg)	88.4±11.41^{b}
Cisplatin +EEPGL (100 mg/Kg)	102.8±17.41^{ab}
Cisplatin + EEPGL (200 mg/kg)	91.4 ± 8..32^{b}

Means in the same column with completely different letters are significantly different at p≤0.05.

Table (5) : Effects of ethanolic extracts of MOL and PGL on antioxidant levels in kidneys tissues of nephrotoxic rats induced by cisplatin (mean±SD, n=5)

Groups	SOD (U/gT)	GPX (U/gT)	CAT (U/g)	MDA (nmol /gT)	NO (Mmol/L)
Normal (- control)	25.55±1.41^{a}	51.42±1.53^{a}	0.59±0.02 ^{a}	9.06±0.45 ^{e}	2.80±0.21^{d}
Cisplatin (+ control)	15.58±2.26^{c}	33.68±1.15^{d}	0.38±0.01^{e}	19.68±1.00 ^{a}	4.97±0.14 ^{a}
Cisplatin + EEMOL(100mg/kg)	21.98±2.57^{b}	41.46±0.95^{c}	0.49±0.01 ^{c}	13.06±0.61 ^{c}	3.80±0.03 ^{b}
Cisplatin + EEMOL (200 mg/kg)	25.64±0.68 ^{a}	47.24±0.82^{b}	0.53±0.01 ^{b}	10.06±0.43 ^{d}	3.31±0.04 ^{c}
Cisplatin +EEPGL (100 mg/Kg)	17.20±1.11^{c}	40.35±1.39^{c}	0.47±0.01 ^{d}	13.98±0.58^{b}	4.02±0.10 ^{b}
Cisplatin + EEPGL (200 mg/kg)	22.34±1.07^{b}	47.8±2.46^{b}	0.52±0.01 ^{b}	10.74±0.51 ^{d}	3.09±0.41 ^{c}

Means in the same column with completely different letters are significantly different at p≤0.05.

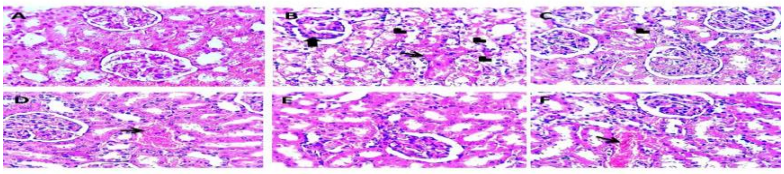

Figure (1): Microscopic images hematoxylin and eosin (H & E) -. (A) Normal (- control). (B) Cisplatin (+ control). (C) Cisplatin + EEMOL(100mg/kg) (D) Cisplatin + EEMOL (200 mg/kg) , (E) Cisplatin +EEPGL (100 mg/Kg) (F) Cisplatin + EEPGL (200 mg/kg) .

Discussion

Cisplatin is effective chemotherapy widely used for treatment many types of cancers, although it is restricted due to its side effects especially on kidneys. It can be accumulated in kidney tissues and caused acute renal injury as demonstrated by **Kim[a] *et al*., (2015)**. In the present study, the authors indicated that cisplatin was leading to a decrease in appetite and subsequently to weight loss according to **Hesketh *et al*., (2003)**. These results supported by **Garcia *et al*., (2013)** who reported that cisplatin-induced appetite, body weight and feeding efficiency decreases. Also, **Malik *et al*.,(2006)** reported that cisplatin-induced anorexia ,gastrointestinal tract disorders including vomiting, nausea, stomach distension, and gastric stasis may result in decreased food intake. In harmony with these findings, **Yamamoto *et al*., (2007)** observed that anorexia nervosa is one of the most common gastrointestinal side-effects associated with cisplatin and is, therefore, used as an index of patient quality of life. **Cabezos *et al* ., (2008)** demonstrated that cisplatin has highly emetic effect. Cisplatin led to a decrease gastric motility **(Gong *et al*., 2017**) .

Medicinal plants have been used in traditional medicine due to their antioxidant activities. In the present study, the body weight of adult male rats treated with *Moringa oleifera* leaf extract improved as compared to cisplatin group due to this extract enhancing growth according to **Akudu *et al*., (2014)**. In contrast to **Adedapo *et al* ., (2009)** suggested that supplementation of *moringa* extract at 200mg/kg and 400mg/kg are capable of preventing body weight gain. It is may be dependent on dose of extract it mean that, high doses decrease the body weight. This findings agree with **Bernadier, (2004)** who suggested that *moringa* extract may affect some regulation signals of feed intake and metabolism of the animals. In the study treatment with *Pesiduim guajava* extract lead to improvement in FI, BWG% as compared to positive group, the results agree with **Amer, Afaf, (2014)** who revealed that diet supplemented with *Pesiduim guajava* extract showed significantly increase in feed intake and body weight gain % as compared to the

positive group. On the other hand *Pesiduim guajava* extract reduce body weight according to **Houmard *et al* ., (2011)**.

The obtained results indicated that there are no significant differences in relative kidney weight among all groups. However group treated with EEMOL at dose 200 mg/kg b.wt. was closed to normal control. This result agree with **Adeyemi and Elebiyo (2014)** reported that *M. oleifera* addition to diet has improved relative kidney weight and protected from exposer to toxicants. Also, agree with **Ezejindu *et al*., (2016)** who reported that ethanolic leaf extract of *Moringa oleifera* has antioxidant and anti-inflammatory properties .

In the current study cisplatin group was increased in creatinine, urea and uric acid .These results are in agreement with earlier reports which reported by **Ilic *et al*., (2014).** Also, matching with **Kim[a] *et al*., (2015)** who indicated that increasing the levels of blood urea nitrogen and serum creatinine in cisplatin group caused by increasing in oxidative stress in kidney tissues. Injection of cisplatin increased serum urea, uric acid, and creatinine as indicators of nephrotoxicity **(Sen *et al*., 2018 and Singh *et al*., 2018).** Administration of ethanolic extract of *Moringa oleifera* and *Pesiduim guajava* leaves at high dose (200 mg/kg b.wt.) significantly caused decrease in creatinine, urea and uric acid. In line with these results, **Adeyemi and and Elebiyo** stated, **(2014); Onah *et al*., (2016); Suleiman *et al*.,(2017); Nnadiukwu *et al*., (2017)**; **Kou *et al*., (2018)** and **Saleh, Nahed *et al*., (2018)** stated that *Moringa oleifera* has renoprotective effect and lowering effect on kidney functions parameters duo to bioactive compounds as beta-carotene, vitamin C, vitamin E, and polyphenols and are a good source of natural antioxidants which can protect against oxidative damage.

Similarity, the ethanolic extract of *Pesiduim guajava* leaves, in the present study, lowered creatinine, urea and uric acid, these results agree with **Talubmook and Buddhakala, (2013)** who reported that *Pesiduim guajava* leave extract decreased blood urea nitrogen (BUN), and creatinine duo to antioxidant properties.

Similar finding to our results suggested by **Abd EL-khalik, Dalia (2016)** who reported that *Psidium guajava* leaves led to significant decrease in kidney functions parametrs. Guava-purees contain polyphenol , antioxidant capacity responsible for decreasing the levels of urea and creatinine **(Yolanda *et al*., 2017)**. Also, the results matching with **Innih, and Omage, (2018)**who showed that the aqueous extract of *P. guajava* restored the levels of kidney functions to normal.

In the obtained findings, it found that cisplatin group was increased in blood glucose . These findings supported by **Sarangarajan and Cacini, (2004)** who reported that cisplatin increased plasma glucose. In harmony with these findings, **Nora *et al*., (2014)** observed that cisplatin caused an increase in blood glucose levels, duo to oxidative stress which lead to alteration in glucose concentration. Also, cisplatin increased secretion of urinary glucose as demonstrated by **Patel *et al*., (2012) and Boroushaki *et al*., (2015).**

Treating with ethanolic extract of *Moringa oleifera* and *Pesiduim guajava* leaves at high dose (200 mg/kg b.wt.) significantly caused decrease in blood glucose. The present findings were in accordance with **Kumar and Mandapaka (2013)** who declared that hypoglycemic effect of *Moringa oleifera* leaves. **Basyony *et al* ., (2016); Rahman *et al*., (2018) and Saleh, Nahed et al ., (2018)** concluded that oral administration of *Moringa oleifera* leaf extract decreased the glucose level duo to it contains antidaibetic isolated compounds, and its ability to stimulate insulin release from the pancreatic beta cells and so reduced the blood glucose level.

On the other hand, the lowering effect of glucose levels by extract of *P. guajava* may be due to the high content of antioxidant this results agree with **Atawodi and Muazu (2003) and Banu *et al*., (2012)** who showed marked decrease in glucose in groups treated with *P. guajava*. Due to *P. guajava* increase of glucose utilization and inhibition reabsorption glucose in the kidney. **Jiao *et***

***al.*, (2018)** explained the causes of decreasing blood glucose by *P. guajava* when they reported that guava polysaccharides act as an α-glucosidase inhibitor which reducing blood glucose level. In harmony with our findings **Kangogo, (2018)** showed that guava leaves extracts significantly reduced blood glucose in rats due to bioactive compounds which responsible for hypoglycemic activity, and recommended using higher doses of the extracts.

The current investigation revealed that a significant ($p \leq 0.05$) decrease in of SOD, GPx, Catalase while increase in MDA and NO levels in cisplatin (+ control) compared to the normal control group. The decreased levels of SOD, GPx, CAT and increased levels of MDA and NO in kidney imply that the CP generate excessive amount of reactive oxygen species which combat tissue antioxidant defense. The obtained results agree with **Lee *et al.*, (2017)** who reported that cisplatin induced high levels of oxidative stress, as accompanied by an increased level of MDA, and decreased activities of glutathione S-transferase, superoxide dismutase, and catalase in kidney tissues and caused acute kidney damage.

The obtained other hand, all treated groups improved previous parameters as compared to cisplatin (+ control). The best result was found in treated groups with high doses of EEMOL and EEPGL . Our results corresponding to **Karthivashan *et al.*, (2016)** who demonstrated that EEMOL increases the capability of antioxidant system and showed a modulatory effect on specific inflammatory cytokines in kidney tissues that evidence by elevated SOD, CAT and GPx activities and decreased the levels of MDA in the groups treated with MO leaf extract. These results indicate that MO leaf extracts effectively regulate and restore the antioxidant status of acetaminophen -intoxicated mice kidney.

The extract of *M. oleifera* leaves scavenged NO and inhibited MDA production due to gallic acid, chlorogenic acid, quercetin, and kaempferol were the most abundant phenolic compounds identified in the leaf extract which play important role in development antioxidant potential **(Oboh *et al.*, 2015).**

Also, our results agreement with **Mohan *et al.*, (2014)** who suggested that ethanolic extract of *Psidium guajava* leaves has nephroprotective activity against doxorubicin . The animals treated with *Psidium guajava* showed a significant increase in SOD, GPX , CAT levels and decreased level of lipid peroxidation (LPO). The ethanolic extract of *Psidium guajava* leaves possess antioxidant and free radical scavenging activity.

Histopathological examination of kidney tissues in cisplatin group showed shrunken glomeruli , hydropic degeneration in tubular epithelium and tubular necrosis these results are supported by **Ilić *et al.*, (2014).**The toxic effects of cisplatin in our study were similar to those shown by **Kim[a] *et al.*, (2015)** who reported that cisplatin caused histological changes in kidney tissues, increased generation of (ROS) and reduced antioxidant enzymes. The obtained results were in agreement with the finding of **Sonia *et al.*, (2018)** who demonstrated that cisplatin-induced nephrotoxicity by promoting oxidative renal tubular cell death.

Administration of EEMOL at two dose (100 and 200 mg/kg b.wt.) and EEPGL at dose (200 mg /kg b.wt.) improved to some extent the histopathological picture but some microscopical lesions were still apparent including mild hydropic degeneration in tubular epithelium and congested blood vessels. These results are supported by **Adeyemi and Elebiyo, (2014) and Karthivashan *et al.*, (2016)**. who stated the renoprotective effect of *Moringa oleifera* against kidney damage through enhancement of antioxidant system. In harmony with our results **Saleh, Nahed *et al* ., (2018)** when observed that *Moringa* leaf extract improved the histopathological picture but some lesions were still apparent. The best results which retained kidney tissues to normal histological picture is *Psidium guajava* (100 mg/ kg b.wt.) duo to antioxidant activity, inhibition of oxidative stress and scavenger of free radical as reported by **Udemezue *et al.*, (2014); Innih and Omage, (2018) and Wu *et al.*, (2018).**

Conclusion

Cisplatin has side effects on body organs specially kidneys. It caused acute kidney injury and nephrotoxicity . In the light of biochemical results and histological findings, EEPGL and EEMOL be suggested as neuroprotective plants duo to antioxidant activity . Therefore, this can be used for improvement kidney functions and protection from renal injury .

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Journal of Home Economics

المؤتمر الدولى السادس – العربى العشرون للإقتصاد المنزلى
" الاقتصاد المنزلى وجودة التعليم"
٢٣-٢٤ ديسمبر ٢٠١٨ م

http://homeEcon.menofia.edu.eg ISSN 1110-2578

تأثير الستخلص الإيثانولى لأوراق الجوافة والمورينجا على اصابة الكلى الحادة في فئران التجارب

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الملخص العربى:

أجريت الدراسة لمعرفة تأثير الستخلص الإيثانولى لأوراق الجوافة والمورينجا على التهاب الكلى الحاد في فئران التجارب الذكور . أجريت الدراسة باستخدام ثلاثون من ذكور فئران الألبينو والتي تبلغ أوزانهم (٢٠٠ ± ٢٠ جم) وتم تقسيمهم الى مجموعتين رئيسيتين احداهما المجموعة الرئيسية الأولى (٥ فئران) وهي المجموعة الضابطة السليمة، بينما الأخري هي المجموعة الرئيسية الثانية (٢٥ فأر) تم حقنها في الغشاء البريتوني مرة واحدة بمادة السيسبلاتين بجرعة (٧ ملجم / كجم من وزن الجسم) لاحداث اصابة الكلى الحادة. بعد احداث الاصابة تم تقسيم المجموعة الرئيسية الثانية الى خمس مجموعات , بقيت احدي المجموعات كمجموعة ضابطة موجبة بينما المجموعات الأخرى تم اعطائهم عن طريق الفم المستخلص الايثانولي لأوراق الجوافة والمورينجا بجرعتين هما ١٠٠ و٢٠٠ مجم / كجم من وزن الجسم. استمرت التجربة لمدة ست اسابيع. تم اجراء التقييم البيولوجي ويشمل النسبة المئوية لوزن الجسم المكتسب , المأخوذ الغذائي و معدل الاستفادة من كفاءة الغذاء . تم تقدير مستوى الكرياتنين واليوريا وحمض اليوريك في السيرم ، تم تقدير الانزيمات المضادة للأكسدة في انسجة الكلى (سوبر أكسيد ديسميوتيز , جلوتاثيون بيروكسيديز و الكتاليز) وقياس مؤشرات حدوث الأكسدة (المالون داى الدهيد , اكسيد النيتريك) وتم تقدير مستوى سكر الجلوكوز في الدم. وكذلك التغيرات الهستوباثولوجية في الكلى تم فحصها , ووجدت افضل النتائج في المجموعات المعالجة بالجرعات العالية لكلا المستخلصات النباتية (الجوافة والمورينجا) . وفقا لهذه النتائج يمكن استخدام المستخلصات الايثانولية لأوراق الجوافة والمورينجا في تحسين وظائف الكلى وكذلك معالجة اصابة الكلى الحادة .