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Relative Effects Of Chicory, Sonchus As Well As Leek And Celery Varieties On Paracetamol Hepatopathy And Immunity Of Rats

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Abstract: The present work aimed to evaluate the effect of chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery and Chinese celery (as 5%) on paracetamol intoxicated and immunity of rats. For this purpose, the studies included 40 rats about 150/100(g) weight. Rats were fed on normal (basal) diet for one week. The animals were divided to 8 equal groups; one was kept as control- ve group, while the other 7 groups were treated orally by paracetamol (500 mg / kg.B.Wt.) for 5 days to induce hepatotoxicity. Group (2): Control positive (+ve), in which hepatotoxicity rats were given orallyparacetamol then were fed on basal diet for 28 days. Group (3): Paracetamol hepatotoxicity rats were fed on basal diet containing 5 % chicory for 28 days. Group (4): Paracetamol hepatotoxicity rats were fed on basal diet containing 5% sonchus for 28 days. Group (5): Paracetamol hepatotoxicity rats were fed on basal diet containing 5% Egyptian leek for 28 days. Group (6): Paracetamol hepatotoxicity rats were fed on basal diet containing 5% Chinese leek for 28 days. Group (7): Paracetamol hepatotoxicity rats were fed on basal diet containing 5% Egyptian celery for 28 days. Group (8): Paracetamol hepatotoxicity rats were fed on basal diet containing 5% Chinese celery for 28 days. At the end of experimental period (28 day), animals were sacrificed. Blood samples were collected to determine the following parameters: Antioxidant enzymes (SOD,CAT and GPx), level of serum liver enzymes (ALT, AST and ALP), total cholesterol, triglycerides, lipoprotein fractions (HDL-c&LDL-c). Complete blood count including immunity cells count (WBC, Lymph,

NEUTROPHILS, and MONO) were assessed. BWG calculated, liverand kidney were weighted then kept in (10%) formalin solution for histopathological examination.The results revealedthat due to hepatointoxication, rats BWG was decreased. Feeding on basal diet contained chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery (as5%) raised the BWG. Inflicting with paracetamol raised the internal organs weights while the reverse indicated on feeding with chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery (as5%). Paracetamol hepatotoxicity rats showed an increase of TC, TG& LDL,but decreased the serum HDL. Inflicting rats with paracetamolhepatotoxicity raised the activities of serum GOT, GPT and ALP. When feeding with chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery (as5%) these levels were reduced. There were a significant decreases in SOD, GPx and CAT in the blood of rats poisoned by paracetamol, while given orally rats with paracetamol then fed on these plants revealed a significant increases when compared with (C +ve) group. Paracetamol hepatotoxicity rats decreased WBC&Lymph ,but increased NEUTROPHILS &MONO. Accordingly rats immunity raised due to feeding treatments of present work.

Key words: Chicory, Sonchus, Egyptian leek, Chinese leek, Egyptian celery, Chinese celery,antioxidant enzymes, liver enzymes ,paracetamol hepatotoxicity, immunity.

Introduction:

The liver is one of the largest solid organs of the body. It is located in the upper right part of the abdomen. Most of the organ lies under coverof the rib cage. Its major functions include processing the food that passesthrough the gut and converting it into energy that can be utilized by thebody. It is also a powerful detoxification center that handles manychemicals, alcohol, poisons and toxins as well as drugs and clears theblood from them. The liver also makes bile and stores it in a small pouch like organcalled the gallbladder. This bile helps in digestion, especially fats. Liverdiseases may vary in causation. They may be of short duration, acute liverdisease, or long term, chronic liver disease. An acute liver disease may alsoconvert into a chronic liver disease over time. Some liver diseases arecaused by infective viruses like hepatitis virus (A, B and C). Liver diseasesalso result from taking in

some drugs or alcohol over long term. Sometimes the diseased liver over long term becomes shrunken and scarred. Such a condition is called cirrhosis. Like other organs liver can also be afflictedwith cancers **(Ananya, 2013).**

Phytochemical analysis showed that the different parts *Cichoriumintybus* contained sesquiterpene lactones (especially lactucin, lactucopicrin, 8-desoxy lactucin, guaianolid glycosides, including chicoroisides B and C, sonchuside C), caffeic acid derivatives (chiroric acid, chlorogenic acid, isochlorogenic acid, dicaffeoyl tartaric acid), inulin, sugars, proteins, hydroxycoumarins, flavonoids, alkaloids, steroids, terpenoids, oils, volatile compounds, coumarins, vitamins and polyynes. It possessed hepatoprotective, gastroprotective, cardiovascular, antioxidant, hypolipidemic, anticancer, reproductive, antidiabetic, anti-inflammatory, analgesic, sedative, immunological, antimicrobial, anthelmintic, anti-protozoal, wound healing and many other pharmacological effects **(Ali, 2016)**.

The health benefits of celery are due to the excellent sources of beneficial enzymes and antioxidants. Celery is loaded with essential minerals and vitamins such as folate, potassium, vitamin B6, vitamin C and vitamin K. The nutritional values and health benefits of celery have been well studied and this vegetable has been used in culinary and folk medicine for centuries. Regular consumption of celery can help protect cardiovascular health. Moreover, anti-inflammatory and antioxidant properties of celery make it become an ideal food for patients with high cholesterol levels and blood pressure, as well as heart disease. Celery also has numerous amazing benefits for skin, liver, eye and cognitive health **(Partha, 2019)**.

Sonchusoleraceus commonly used as a fodder. Stems are used as sedative and tonic. Juice of the plant used for cleaning and healing ulcers.*Sonchusoleraceus* has many medicinal properties like antidepressant, antinociceptive, anxiolytic, antioxidant, antimicrobial, antitumor, antimalarial, blood purifier, hepatic, sedative, febrifuge, tonic, anti-inflammatory, anticancer etc.Stems and leaves are also used in cooking by local peoples. The latex in the sap is used in the treatment of warts. The leaves are applied as a poultice to inflammatory swellings. *Sonchusoleraceus* used in the treatment of headaches, general pain, diarrhea, menstrual problems, fever, hepatitis, salmonella infection, wars, eye problems, liver infections, infections, inflammation and

rheumatism. It is also used to treat a wide variety of infections **(Anon, 2019)**.

Materials And Methods

1- Materials

1.1-Plants

Chicory (*Cichoriumintybus*), Sonchus (*Sonchusoleraceus*), Egyptian leek (*Allium ampeloprasum*), Chinese leek (*Allium tuberosum*), Egyptian celery (*Apiumgraveolens*), Chinese celery (*Apiumgraveolens var. secalinum*) were obtained from local market, dried at 105C^{o} and milled.

1.2-Paracetamol

Paracetamol was obtained fromthe drug pharmacy, Menoufia, Egypt, as a toxic chemical for liver poisoning according to **Janice (2006).** In the same time, it was given orally to rats.

1.3-Animals

Forty (40) (Spargue – Dawley strain) male albino rats, weighing (150 ± 10 g) were used in this study. Rats were housed in wire cages under the normal laboratory condition and fed on basal diet for 7 consecutive days as adaptation period. Diets were introduced to rats in a special non-scattering feeding cup to avoid loss of feed and contamination. Tap water was provided to rats by means of glass tubes projecting through wire cages from inverted bottles supported to one side of the cage.

2- Methods

2.1- Induction of liver intoxication in Rats.

Thirty five (35) male albino rats (Spargue – Dawley strain) weighing (150 ± 10 g) were treated by oral administration at a dose of 500 milligrams paracetamol per kilogram of rats weight for 5 days to induce chronic damage of the liver according to the method described by **Afaf and Amel (2017) .**

2.2- Experimental designs and animal groups

Forty (40) (Spargue – Dawley strain) male albino rats were distributed into 8 groups each of 5 rats in which means of rats weight for all groups were nearly equal. All the groups of rats were housed in wire cages and fed on the experimental diet for 4 weeks according to the following groups:

Group (1): Control negative group (-ve), in which normal rats were fed on basal diet for 28 days.

Group (2): Control positive (+ve), in which hepatotoxic rats were (treated orally by paracetamol) were fed on basal diet for 28 days.
Group (3): Paracetamol hepatotoxic rats fed on basal diet containing 5 % chicory for 28 days.
Group (4): Paracetamol hepatotoxic rats fed on basal diet containing 5% sonchus for 28 days.
Group (5): Paracetamol hepatotoxic rats fed on basal diet containing 5% Egyptian leek for 28 days.
Group (6): Paracetamol hepatotoxic rats fed on basal diet containing 5% Chinese leek for 28 days.
Group (7): Paracetamol hepatotoxic rats fed on basal diet containing 5% Egyptian celery for 28 days.
Group (8): Paracetamol hepatotoxic rats fed on basal diet containing 5% Chinese celery for 28 days.

2.3-Blood samples and organs collection:

From all the previously mentioned groups, blood samples were collected after 12 hours fasting at the end of experiment. Using the retro - orbital method, by means of a micro capillary glass, blood was collected into a dry clean centrifuge tube, and left to clot at room temperature for half an hours. The blood was centrifuged for 10 minutes at 3000 r.p.m to separate the serum. Serum was carefully aspirated and transferred into clean quit fit plastic tubes and kept frozen at ($-20C^{o}$) until the time of analysis. The organs (liver, kidney, heart, lungs and spleen) were removed, washed in saline solution, blotted by filter paper and weighted; livers &kidneys stored in (10%) formalin solution according to methods described by **Drury and Wallington (1980)** for histological investigation.

2.4-Biological indices calculation

During the experimental period, the diet consumed was recorded every day, and body weight recorded every week. The body weight gain (BWG) and feed efficiency ratio (FER) were calculated according to **Chapman *et al.*, (1959)** using the following equations:

Body Weight Gain (g) = Final weight (g) - Initial Weight (g) ×100 / Initial Weight (g)

2.5-Biochemical analysis of serum

2.5.1) Determination of serum lipids profile:

2.5.1.1) Determination of serum total triglyceride

Enzymatic colorimetric determination of triglycerides was carried out according to**Fossati and Prencipe (1982).**

2.5.1.2) Determination of serum total cholesterol:

The principle used of total cholesterol determination was according to**Allain(1974)**.

2.5.1.3) Determination of serum HDL-cholesterol:

Phosphotungstic acid and magnesium ions selectivity precipitating all lipoproteins except the HDL fraction. Cholesterol present in the supernatant can be determined by the same method used for total cholesterol, according to **Lopez (1977).**

2.5.1.4) Calculation of serum LDL -cholesterol:

The calculation of serum LDL were carried out according to the method of **Lee and Nieman (1996)** as follows.

LDL (mg/dl) = Total Cholesterol - [(VLDL-C) + (HDL-C)].

2.5.2) Determination of liver enzymes:

2.5.2.1) Determination of GPT (ALT):

Determination of GPT was carried out according to the method of **Henry (1974) and Yound (1975).**

2.5.2.2) Determination of GOT (AST):

Determination of GOT was carried out according to the method of **Henry (1974) and Yound (1975).**

2.5.2.3) Determination of (ALP):

Determination of alkaline phosphatase (ALP): Kits were obtained from Bios stemsS.A.Kits, Barcelona (Spain). Serum ALP was determined according to **IFCC, (1983).**

2.5.3) **Determination of enzymatic antioxidant:**

2.5.3.1) Determination of superoxide dismutase (SOD):

Determination of SOD was carried out according to the method of **Sun *et al.*,(1988).**

2.5.3.2) Determination of glutathione peroxidase (GPx):

Determination of GPx was carried out accordingto the method of **Zhao *et al.*,(2001).**

2.5.3.3) Determination of catalase (CAT):

Determination of CAT was carried out according to the method of **Diego, (2011).**

2.5.4)Determination of serum complete blood count (CBC):

CBC was carried out by medical analysis laboratory (Elnahar) at Ashmoun, Menoufia,Egypt.

At the end of experimental period , a 5 ml blood sample were taken to determine of white blood cell count (WBC),Lymph,

NEUTROPHILS and MONO were estimated according to the method described by **Decie and Lewis (1998)**.

2.6-Histopathological examination:

Specimens of the internal organs (Liver and kidney) were taken immediately after sacrificing rats and immersed in 10% neutral buffered formalin. The fixed specimens were then trimmed and dehydrated in ascending grades of alcohol , cleared in xylene, embedded in paraffin, sectioned (4-6 Mm thiclness), stained with hematoxylin and eosin and examined microscopically **(Carleton, 1979).**

2.7-Statical analysis:

The data were statically analyzed using a Computerized Costat Program by one way ANOVA. The results are presented as mean ± SD. Differences between treatments at $p \leq 0.05$ were considered significant.

RESULTS AND DISSCUSION

Table (1) show the mean value of body weight gain % of paracetamol intoxicated rats fed on various diets. It could be noticed that the mean value of BWG% of control (+) group was lower than control (-) group, being 0.29 ±0.04 & 1.37 ± 0.3%,respectively, showing a significant difference with percent of increase +372.4 of control (-) group as compared to control (+). All paracetamol intoxicated rats fed on various diets showed significant increases in mean values as compared to control (+) group. The values were 0.98±0.06, 0.89±0.05, 1.16±0.2, 1.02±0.03, 0.94±0.05& 0.87±0.05 % forchicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery, respectively. The percent of increases were +237.9, +206.9, +300, +251.7, +224.1& +200% for groups 3,4,5,6.7 & 8, respectively. Rats fed on groups 3, 6, & 7 showed nonsignificant differences between them. Rats fed on groups 4 & 8 showed nonsignificant differences between them. The best BWG % was recorded for group5 (paracetamol intoxicated rats fed on Egyptian leek) when compared to control (+) group.

According to **Abd El-Mageed (2011)**and**Afyaa, sabah(2012)** feeding on diets containing chicory leaves, celery, ethanol extract of leek & barley grains caused the increase of BWG of hepatointoxicated rats.

Table (2) show the mean value of liver weight (g) of paracetamol intoxicated rats fed on various diets. It could be noticed that the mean value of liver (g) of control (+) group was higher than control (-) group, being 3.8±0.04 & 2.5±0.05 g, respectively, showing a significant difference with percent of decrease -34.2% of control (-) group as compared to control (+). All paracetamol intoxicated rats fed on various

diets showed a significant decrease in mean values as compared to control (+) group. The values were 2.7±0.03, 2.8±0.04, 2.6±0.02, 2.7±0.01, 2.9±0.05& 3±0.03g for chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery, respectively. Rats fed on groups 7&8 showed nonsignifcant differences between them. Nonsignifcant differences was revealed between groups 3,4,5,6&1(healthy rats).Numerically the best liver weight was recorded for group 5 (paracetamol intoxicated rats fed on Egyptian leek) when compared to control (+) group.

Table (2) indicate the mean value of kidneys weight (g) of paracetamol intoxicated rats fed on different diets. It could be noticed that the mean value of kidneys (g) of control (+) group was higher than control (-) group, being 0.8±0.02 & 0.5±0.04 g, respectively, showing a significant difference with percent of decrease -37.5% of control (-) group as compared to control (+) group. All paracetamol intoxicated rats fed on various diets showed significant decreases in mean values as compared to control (+) group. The values were 0.6±0.01, 0.7±0.03, 0.5±0.01, 0.5±0.05, 0.6±0.04& 0.6±0.02 g for Chicory, Sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery respectively. Rats fed on groups 3, 4, 5, 6, 7&8 showed nonsignificant differences between them. The best kidneys weight was revealed for groups 5&6 (paracetamol intoxicated rats fed on Egyptian leek& Chinese leek) when compared to control (+) group.

Due to hepatointoxicated internal rats organs were raised due to inflammations, while feeding on diet containing ethanol extract of leek & leek reversed such changes. **Afyaa, sabah (2012)** and **Hur and Lee (2017)**.

Data of table (3) illustrate the mean values of serum (TC) (mg/dl) ofparacetamol intoxicated rats fed on different diets. It could be observed that the mean value of (TC) of control (+) group was higher than control (-) group, being 246 ± 2.8 & 119±3.0 mg/dl, respectively, showing significant difference with percent of decrease -51.63% of control (-) group as compared to control (+) group. All paracetamol intoxicated rats fed on different diets revealed significant decreases in mean values as compared to control (+) group. The values were 168±3.1, 131±2.0, 142±3.5, 205±2.7, 195±2.0 & 235±3.1 mg/dl for chicory,sonchus,Egyptian leek, Chineseleek, Egyptian celery & Chinese celery, respectively. The percent of decreases were -31.71, - 46.75, -42.28, -16.67, -20.73& -4.47 % for groups 3, 4, 5, 6, 7&8 respectively.

Numerically the better serum (TC) was showed for group 4 (paracetamol intoxicated rats fed on sonchus) when compared to control (+) group.

Table (4) show the mean value of serum (TG) (mg/dl) of paracetamol intoxicated rats fed on different diets. It could be noticed that the mean value of (TG) of control (+) group was higher than control (-) group, being 195 ±3.0 & 86 ±2.0 mg/dl,respectively, indicating a significant difference with percent of decrease -55.9% of control (-) group as compared to control (+) group. All paracetamol intoxicated rats fed on different diets revealed a significant decrease in mean values as compared to control (+) group. The values were 131±3.3, 94 ± 2.2, 92±2.6, 160±3.2, 123±3.3 & 181±3.0 mg/dl, for chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery respectively. The percent of decreases were -32.8, - 51.8, - 52.8, - 17.9,- 36.9 & -7.18 % for groups 3, 4,5,6,7 & 8, respectively. Rats fed on groups 4&5 showed nonsignificant differences between them. Rats fed on Egyptian leek showed (treatment 5) the best serum (TG) when compared to control (+) group.

Table (5) indicate the mean value of serum (HDL-c) (mg/dl) of paracetamol intoxicated rats fed on different diets. It could be observed that the mean value of (HDL-c) of control (+) group was lower than control (-) group, being 39 ±1.2 & 40±1.0 mg/dl,respectively, showing a significant difference with percent of increase +2.56% of control (-) group as compared to control (+) group. All paracetamolintoxicated rats fed on different diets revealed a significant increase in mean values as compared to control (+) group. The values were 42±1.0, 45±1.3, 48±1.0, 36±1.2, 43±1.4&35±1.0 mg/dl. for chicory , sonchus ,Egyptian leek ,Chinese leek , Egyptian celery & Chinese celery respectively. The percent of increases& decreases were +7.69, +15.38, +23.08, -7.69, +10.26 &-10.26 % for groups 3, 4, 5, 6, 7&8, respectively. Numerically the best serum (HDL-c) was observed for group 5 (hepatointoxicated rats fed on Egyptian leek). This group showed significant increase, as compared to other treated groups.

Data in table (6) illustrate the mean value of serum (LDL-c) (mg/dl) of paracetamol intoxicated rats fed on different diets. It could be observed that the mean value of (LDL-c) of control (+) group was higher than control (-) group, being 167 ±1.6 & 62 ±1.3 mg/dl, respectively, showing a significant difference with percent of decrease -62.87% of control (-) group as compared to control (+) group. All paracetamol intoxicated rats fed on different diets revealed a significant decrease in

mean values as compared to control (+) group. The values were 100±1.2, 107±1.1, 76±1.4, 137±1.0, 127±1.0 &164±1.2 mg/dl. for chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery respectively. The percent of decreases were -40.12, -35.93, -54.49, -17.96,-23.95 & -1.79 % for groups 3, 4, 5, 6, 7&8, respectively. Rats fed on group 5(Egyptian leek) recorded the best result of serum (LDL-c).

It is worthy to mention that due to liver function disorder,serum TC, TG, HDL and LDL were raised, while leading on diet containing purslane, purslane seeds, celery and celery seeds reversed these changes. **Manal and Sahar (2012)**and**Mahin*et al*., (2015).**

Data of table (7) illustrate the mean value of serum (GOT) (U/L) of paracetamol intoxicated rats fed on various diets. It could be noticed that the mean value of (GOT) of control (+) group was higher than control (-) group, being 167 ±3.0& 27 ±2.0 U/L, respectively, showing a significant difference with percent of decrease -83.83 % of control (-) group when compared to control (+) group. All paracetamol intoxicated rats fed on different diets revealed a significant decrease in mean values as compared to control (+) group. The values were 72±2.0, 48±2.0, 40±2.0, 89±1.0, 57±2.0 & 81±2.0 U/L for chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery, respectively. The percent of decreases were -56.89 , -71.26 , -76.05 , -46.71 ,-65.87 & -51.49 % for groups 3,4,5,6,7&8 respectively. Egyptian leek (group5) revealed the best treatment when compared to control (+) group considering (AST) activity.

Data of table (8) show the mean value of serum (GPT) (U/L) of paracetamol intoxicated rats fed on different diets. It could be observed that the mean value of (GPT) of control (+) group was higher than control (-) group, being 103 ±3.2 & 21 ±2.6 U/L, respectively, showing a significant difference with percent of decrease -79.61 % of control (-) group when compared to control (+) group. All paracetamol intoxicated rats fed on various diets revealed significant decreases in mean values as compared to control (+) group. The values were 53±3.0, 40±2.2, 39±3.1, 69±3.0, 43±2.9 & 52±3.5 U/L for chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery, respectively. The percent of decreases were -48.54,-61.17 , -62.14 , -33.01,-58.25 & -49.51 % for groups 3,4,5,6,7&8, respectively. Rats fed on groups 4, 5 &7 showed nonsignificant differences between them. Also groups 3&8 indicated nonsignificant differences. Egyptian leek (group5) revealed the best treatment when compared to control (+) group considering (ALT) activity.

Data of table (9) illustrate the mean value of serum (ALP) (U/L) of hepatointoxicated rats fed on various diets. It could be noticed that the mean value of (ALP)of control (+) group was higher than control (-) group, being 356 ±4.0 & 210 ±3.0 U/L, respectively, indicated a significant difference with percent of decrease -41.01 % of control (-) group when compared to control (+)group. All hepatointoxicated rats fed on various diets revealed a significant decrease in mean values as compared to control (+) group. The values were 340±3.0, 338±2.0, 207±3.0, 274±3.0, 350±5.0 & 312±3.0 U/L for chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery, respectively. The percent of decreases were -4.49, -5.06,-41.85, -23.03,-1.69 & -12.36% for groups 3, 4, 5, 6, 7&8, respectively. Rats fed on groups 3&4 showed nonsignificant differences between them. Egyptian leek diet recorded the better treatment of serum ALP**.**

Data of table (10) indicate the mean value of serum (GOT) / (GPT)ratio (U/L) of paracetamol intoxicated rats fed on various diets. It could be noticed that the mean value of (GOT) / (GPT) ratio of control (+) group was higher than control (-) group, being 1.62 ±0.22 & 1.29 ±0.2 U/L, respectively, showing a significant difference with percent of decrease -20.37 % of control (-) group when compared to control (+) group. All hepatic rats fed on various diets revealed a significant decrease in mean values as compared to control (+) group. The values were 1.36±0.02, 1.19±0.01, 1.02±0.09, 1.29±0.05, 1.33±0.02& 1.56±0.13 U/L for chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery &Chinese celery, respectively. The percent of decreases were -16.05 , -26.54 , -37.04 ,-20.37, -17.9& -3.70% for groups 3,4,5,6,7&8, respectively. Rats fed on groups3, 4, 6 &7 showed nonsignificant differences between them. The best treatment considering the GOT/ GPT ratio was recorded for group "5" even in comparison with group"1" healthy rats.

As reported by **Abd El-Mageed (2011)** and**Afyaa, sabah(2012)**hepatointoxicated caused the rise of liver enzymes (AST, ALT, ALP) and also AST/ALT ration which were reversed when feeding inflicted rats with diets containing plants (chicory leaves, celery, barley grains and leek extract) . Damage of liver cells raised the escaped liver enzymes in serum.

Data of table (11) indicate the mean value of serum GPx (mU/mL) of paracetamol intoxicated rats fed on various diets. It could be observed that the mean value of GPx of control (+) group was lower than control (-) group, being 24 ±1.8 & 82 ±2.0 mU/mL, respectively, showing a

significant difference with percent of increase +241.67 % of control (-) group when compared to control (+) group. All hepatic rats fed on different diets revealed a significant increase in mean values as compared to control (+) group. The values were 58±2.2, 50±1.9, 73±2.0, 71±2.1, 47±1.7 &43±1.9 mU/mL for chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery, respectively. The percent of increases were +141.67, + 108.33, +204.17, +195.83, +95.83&+79.17 % for groups 3, 4, 5, 6, 7&8, respectively. Rats of groups5 &6 showed nonsignificant differences between them. Also Rats of groups4&7 showed nonsignificant differences between them. Groups 5 & 6 recorded numerically the best treatments for increasing GPx.

Data of table (12) illustrate the mean value of serum SOD enzyme (U/mL) of hepatic rats fed on various diets. It could be noticed that the mean value of SOD of control (+) group was lower than control (-) group, being 585 ±2.0 & 1218 ±6.0 U/mL, respectively, showing a significant difference with percent of increase +108.21 % of control (-) group when compared to control (+)group. All hepatic rats fed on different diets indicateda significant increase in mean values as compared to control (+) group. The values were 960±5.0, 918±4.0, 1130±5.0, 1120±5.0, 870±4.0 & 854±4.0 U/mL for chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery,respectively. The percent of increases were + 64.10, +56.92, +93.16, +91.45, +48.72 & +45.98% for groups 3, 4, 5, 6, 7&8, respectively. Group 5 revealed maximum efficiency as regards SOD enzyme activity.

Data of table (13) illustrate the mean value of serum catalase enzyme (U/L) of hepatic rats fed on various diets. It could be observed that the mean value of catalase of control (+) group was lower than control (-) group, being 32 ±2.0 & 146 ±3.0 U/L, respectively, indicating a significant difference with percent of increase +356.25 % of control (-) group when compared to control (+) group. All hepatic rats fed on different diets showed a significant increase in mean values as compared to control (+) group. The values were 123±4.0, 128±3.0, 138±3.0, 134±3.0, 103±2.0 & 92±2.0 U/L for chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery, respectively. The percent of increases were +284.38 , +300 , +331.25 , +318.75 , 221.88 & +187.5% for groups 3,4,5,6,7&8, respectively. Rats of groups 5 &6 revealed nonsignificant differences between them. Numerically group 5(rats fed on diet containing Egyptian leek) showed maximum improvement as regards catalase enzyme activity.

GPX, SOD and CAT activating were reduced in hepatointoxicated rats while their activities increased in the inflicted rats serum fed on plant parts**Samarghandian *et al*.,(2013**) and**Xingli*et al.*, (2017).**

Data of table (14) revealed the mean value of WBC (10^3 /l) of paracetamol intoxicated fed on different diets. It could be noticed that the mean value of (WBC) of control (+) group was lower than control (-) group, being 7.2 ±1.2 & 15.9 ±1.1 (10^3 /l), respectively, showing a significant difference with percent of increase +120.83% of control (-) group when compared to control (+) group. All hepatointoxicated rats fed on various diets showed a significant increase in mean values as compared to control (+) group. The values were 13.7±1.2, 13.1±1.1, 14.6±1.2, 14±1.0, 12.8±1.1 & 12.3±1.1 (10^3 /l) for chicory,sonchus, Egyptianleek, Chineseleek, Egyptian celery& Chinese celery, respectively. The percent of increases were +90.28, +81.94, +102.78 +94.44, +77.78&+70.83 % for groups 3, 4, 5, 6, 7&8, respectively. Rats fed on groups 3, 4&7 showed nonsignificant differences between them. The best treatments was recorded for group 5 considering WBC.

According to **Samson *et al*., (2012)** WBC level decreased for hepatointoxicated rats, but were raised when inflicted rats fed on diets containing certain plants.

Data of table (15) revealed the mean value of Lymph % of paracetamol intoxicated fed on different diets as immunity markers. It could be noticed that the mean value of (Lymph) of control (+) group was lower than control (-) group, being 14.2 ±1.2 & 39.2 ±1.1%, respectively, showing a significant difference with percent of increase +176.06% of control (-) group when compared to control (+) group. All hepatointoxicated rats fed on various diets showed a significant increase in mean values as compared to control (+) group. The values were 28±1.0, 25.5±1.1, 40.1±1.1, 32.2±1.2, 27.4±1.2 & 24.8±1.1 % for chicory,sonchus, Egyptianleek, Chineseleek, Egyptian celery& Chinese celery, respectively. The percent of increases were +97.18, +79.58, +182.39, +126.76, +92.96, &+74.65 % for groups 3, 4, 5, 6, 7&8, respectively. The best treatment was recorded for group 5 considering Lymph.

Data of table (15) revealed the mean value of NEUTROPHILS %of paracetamol intoxicated fed on different diets. It could be noticed that the mean value of (NEUTROPHILS) of control (+) group was higher than control (-) group, being 60.4 ±1.1 & 50.5 ±1.1%, respectively, showing a significant difference with percent of decrease -16.39% of control (-) group when compared to control (+) group. All

hepatointoxicated rats fed on various diets showed a significant decrease in mean values as compared to control (+) group. The values were 52±1, 53.2±1.1, 50±1.0, 53±1.0, 54.1±1.1 & 55.3±1.1 % for chicory,sonchus, Egyptianleek, Chineseleek, Egyptian celery& Chinese celery, respectively. The percent of decreases were -13.91, -11.92, -17.22,-12.25, -10.43&-8.44 % for groups 3, 4, 5, 6, 7&8, respectively. Rats fed on groups 4&6showed nonsignificant differences between them. The best treatment was recorded for group 5 considering NEUTROPHILS.

Data of table (15) revealed the mean value of MONO %of paracetamol intoxicated fed on different diets. It could be noticed that the mean value of (MONO) of control (+) group was higher than control (-) group, being 25.4 ±1.1 & 10.3 ±1.1%, respectively, showing a significant difference with percent of decrease -59.45% of control (-) group when compared to control (+) group. All hepatointoxicated rats fed on various diets showed a significant decrease in mean values as compared to control (+) group. The values were 20±1.0, 21.3±1.2, 9.9±1.1, 14.8±1.1, 18.5±1.2 & 19.1±1.1 % for chicory,sonchus, Egyptianleek, Chineseleek, Egyptian celery& Chinese celery, respectively. The percent of decreases were -21.26, -16.14, -61.02, -41.73, -27.17&-24.80% for groups 3, 4, 5, 6, 7&8, respectively. Rats fed on groups 7&8 showed nonsignificant differences between them. The best treatment was recorded for group 5 considering MONO.

As reported by **Uorakkottil*et al*., (2016)** and **Muhammad *et al*., (2017)**hepatointoxicated changed the levels of Lymph, Neutrophils and Mono levels, while feeding on diets containing certain herbs reversed these changes indicating improvement of immunity of inflicted rats.

The Histopathological Results:

Liver:

Microscopically, liver of rats from group 1 revealed the normal histological structure of hepatic lobule (Photoes 1 & 2). In contrary, liver of rats from group 2 revealed cytoplasmic vacuolization of hepatocytes (Photo 3) and fibroplasia in the portal triad (Photo 4). Meanwhile, liver from groups 3, 4, 5&6 revealed no histopathological changes (Photoes 5, 6, 7 & 8). However, liver from group 7 showed necrosis of sporadic hepatocytes and portal infiltration with inflammatory cells.Examined sections from group 8 revealed slight cytoplasmic vacuolization of hepatocytes and binucleation of hepatocytes.

Kidney:

Microscopically, kidneys of rats from group 1 revealed the normal histological structure of renal parenchyma (Photoes9& 10). Meanwhile,

Kidneys of rats from group 2 showed pyknosis of the nuclei of epithelial lining renal tubules, vacuolation of endothelial lining glomerular tuft (Photo 11), vacuolation of epithelial lining renal tubules and proteinaceous material in the lumen of renal tubules (Photo 12). However, sections from group 3 revealed vacuolation of endothelial lining glomerular tuft, proteinaceous material in the lumen of renal tubules (Photo 13) and vacuolation of epithelial lining renal tubules (Photo 14). Moreover, sections from group 4 revealed vacuolation of epithelial lining renal tubules, congestion of renal blood vessel (Photo 15) and slight vacuolation of endothelial lining glomerular tuft (Photo 16). Meanwhile, kidneys from group 5 revealed no histopathological changes (Photo17). Moreover, kidneys from group 6 showed no histopathological changes except slight granular degeneration of epithelial lining some renal tubules. Congestion of glomerular tuft and renal blood vessels was the only histopathological finding observed in kidneys from group 7. However, sections from group 8 revealed congestion of glomerular tuft and renal blood vessels as well as proteinaceous material in the lumen of renal tubules.

Table (1): Effect of chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery on body weight gain % of paracetamol intoxicated rats

Parameter / Groups	BWG% (Mean±SD)	% change of (+Ve) group
Control –ve(G1)	$1.37^{a} \pm 0.3$	+372.4
Control+ve(G2)	$0.29^{d} \pm 0.04$	00.00
5%Chicory(G3)	$0.98^{bc} \pm 0.06$	+ 237.9
5%Sonchus(G4)	$0.89^{c} \pm 0.05$	+206.9
5%Egyptian leek(G5)	$1.16^{ab} \pm 0.2$	+300.0
5%Chinese leek(G6)	$1.02^{bc} \pm .03$	+251.7
5%Egyptian celery(G7)	$0.94^{bc} \pm 0.05$	+ 224.1
5%Chinese celery(G8)	$0.87^{c} \pm 0.05$	+ 200.0
LSD	**.232**	

Values denote arithmetic means ± standard deviation of the mean.

Means with different letters (**a,b, c, d**, etc ,) in the same column differ significantly atp ≤ 0.05 using ANOVA test , while those with similar letters are non-significantly different .

Table (2): Effect of chicory, sonchus,Egyptian leek, Chinese leek,Egyptian celery & Chinese celery on organs weight (g) ofparacetamol intoxicated rats

Parameter / Groups	Liver (g) (Mean±SD)	Kidneys (g) (Mean±SD)
Control –ve(G1)	2.5^{b} ± 0. 05	0.5^{a} ± 0.04
Control+ve(G2)	3.8^{a} ± 0.04	0.8^{a} ± 0.02
5%Chicory(G3)	2.7^{b} ± 0.03	0.6^{a} ± 0.01
5%Sonchus(G4)	2.8^{b} ± 0.04	0.7^{a} ± 0.03
5%Egyptian leek(G5)	2.6^{b} ± 0.02	0.5^{a} ± 0.01
5%Chinese leek(G6)	2.7^{b}± 0.01	0.5^{a} ± 0.05
5%Egyptian celery(G7)	2.9^{ab}± 0.05	0.6^{a} ± 0.04
5%Chinese celery(G8)	3.0^{ab}± 0.03	0.6^{a} ± 0.02
LSD	**0.865**	**0.346**

Values denote arithmetic means ± standard deviation of the mean .

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (3): Effect of chicory, sonchus,Egyptian leek, Chinese leek,Egyptian celery & Chinese celery on serum cholesterol ofparacetamol intoxicated rats

Parameter / Groups	Serum cholesterol (mg/dl)*(Mean±SD)	% change of (+Ve) group
Control –ve(G1)	119^{h} ± 3.0	-51.63
Control+ve(G2)	246^{a} ± 2.8	00.00
5%Chicory(G3)	168^{e} ± 3.1	-31.71
5%Sonchus(G4)	131^{g} ± 2.0	-46.75
5%Egyptian leek(G5)	142^{f} ±3.5	-42.28
5%Chinese leek(G6)	205^{c} ± 2.7	-16.67
5%Egyptian celery(G7)	195^{d} ± 2.0	-20.73
5%Chinese celery(G8)	235^{b} ± 3.1	-4.47
LSD	**5.19**	

(mg/dl)* means milligram per deciliter.

Values denote arithmetic means ± standard deviation of the mean .

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (4): Effect of chicory, sonchus,Egyptian leek, Chineseleek, Egyptian celery & Chinese celery on serum triglyceridesof paracetamol intoxicated rats

Parameter / Groups	Serum triglycerides (mg/dl)* (Mean±SD)	% change of (+Ve) group
Control –ve(G1)	$86^{g} \pm 2.0$	-55.9
Control+ve(G2)	$195^{a} \pm 3.0$	00.00
5%Chicory(G3)	$131^{d} \pm 3.3$	-32.8
5%Sonchus(G4)	$94^{f} \pm 2.2$	-51.8
5%Egyptian leek(G5)	$92^{f} \pm 2.6$	-52.8
5%Chinese leek(G6)	$160^{c} \pm 3.2$	-17.9
5%Egyptian celery(G7)	$123^{e} \pm 3.3$	-36.9
5%Chinese celery(G8)	$181^{b} \pm 3.0$	-7.18
LSD	**4.62**	

(mg/dl)* means milligram per deciliter.

Values denote arithmetic means ± standard deviation of the mean .

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (5): Effect of chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery on serum high densitylipoprotein-cholesterol of paracetamol intoxicated rats

Parameter / Groups	Serum HDL-c (mg/dl)* (Mean±SD)	% change of (+Ve) group
Control –ve(G1)	$40^{cd} \pm 1.0$	+2.56
Control+ve(G2)	$39^{de} \pm 1.2$	00.00
5%Chicory(G3)	$42^{bcd} \pm 1.0$	+7.69
5%Sonchus(G4)	$45^{ab} \pm 1.3$	+15.38
5%Egyptian leek(G5)	$48^{a} \pm 1.0$	+23.08
5%Chinese leek(G6)	$36^{ef} \pm 1.2$	-7.69
5%Egyptian celery(G7)	$43^{bc} \pm 1.4$	+10.26
5%Chinese celery(G8)	$35^{f} \pm 1.0$	-10.26
LSD	**3.295**	

(mg/dl)* means milligram per deciliter

Values denote arithmetic means ± standard deviation of the mean .

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (6): Effect of chicory, sonchus,Egyptian leek, Chinese leek,Egyptian celery & Chinese celery on serum low densitylipoprotein-cholesterol of paracetamol intoxicated rats

Parameter / Groups	Serum LDL-c (mg/dl)* (Mean±SD)	% change of (+Ve) group
Control –ve(G1)	62^{g} ± 1.3	-62.87
Control+ve(G2)	167^{a} ± 1.6	00.00
5%Chicory(G3)	100^{e} ± 1.2	-40.12
5%Sonchus(G4)	107^{d} ± 1.1	-35.93
5%Egyptian leek(G5)	76^{f} ±1.4	-54.49
5%Chinese leek(G6)	137^{b} ± 1.0	-17.96
5%Egyptian celery(G7)	127^{c} ± 1.0	-23.95
5%Chinese celery(G8)	164^{a} ± 1.2	-1.79
LSD	**4.195**	

(mg/dl)* means milligram per deciliter

Values denote arithmetic means ± standard deviation of the mean.

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (7): Effect of chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery on GOT (AST) ofparacetamol intoxicated rats

Parameter / Groups	AST (U/L)* (Mean±SD)	% change of (+Ve) group
Control –ve(G1)	27^{h}± 2.0	-83,83
Control+ve(G2)	167^{a} ± 3.0	00.00
5%Chicory(G3)	72^{d} ± 2.0	-56.89
5%Sonchus(G4)	48^{f} ± 2.0	-71.26
5%Egyptian leek(G5)	40^{g} ± 2.0	-76.05
5%Chinese leek(G6)	89^{b} ± 1.0	-46.71
5%Egyptian celery(G7)	57^{e} ± 2.0	-65.87
5%Chinese celery(G8)	81^{c} ± 2.0	-51.49
LSD	**3.57**	

(U/L)* means unit per liter.

Values denote arithmetic means ± standard deviation of the mean .

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (8): Effect of chicory, sonchus,Egyptian leek, Chinese leek,Egyptian celery & Chinese celery on GPT (ALT) of paracetamol intoxicated rats

Parameter / Groups	ALT (U/L)* (Mean±SD)	% change of (+Ve) group
Control –ve(G1)	21^{e}± 2.6	-79.61
Control+ve(G2)	103^{a} ± 3.2	00.00
5%Chicory(G3)	53^{c} ± 3.0	-48.54
5%Sonchus(G4)	40^{d} ± 2.2	-61.17
5%Egyptian leek(G5)	39^{d} ± 3.1	-62.14
5%Chinese leek(G6)	69^{b} ± 3.0	-33.01
5%Egyptian celery(G7)	43^{d} ± 2.9	-58.25
5%Chinese celery(G8)	52^{c} ± 3.5	-49.51
LSD	**3.97**	

(U/L)* means unit per liter

Values denote arithmetic means ± standard deviation of the mean.

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (9): Effect of chicory, sonchus,Egyptian leek, Chinese leek,Egyptian celery & Chinese celery on ALP of paracetamolintoxicated rats

Parameter / Groups	Alkaline phosphates (U/L)* (Mean±SD)	% change of (+Ve) group
Control –ve(G1)	210^{f}± 3.0	-41.01
Control+ve(G2)	356^{a} ± 4.0	00.00
5%Chicory(G3)	340^{c} ± 3.0	-4.94
5%Sonchus(G4)	338^{c} ± 2.0	-5.06
5%Egyptian leek(G5)	207^{f}± 3.0	-41.85
5%Chinese leek(G6)	274^{e} ± 3.0	-23.03
5%Egyptian celery(G7)	350^{b} ± 5.0	-1.69
5%Chinese celery(G8)	312^{d} ± 3.0	-12.36
LSD	**5.8**	

(U/L)* means unit per liter

Values denote arithmetic means ± standard deviation of the mean .

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (10): Effect of chicory, sonchus,Egyptian leek, Chinese leek,Egyptian celery & Chinese celery on AST / ALT (U/L) ofhepatointoxicated rats

Parameter / Groups	AST / ALT (U/L)* (Mean±SD)	% change of (+Ve) group
Control –ve(G1)	1.29 ^{b}± 0.2	-20.37
Control+ve(G2)	1.62^{a} ± 0.22	00.00
5%Chicory(G3)	1.36^{b} ± 0.02	-16.05
5%Sonchus(G4)	1.19^{b} ± 0.01	-26.54
5%Egyptian leek(G5)	1.02^{c}± 0.09	-37.04
5%Chinese leek(G6)	1.29^{b} ± 0.05	-20.37
5%Egyptian celery(G7)	1.33^{b} ± 0.02	-17.9
5%Chinese celery(G8)	1.56^{a} ± 0.13	-3.70
LSD	**.179**	

(U/L)* means unit per liter

Values denote arithmetic means ± standard deviation of the mean .

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (11): Effect of chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery onglutathioneper - oxidase (GPx) mU/mL of hepatointoxicated rats

Parameter / Groups	GPx (mU/mL) Mean ± SD	% change of (+Ve) group
Control –ve(G1)	82 ^{a}± 2.0	+241.67
Control+ve(G2)	24^{f} ± 1.8	00.00
5%Chicory(G3)	58^{c} ± 2.2	+141.67
5%Sonchus(G4)	50^{d} ± 1.9	+108.33
5%Egyptian leek(G5)	73^{b} ± 2.0	+204.17
5%Chinese leek(G6)	71^{b} ± 2.1	+195.83
5%Egyptian celery(G7)	47 ^{d} ± 1.7	+95.83
5%Chinese celery(G8)	43^{e} ± 1.9	+79.17
LSD	**3.46**	

Values denote arithmetic means ± standard deviation of the mean.

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (12): Effect of chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery onsuper oxidedismutase enzyme (U/mL) ofhepatointoxicated rats

Parameter / Groups	SOD (U/mL) (Mean±SD)	% change of (+Ve) group
Control –ve(G1)	1218 ^{a}± 6.0	+108.21
Control+ve(G2)	585^{h}± 2.0	00.00
5%Chicory(G3)	960^{d} ± 5.0	+64.10
5%Sonchus(G4)	918^{e} ± 4.0	+56.92
5%Egyptian leek(G5)	1130^{b} ± 5.0	+93.16
5%Chinese leek(G6)	1120^{c} ± 5.0	+91.45
5%Egyptian celery(G7)	870 ^{f} ± 4.0	+48.72
5%Chinese celery(G8)	854^{g} ± 4.0	+45.98
LSD	**7.81**	

(U/mL)* means unit per mil liter.

Values denote arithmetic means ± standard deviation of the mean .

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (13): Effect of chicory, Sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery oncatalase enzyme (U/L) of hepatointoxicated rats

Parameter / Groups	Catalase (U/L) (Mean±SD)	% change of (+Ve) group
Control –ve(G1)	146 ^{a}± 3.0	+356.25
Control+ve(G2)	32^{g}± 2.0	00.00
5%Chicory(G3)	123^{d} ± 4.0	+284.38
5%Sonchus(G4)	128^{c} ± 3.0	+300
5%Egyptian leek(G5)	138^{b} ± 3.0	+331.25
5%Chinese leek(G6)	134^{b} ± 3.0	+318.75
5%Egyptian celery(G7)	103 ^{e} ± 2.0	+221.88
5%Chinese celery(G8)	92^{f} ± 2.0	+187.5
LSD	**4.895**	

(U/L)* means unit per liter.

Values denote arithmetic means ± standard deviation of the mean .

Means with different letters (**a,b, c, d,**etc ,) in the same column differ significantly at p $\leq$0.05 using **ANOVA** test , while those with similar letters are non-significantly different .

Table (14): Effect of chicory, sonchus,Egyptian leek, Chinese leek,Egyptian celery & Chinese celery on WBC ofparacetamol intoxicated rats

Parameter / Groups	WBC (10^3 /l)	
	Mean ± SD	% change of (+Ve) group
Control –ve(G1)	15.9^{a} ± 1.1	+120.83
Control+ve(G2)	7.2^{d} ± 1.2	00.00
5%Chicory(G3)	13.7^{bc} ± 1.2	+90.28
5%Sonchus(G4)	13.1^{bc} ± 1.1	+81.94
5%Egyptian leek(G5)	14.6^{ab} ± 1.2	+102.78
5%Chinese leek(G6)	14^{abc} ± 1	+94.44
5%Egyptian celery(G7)	12.8^{bc} ± 1.1	+77.78
5%Chinese celery(G8)	12.3^{c}± 1.1	+70.83
LSD	**1.95**	

- Values denote arithmetic means ± standard error of the means.
- Means with different letters (a, b, c, d) in the same column differ significantly at p≤0.05using one way ANOVA test, while those with similar letters are non-significantly different.

Table (15): Effect of chicory, sonchus,Egyptian leek, Chinese leek, Egyptian celery & Chinese celery on Lymph, NEUTROPHILS & MONO of paracetamol intoxicatedrats

Parameter / Groups	Lymph %		NEUTROPHILS %		MONO %	
	Mean ± SD	% change of (+Ve) group	Mean ± SD	% change of (+Ve) group	Mean ± SD	% change of (+Ve) group
Control –ve(G1)	39.2^{a} ± 1.1	+176.06	50.5^{ef} ± 1.1	-16.39	10.3^{e}± 1.1	-59.45
Control+ve(G2)	14.2^{f} ± 1.2	00.00	60.4^{a} ± 1.1	00.00	25.4^{a} ± 1.1	00.00
5%Chicory(G3)	28^{c} ± 1.0	+97.18	52^{de} ± 1.0	-13.91	20^{bc} ± 1.0	-21.26
5%Sonchus(G4)	25.5^{de} ± 1.1	+79.58	53.2^{cd} ± 1.1	-11.92	21.3^{b} ± 1.2	-16.14
5%Egyptian leek(G5)	40.1^{a} ± 1.1	+182.39	50^{f} ± 1.0	-17.22	9.9^{e} ± 1.1	-61.02
5%Chinese leek(G6)	32.2^{b} ± 1.2	+126.76	53^{cd} ± 1.0	-12.25	14.8^{d} ± 1.1	-41.73
5%Egyptian celery(G7)	27.4^{cd} ± 1.2	+92.96	54.1^{bc}± 1.1	-10.43	18.5^{c} ± 1.2	-27.17
5%Chinese celery(G8)	24.8^{e} ± 1.1	+74.65	55.3^{b} ± 1.1	-8.44	19.1^{a} ± 1.1	-24.80
LSD	**1.95**		**1.84**		**1.93**	

- Values denote arithmetic means ± standard error of the means.
- Means with different letters (a, b, c, d) in the same column differ significantly at p≤0.05using one way ANOVA test, while those with similar letters are non-significantly different.

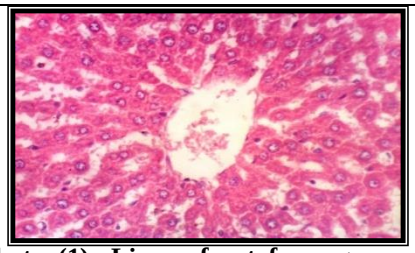

Photo (1): Liver of rat from group 1 showing the normal histological structure of hepatic lobule (H & E X 400).

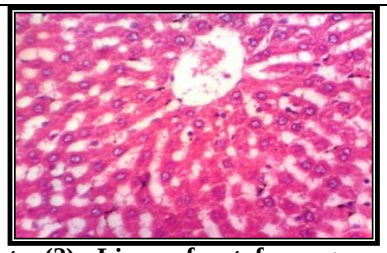

Photo (2): Liver of rat from group 1 showing the normal histological structure of hepatic lobule (H & E X 400).

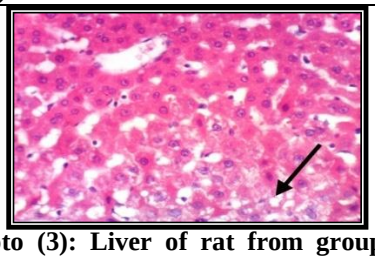

Photo (3): Liver of rat from group 2 showing cytoplasmic vacuolization of hepatocytes (H & E X 400).

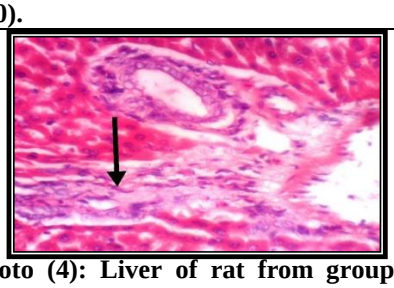

Photo (4): Liver of rat from group 2 showing fibroplasia in the portal triad (H & E X 400).

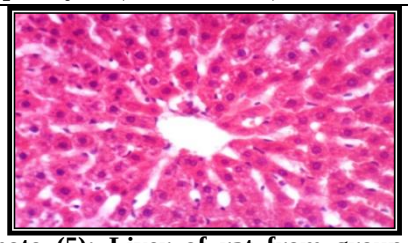

Photo (5): Liver of rat from group 3 showing no histopathological changes(H & E X 400).

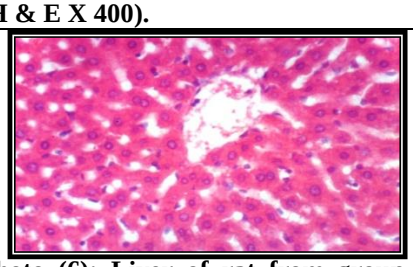

Photo (6): Liver of rat from group 3 showing no histopathological changes (H & E X 400).

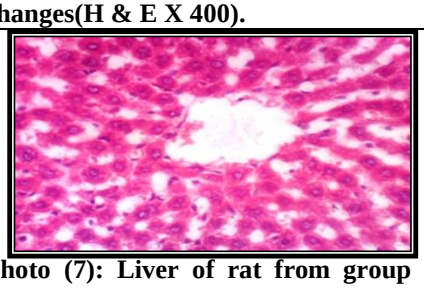

Photo (7): Liver of rat from group 4 showing no histopathological changes (H & E X 400).

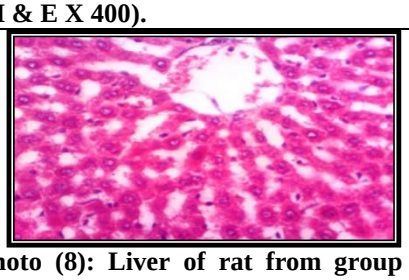

Photo (8): Liver of rat from group 5 showing no histopathological changes(H & E X 400).

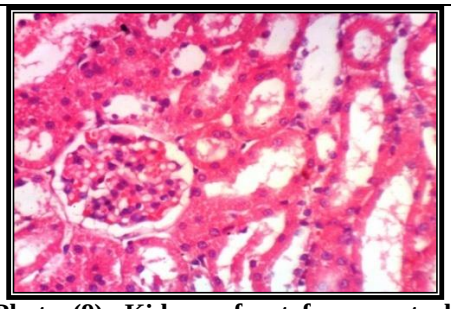

Photo (9): Kidney of rat from control normal group showing the normal histological structure of renal parenchyma (H & E X 400).

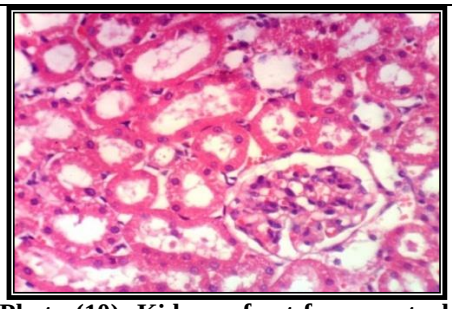

Photo (10): Kidney of rat from control normal group showing the normal histological structure of renal parenchyma (H & E X 400).

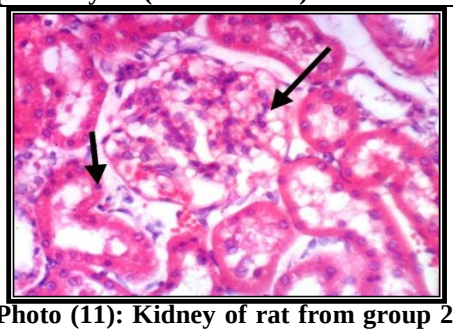

Photo (11): Kidney of rat from group 2 showing pyknosis of the nuclei of epithelial lining renal tubules and vacuolation of endothelial lining glomerular tuft (H & E X 400).

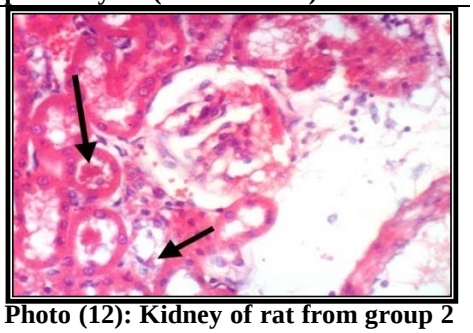

Photo (12): Kidney of rat from group 2 showing vacuolation of epithelial lining renal tubules and proteinaceous material in the lumen of renal tubules (H & E X 400).

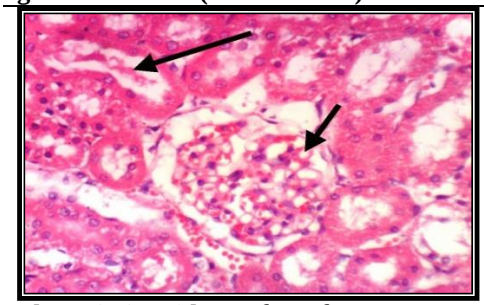

Photo (13): Kidney of rat from group 3 showing vacuolation of endothelial lining glomerular tuft and proteinaceous material in the lumen of renal tubules (H & E X 400).

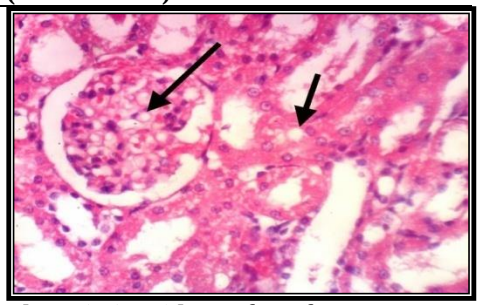

Photo (14): Kidney of rat from group 3 showing vacuolation of epithelial lining renal tubules and endothelial lining glomerular tuft (H & E X 400).

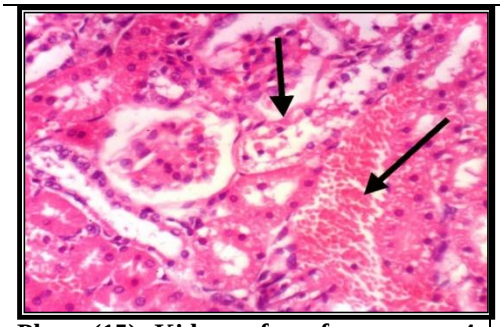

Photo (15): Kidney of rat from group 4 showing vacuolation of epithelial lining renal tubules and congestion of renal blood vessel (H & E X 400).

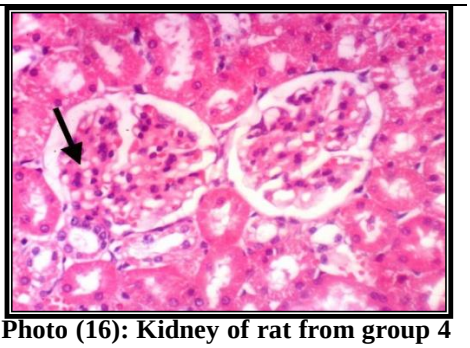

Photo (16): Kidney of rat from group 4 showing slight vacuolation of endothelial lining glomerular tuft (H & E X 400).

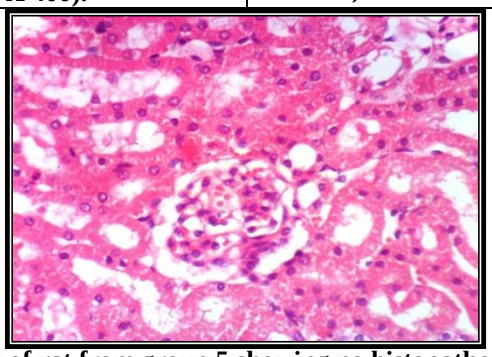

Photo (17): Kidney of rat from group 5 showing no histopathological changes (H & E X 400).

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التأثيرات النسبية للسريس والجعضيض بالإضافة إلي أنواع الكرفسوالكرات علي مرض الكبد والمناعة للفئران المحقونة بالباراسيتامول

محمد سمير الدشلوطي ،عزه محمد الاسكافي،محمد عبد المنصف عبد الرسول
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الملخص العربي

تم إجراء هذه الدراسةالحاليه لمعرفةالتأثيرات العلاجية لكل من النباتات(السريس + الجعضيض + الكرات المصري والصيني +الكرفس المصري والصيني) بنسبة ٥% على الخلل الفسيولوجى الحادث فىالكبد والمناعةللفئران المصابه بمرض الكبد بالبارسيتامول .وقد أجريت هذه الدراسه على عدد 40 فأر ابيض بالغ يتراوح وزن كل منهم (١٥٠± ١٠ جم) ويتم تغذيتها على الغذاء الاساسى ويقدم لها الماء طوال التجربه.وتم تقسيم الفئران الى 8 مجموعات متساويه وتركت احداها كمجموعه ظابطه (سالبه) اما المجموعات السبع الاخرى فتم احداث تسمم للكبد تدريجيا باستخدام الباراسيتامولبالفم بنسبه 500 ملجم / كجم من وزن الجسم لمده 5 ايام وتم تقسيم الفئران المصابه الى مجموعات كالاتى :المجموعهالثانيه : تركت كمجموعه ضابطه موجبه ويتم تغذيتها على الغذاء الاساسى .المجموعهالثالثه : اعطيت الغذاء الاساسىبالاضافه الى ٥% من مسحوق نبات السريس.المجموعهالرابعه : اعطيت الغذاء الاساسىبالاضافه الى ٥% من مسحوق نبات الجعضيض.المجموعهالخامسه: اعطيت الغذاء الاساسىبالاضافه الى٥% من مسحوق الكرات المصري.المجموعهالسادسه : اعطيت الغذاء الاساسىبالاضافه الى٥% من مسحوق الكرات الصيني .المجموعهالسابعه : اعطيت الغذاء الاساسىبالاضافه الى٥% من مسحوق الكرفس المصري.المجموعهالثامنه: اعطيت الغذاء الاساسىبالاضافه الى٥% من مسحوق الكرفس الصيني.وقد تم اعطاء النباتات السالف ذكرها لمده ٢٨ يوم . وبعد نهايهالتجربه تم أخذ عينات الدم من جميع الفئران بكل المجموعات ويتم فصل السيرم وذلك لقياس مايلى من المؤشرات البيولوجيه وتشملانزيمات الكبد (ALT,AST,ALP)والكوليسترول الكلى ,الجليسريداتالثلاثيه , الليبوبروتينات (HDL-c, LDL-c,) ومضادات الاكسده الانزيميه (GPX ,SOD and CAT)وصوره الدم الكامله ومؤشرات المناعة (WBC, Lymph, NEUTROPHILS, MONO).وقد تم اخذ اعضاء الكبد والكلى لوزنهم ثم حفظهم فى محلول فورمالين ١٠ % لإجراء الفحص الهستاباثولوجى. وكشفت النتائج حدوث انخفاض بدرجه معنويه فى معدل اكتساب الوزن للمجموعه الضابطه

الموجبه (المصابه) مقارنه بالمجموعه الضابطه السالبه (الطبيعيه) أما المجموعات التى تم فيها إحداث تسمم بالبارسيتامول ثم تغذت على مسحوق النباتات فقد اظهرت ارتفاع فى المؤشرات بدرجات معنويه بالمقارنه بالمجموعه الضابطه الموجبة. وأظهرت مجموعه الفئران المصابه التى تغذت على الوجبه الاساسيه بالاضافه الى٥% من نبات الكرات المصري افضل المعاملات بالنسبه لوزن الكبد .واظهرت مجموعه الفئران المصابه التى تغذت على الوجبه الاساسيه بالاضافه الى ٥% من نبات الكرات المصري والصيني افضل المعاملات بالنسبه لوزن الكلى .وحدوث زياده معنويه فى الكوليسترول الكلى والدهون الثلاثيهفى مجموعات الفئران التى اعطيت الباراسيتامول بدون معالجه مقارنه بالفئران السليمه بينما التى اعطيت البارسيتامول ثم تغذت على كل النباتات فقد اوضحت انخفاض بدرجه معنويه فى كل من الكوليسترول الكلى والدهون الثلاثيه مقارنه بالمجموعه الضابطه الموجبه.وحدث ارتفاع بدرجه معنويه فى إنزيمات الكبد (ALT, AST ,AST/ ALT,ALP) فى الفئران المصابه(المجموعهالضابطه) مقارنه بالمجموعه السالبه أما الفئران المعامله بالبارسيتامول ثم تغذت على النباتات فقد أدت إلى انخفاض معنوى فى إنزيمات الكبد .وحدث إنخفاض بدرجه معنوية فى (SOD, GPX and CAT) فى دم الفئران التى تم إعطائها البارسيتامول وبدون معالجه مقارنه بالمجموعه الضابطه السالبه . بينما الفئران التى تم إعطائها البارسيتامول وتغذت على كل النباتات فقد اوضحت زياده معنويه فى (SOD, GPX and CAT) مقارنه بالمجموعهالضابطهالموجبه .ووجد ايضا انخفاض معنوىفى مستوي WBC لفئران المجموعه الضابطه الموجبه بالمقارنه لفئران المجموعه الضابطه السالبه . اما الفئران التى اعطيت البارسيتامول ثم تغذت على النباتات فقد اظهرت زياده معنويه فىWBC .ووجد أيضا إنخفاض معنوى فى مستوي Lymph مع إرتفاع معنوىفى مستوي , NEUTROPHILS MONO لفئران المجموعه الضابطه الموجبه بالمقارنه لفئران المجموعه الضابطه السالبه . اما الفئران التى اعطيت البارسيتامول ثم تغذت على النباتات فقد اظهرت زياده معنويه فى Lymphمع انخفاض معنوى فى NEUTROPHILS , MONO.

الكلمات المفتاحية :السريس -الجعضيض- الكرات المصري والصيني - الكرفس المصري والصيني- دهون الدم - وظائف الكبد - انزيمات الاكسدة – تسمم الكبد بالبارسيتامول– المناعة .