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Effect of Garden Cress (Lepidium Sativum) Extracts on Aflatoxin B1 in Rats.

Abou Taleb, S. T A, M. Yossef M, I. Sanad M. Sh. Abbas

Dept. of Agric. Chemistry || Faculty of Agriculture || Mansoura University || Egypt.

ABSTRACT: Crude dichloromethane and methanolic extracts of Lepidium Sativum seeds Belong to family Brassicaceae, were used in this work to study their efficiency to relief Aflatoxin B1 in rats. The more effective of dichloromethane extract which decreased AflatoxinB1 rate from 7.5 to 1.0ppb at a dose of 300mg/kg body weight comparing with Silymarin which reduced AflatoxinB1 to 0.97ppb in concentration of 100mg/kg after 5weeks, followed by methanolic extract which showed the mean value of 1.2ppb. Also, the more effective treatment were Silymarin in concentration of 100mg/kg and dichloromethane extract, followed by methanolic extracts of Lepidium Sativum seeds for blood tests in Aflatoxin B1 in rats, e.g. serum marker enzyme parameters (SGOT, SGPT, ALP and Bilirubin), kidney functions (Creatinine and Urea), liver functions (ALT, AST, Total proteins, Albumin and Globulins), lipid profile (triglycerides, total cholesterol, HDL, LDL and vLDL) haematological parameters (HB, RBCs, Plt and WBCs),comparing with control rats.

Keywords: Lepidium Sativum seeds extracts and Aflatoxin B_1.

INTRODUCTION

Aflatoxins (AFs) are secondary metabolites produced mainly by three species of Aspergillus including A. flavus, A. parasiticus and A. nomius. The most known AFs which can be found as contaminants of food and feed are B1, B2, G1 and G2 and their two metabolic products M1 and M2. They are probably the most known and most intensively researched mycotoxins in the world. Aflatoxins have been associated with various diseases, such as aflatoxicosis, in livestock, domestic animals and humans throughout the world. (Jovana et al., 2013).

Silymarin, a natural acknowledged hepatoprotector used in humans to treat liver diseases, has been tested in dairy cows during peripartum, a period during which animals are subject to subclinical fatty liver. Silymarin, a standardized extract from seeds of Silybum marianum L. (Gaertn.) (milk thistle), is used in humans for the treatment of liver diseases of different etiologies. Silymarin extract contains a mixture of flavonolignans and a residual fraction that has not yet been defined chemically in detail. (Tedesco et al., 2004).

Medicinal plants are widely used as home remedies and raw materials for the pharmaceutical industries. During harvesting, handling, storage and distribution, medicinal plants are subjected to contamination by various fungi, which may be responsible for spoilage and production of mycotoxins. The

increasing consumption of medicinal plants has made their use a public health problem due to the lack of effective surveillance of the use, efficacy, toxicity and quality of these natural products. (Kostik; 2015).

Lepidium sativum (Garden cress) is an annual herb, belonging to Brassicaceae family. It is a fast-growing, edible plant botanically related to watercress and mustard and sharing their peppery, tangy flavor and aroma. Seeds, leaves and roots are economically important, however, the crop is mainly cultivated for seeds. In some regions garden cress is known as garden pepper cress, pepper grass or pepperwort. It is also known as Asalio or chandrasur in India and it is an important medicinal crop in India. Garden cress is a perennial plant, and an important green vegetable consumed by human beings, most typically as a garnish or as a leaf vegetable. (Tiwari and Kulmi, 2004).

(Divanji et al, 2012), Lepidium sativum, mainly contains alkaloids, saponins, anthracene glycosides, carbohydrates, proteins, amino acids, flavonoids, sterols as chief phytochemical constituents. Glutamic acid is the most abundant amino acid; leucine and methionine are the highest and the lowest essential amino acids respectively. Its extracts have been found to possess various pharmacologicalivities. A Comprehensive review of its ethno-medical uses, chemical constituents and pharmacological profile as a medicinal plant. Mainly focused on its anti-inflammatory, antipyretic, analgesic and coagulant, antihypertensive, diuretic anti-diabetic, hepatoprotective, anti-asthmatic, and anti-oxidant activity for better evaluation in various therapeutic applications.

Aim of this study is to examine the efficiency of dichloromethane and methanolic extracts of Lepidium Sativum seeds at doses of 100 and 200 mg/kg body weight on Aflatoxin B1 in rats after 5weeks through the determination of Aflatoxin B1 in rats blood, serum marker enzyme parameters, kidney functions, liver functions, lipid profile (triglycerides, total cholesterol, haematological parameters, comparing with Silymarin in concentration of 100mg/kg.

MATERIALS AND METHODS

Sampling:

The present investigation was carried out using Lepidium sativum seeds Belong to family Brassicaceae. Samples were kindly obtained from Agricultural Research Center, Giza, Egypt. Seeds samples were air dried in the shade and ground into a fine powder.

Powdered was air dried seeds (2Kg) of each plant extract were extracted by soaking at room temperature for six times with methanol (30 L), then the dichloromethane and methanolic extracts were

concentrated to nearly dryness under reduced pressure using the rotary evaporator at 45°C to achieve the crude methanolic extracts which kept for further investigation (El-Khateeb et al., 2014).

Experimental animals:

A number of 49 male albino rats (100-150g) were obtained from the animal house of Faculty of Pharmacy, Mansoura University, Egypt. All rats were housed in microlon boxes in a controlled environment (temperature 25±20ºC and 12 h dark/light cycle) with standard laboratory diet and water ad libitum. Saluja et al., (2010).

Aflatoxigenic organism:

Aspergillus flavus was used for the production of Aflatoxin in this study. The samples were inoculated into Potato Dextrose Agar (PDA) plate and incubated at 28 ± 2°C for 3-5 days. After incubation the fungal species were used for further use. (Devendran and Balasubramanian; 2011).

Experimental protocol:

Male albino rats were divided into 7 groups contain 7 animals of each, as follows: Group 1 (normal): represents normal rat by means non afltoxins. Group 2 (control): Aflatoxin B1 through single intraperitoneal injection (1.0mg AFB1/kg body weigh. (Soliman et al., 2012).

Group 3: Aflatoxin B1-bearing rat treated with Silymarin was administered intraperitoneally injections (100mg/kg body weight), was used as a standard hepatoprotective drug for comparison according to (Banu et al.; 2009).

Group 4, 5 and 6: Aflatoxin B1-bearing rat treated with dichloromethane extract of Lepidium Sativum seeds (100, 200 and 300mg/kg), respectively. According to (Mohamed and Metwaly; 2009).

Group 7, 8 and 9: Aflatoxin B1-bearing rat treated with methanolic extract of Lepidium Sativum seeds (100, 200 and 300mg/kg), respectively. Single dose of the extract was administrated orally to each animal. (Ramamurthy and Rajeswari; 2015).

Rats were subjected to natural photoperiod of 12hr light: dark cycle throughout the experimental period (5 weeks). (El-Bahr et al., 2015).

Blood samples were collected from the eye canthus by heparinized tubes after 5weeks from the beginning of the experiment. Then, each blood samples were divided into two portions. First portion was centrifugation to obtain the blood serum. Serum samples were kept at refrigerator under freezing conditions for the determination the serum marker enzyme parameters (SGOT, SGPT, ALP and Bilirubin), liver functions (ALT, AST, proteins, albumin and Globulins), kidney functions (creatinine and urea) and lipid profile

(Triglycerides, total cholesterol, HDL-c, LDL-c and VLDL-c). Second portion was treated with 10% of ethylene diamine tetracetic acid (EDTA) with a good shaking to determine complete blood count (CBC) as a haematological analysis.

Determination of aflatoxinB1, were (Zero time and after 5Weeks):

Afla-V Strip Tests utilize the proven sensitivity and selectivity of VICAM's monoclonal antibodies to accurately detect and measure total aflatoxins (B1, B2, G1 & G2) at levels as low as 2 ppb and as high as 100 ppb. Sample preparation is easy and Afla-V's simplified procedure saves time and materials. After just 5 minutes development time, the Afla-V Strip Test is ready for quantitation using the Vertu® Lateral Flow Reader. Results are displayed on the digital screen and may also be printed or transferred to Excel for storage and use as a vital quality assurance tool.

Chemical analysis of blood:

Determination of serum marker enzyme parameters (MDA, SOD, ALP and Bilirubin), Determination of malondialdehyde (MDA), superoxide dismutase (SOD) activity was assayed by the method of Habig et al., (1974) and Nishikimi et al., (1972). Liver functions (ALT+AST) were determined as described by Randox (United Kingdom) according to the method of Reitman and Frankel, (1957). Also, George (1939) method was used to determine of protein and albumin.

Kidney functions (creatinine and blood urea) were determined by a colorimetric method according to Patton and Crouch (1977) as described in a commercial kits by Human (Germany).

Lipid profile (triglycerides, total cholesterol, HDL, LDL and νLDL) were determined by enzymatic colorimetric method of Richmond, (1973) described in a commercial kits by Human (Germany).

Haematological analysis (Hb, RBC, PCV, MCV, MCHC, Plt, MPV, PCT, PDW, WBC, LYM, MON, GRA) were through using apparatus namely ABX Micros 60 which a fully automated Haematological analyzer from Sysmex Corporation International Company according to Nakul et al., (2003).

Statistical analysis of obtained data were done using the statistical software package CoStat (2005). All comparisons were first subjected to one way ANOVA and significant differences between treatment means were determined using Duncan's multiple rang test at $p<0.05$ as the level of the significance (Duncan, 1955).

RESULTS AND DISCUSSION

Effect of crude dichloromethane and methanolic extracts of Lepidium Sativum seeds of aflatoxin B_1 in rats:

The yield of investigated seeds dichloromethane and methanolic extracts were 19.8% and 18.3%, for of Lepidium Sativum.

Data in table (1) revealed that the aflatoxin B_1 in zero time for all rats was ranged from 7.2 and 8.7 ppb. From the same table, it was clear that the aflatoxin B_1 for control rats (Group 2) was raised from 8.7 to 10.0 and 13.6ppb after 3 and 5 weeks, respectively. While, the treatment of Silymarin in concentration of 100mg/kg inhibit aflatoxin B_1 to 2.91ppb after 5weeks. Also, the dichloromethane and methanolic extracts at doses of 100mg/kg reduced the aflatoxin B_1 to 3.19 and 3.25ppb, respectively. Although, at doses of 200mg/kg of the same extracts, reduced the aflatoxin B_1 to 3.08 and 3.16ppb, respectively. While, at doses of 300mg/kg of the same extracts, reduced the aflatoxin B_1 to 2.77 and 3.00ppb, respectively.

Moreover, the treatment of Silymarin in concentration of 100mg/kg inhibit aflatoxin B_1 to 0.97ppb after 5weeks. Also, the dichloromethane and methanolic extracts at doses of 100mg/kg reduced the aflatoxin B_1 to 2.1 and 2.5ppb, respectively. While, at doses of 200mg/kg of the same extracts, reduced the aflatoxin B_1 to 1.2 and 1.36ppb, respectively. While, at doses of 300mg/kg of the same extracts, reduced the aflatoxin B_1 to 1.0 and 1.2ppb, respectively, at the end of the experimental period.

The present data showed the highest impact on aflatoxin B_1, of Silymarin in concentration of 100mg/kg and dichloromethane extracts at doses 200mg/kg, followed by methanolic extracts at doses of 100mg/kg, of Lepidium Sativum seeds, respectively.

Fapohunda et al., (2014), who found that the Mycotoxins level (ppb) in melon seeds treated with ginger reduced from 16.8 to 7.2ppb. while, the melon seeds treated with pepper reduced from 16.8 to 7.8ppb. Moreover, the highest effect of melon treated with cinnamon which reduced from 16.8 to 5.8ppb, respectively.

Table 1. Determination of aflatoxinB_1, were (Zero time and 5 Weeks) intoxicated rats.

Groups	No. of rats	AflatoxinB_1 (ppb)		
		Zero time	3 Weeks	5 Weeks
Group 1	7	0^{r}	0^{r}	0^{r}
Group 2	7	$8.7^{k} \pm 7.5$	$10.0^{a} \pm 11.9$	$13.6^{a} \pm 14.6$
Group 3	7	$7.5^{l} \pm 5.6$	$2.91^{f} \pm 3.7$	$0.97^{d} \pm 3.7$

Groups	No. of rats	AflatoxinB_1 (ppb)		
		Zero time	3 Weeks	5 Weeks
Group 4	7	$7.8^{p} \pm 3.9$	$3.19^{c} \pm 6.5$	$2.1^{b} \pm 6.5$
Group 5	7	$7.3^{m} \pm 6.7$	$3.08^{e} \pm 5.04$	$1.2^{c} \pm 7.4$
Group 6	7	$7.2^{m} \pm 6.7$	$2.77^{e} \pm 5.04$	$1.0^{c} \pm 7.4$
Group 7	7	$8.1^{op} \pm 4.2$	$3.25^{b} \pm 3.01$	$2.5^{b} \pm 4.2$
Group 8	7	$7.8^{no} \pm 5.8$	$3.16^{d} \pm 2.5$	$1.36^{c} \pm 4.1$
Group 9	7	$7.5^{no} \pm 5.8$	$3.00^{d} \pm 2.5$	$1.2^{c} \pm 4.1$
LSD=0.05	1.63			

Group 1: normal rats, Group 2: aflatoxin B1through single intraperitoneal injection (1.0mg AFB1/kg) body weigh

Group 3: Silymarin (100 mg/kg), Groups 4,5,6: dichloromethane (100,200 and 300 mg/kg), Group 7,8,9: methanolic (100, 200 and 300 mg/kg), respectively.

The application of chemicals compounds has led to a number of environmental and health problems due to their residual toxicity, carcinogenicity, hormonal imbalance and spermatotoxicity. There is a need to design new and environmentally safe methods of reducing infection by aflatoxigenic aspergilli and to inhibit aflatoxin biosynthesis. Plants are considered as sources of useful metabolites. Plants contain a wide variety of secondary metabolites such as tannins, terpenoids, alkaloids, and flavonoids, reported to have in vitro antifungal properties. The objectives of this study were to evaluate the fungitoxic effect of various plant extracts against Aspergillus flavus and to test the selected plants for their ability to inhibit aflatoxin B1 production. (Mohammedi and Atik, 2013).

Effect of Lepidium Sativum extracts on some serum marker enzyme parameters:

Data in table (2) cleared that the malondialdehyde (MDA) of normal and control rats were 3.7 and 7.2µmol/ml. While, the most effective treatments with Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at doses of 300mg/kg which decreased MDA levels to 3.9, 4.01 and 4.3µmol/ml, respectively. Also, the effect of dichloromethane and methanolic extracts for Lepidium Sativum seeds at a dose of 200mg/kg reduced MDA to 4.33 and 4.4µmol/ml, respectively. While, the lowest effect of dichloromethane and methanolic extracts for Lepidium Sativum seeds at a dose of 100mg/kg reduced MDA to 4.6 and 4.7µmol/ml, respectively.

From table (2), it was noticed that the total superoxide dismutase (SOD) of normal rats was 1.67U/g which decreased to 1.23U/g in control rats. Though, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at doses of 300mg/kg which decreased MDA levels to 159, 158 and

155U/g, respectively. Followed the effect of dichloromethane and methanolic extracts for Lepidium Sativum seeds at a dose of 200mg/kg reduced MDA to 157 and 154U/g, respectively. While, the lowest effect of dichloromethane and methanolic extracts for Lepidium Sativum seeds at a dose of 100mg/kg reduced MDA to 145 and 142U/g, respectively.

Table (2) cleared that the Alkaline Phosphatase (ALP) of normal and control rats were 11.5 and 258(IU/L). While, the most effective treatments were Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at doses of 300mg/kg which were 127, 137 and 142(IU/L), respectively. Also, the effect of dichloromethane and methanolic extracts of Lepidium Sativum seeds at doses of 200mg/kg which were 140 and 148(IU/L), respectively. While, the effect of dichloromethane and methanolic extracts of Lepidium Sativum seeds at doses of 100mg/kg which were 183 and 186(IU/L), respectively.

The same table exhibited the Bilirubin that raised from 0.85mmol/L of normal rat to reach 2.894(mg/dl) after bearing aflatoxin B1. The most effective treatments were Silymarin (100mg/kg), dichloromethane and methanolic extracts at doses of 300mg/kg which were 0.98, 1.00 and 1.12(mg/dl), respectively. Furthermore, the effect of dichloromethane and methanolic extracts of Lepidium Sativum seeds at a dose of 200mg/kg decreased the Bilirubin values to 1.02 and 1.17(mg/dl), respectively. Likewise, the effect of dichloromethane and methanolic extracts of Lepidium Sativum seeds at a dose of 100mg/kg decreased the Bilirubin values to 1.76 and 1.81(mg/dl), respectively.

Table 2. Effect of Lepidium Sativum extracts on some serum marker enzyme parameters in aflatoxinB_1 intoxicated rats.

Groups	MDA (µmol/ml)	SOD (U/g)	ALP (IU/L)	Bilirubin (mg/dl)
Group 1	3.7^{d}±1.40	1.67^{a}±0.05	115^{f} ± 2.2	0.85^{c} ± 2.15
Group 2	7.2^{a}±2.03	1.23^{a}±0.08	258^{a} ± 2.9	2.89^{a} ± 2.5 3
Group 3	3.9^{d}±0.95	1.59^{a}±0.54	127^{e} ± 2.3	0.98^{c} ± 2.18
Group 4	4.6^{b}±1.56	1.45^{a}±0.41	183.7^{b} ± 5.7	1.76^{b} ± 0.05
Group 5	4.33^{b}±1.87	1.57^{a}±0.26	140^{c} ± 1.91	1.02^{b} ± 0.07
Group 6	4.01^{b}±1.66	1.58^{a}±0.12	137^{d} ± 1.44	1.00^{b} ± 0.02
Group 7	4.7^{b}±1.33	1.42^{a}±0.36	186.7^{b} ± 0.9	1.81^{b} ± 0.15
Group 8	4.4^{b}±1.72	1.54^{a}±0.29	148^{c} ± 1.08	1.17^{b} ± 0.11
Group 9	4.3^{b}±1.54	1.55^{a}±0.44	142^{c} ± 1.02	1.12^{b} ± 0.03
LSD=0.05	2.2	3.02	4.07	1.02

Group 1: normal rats, Group 2: aflatoxin B1through single intraperitoneal injection (1.0mg AFB1/kg) body weigh

Group 3: Silymarin (100 mg/kg), Groups 4,5,6: dichloromethane (100,200 and 300 mg/kg), Group 7,8,9: methanolic (100, 200 and 300 mg/kg), respectively.

This finding was in the same line of, Mohamed and Metwally et al., (2009), who found effect of zingiber, cinnamomum, trigonella, camellia and salvia on MDA enzyme which decreased to 18.40, 15.60, 15.90, 16.00, 16.50µmol/g, respectively. While, effect of aflatoxin on MDA enzyme in control rats, was 35.7µmol/g, as compared with normal control for MDA was 17.50µmol/g.

Obtained data were agreed with those by (El-Bahr et al., 2015)., who found that effect of oral administration of AFB1 on SOD (U/gram tissue), was 5.00U/g, compared with normal rats, were 8.33U/g, respectively. While, the effect of curcumin on (SOD), was 8.00U/g, respectively.

Obtained data were agreed with those by (Ramamurthy and Rajeswari; 2015). who found the effect of aflatoxin on serum marker enzyme parameters SOD, ALP and Bilirubin control rats which were 4.50(µmole/g), 285(IU/L) and 2.89(mg/dl), respectively. While, the highest effect of Silymarin at concentration 25mg/kg, value decreased to 12.5(µmole/g), 137(IU/L) and 0.98(mg/dl), respectively. Moreover, the effect of Cynodon dactylon extracts, which were, 11.8(µmole/g), 145(IU/L) and 1.22, (mg/dl), respectively. Compared with normal rats, which were 14.3(µmole/g), 115(IU/L) and 0.85, (mg/dl), respectively.

Effect of Lepidium Sativum extracts on liver functions:

Alanine amino transferase (ALT) and aspartate amino transferase (AST) activities are known as cytosolic marker enzymes reflecting hepatocellular necrosis as they are released into the blood after damaging of the cell membrane. Therefore both enzymes are used as indicators for hepatic damage (Andallu and Vardacharyulu, 2001).

Data in tables, (3) showed that the alanine amino transferase was raised from 38.36 for normal rats to reach 117.76U/l, after bearing aflatoxin B1. While, the most effective treatments was Silymarin in concentration of 100mg/kg dichloromethane and methanolic extracts at doses of 200mg/kg on ALT, which were 42.84, 44.12 and 49.37U/l, respectively. Similarly, the effect of dichloromethane and methanolic extracts Lepidium Sativum seeds at doses of 200mg/kg which were 46.09 and 51.11U/l, respectively. Likewise, the effect of dichloromethane and methanolic extracts Lepidium Sativum seeds at doses of 100mg/kg which were 81.94 and 83.14U/l, respectively.

The table showed that the aspartate amino transferase AST of normal rats was 36.25U/g which raised to 106.02U/l in control rats. Though, the effect of Silymarin in concentration of 100mg/kg dichloromethane

and methanolic extracts at doses of 300mg/kg on AST, which were 41.12, 42.28 and 45.00U/l, respectively. Furthermore, the effect of dichloromethane and methanolic extracts Lepidium Sativum seeds at doses of 200mg/kg which were 44.54 and 48.54U/l, respectively. Moreover, the effect of dichloromethane and methanolic extracts Lepidium Sativum seeds at doses of 100mg/kg which were 77.92 and 79.12U/l, respectively.

Shyamal et al., (2010), who found the effects of aflatoxin B1 on serum enzyme levels in rats AST or SGOT and ALT or SGPT, were 144 and 62.4U/l, as compared with noemal rats, which were 72 and 26.3U/l. While, the effect on (AST) of Ixora coccinea, Spilanthes ciliate and Rhinacanthus nasuta extracts were 78.8, 95.3 and 76.3U/l, at doses 200mg/kg, respectively. Also, they found that effect on (ALT) of Ixora coccinea, Spilanthes ciliate and Rhinacanthus nasuta extracts were 30.1, 40.3 and 32.3U/l, at doses 200mg/kg, respectively. Compared to effects of Silymarin (100mg/kg) on AST and ALT, were 70.1 and 28.3U/l, respectively.

Obtained data were agreed with those by (El-Bahr et al., 2015)., who found that effect of oral administration of AFB1 on ALT and AST, were 28.00 and 150.33U/l, compared with normal rats, were 18.33 and 110.33U/l, respectively. While, the effect of curcumin on ALT and AST, were 22.00 and 120U/l, respectively.

Effect on total proteins, albumins and globulins activity:

Also, data cleared that the total proteins in normal rats was 7.5g/dl, while it showed that Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extract of Lepidium Sativum seeds at a dose of 300mg/kg the values for total proteins, were 6.9, 6.7 and 6.4g/dl, respectively. Followed by dichloromethane and methanolic extract of Lepidium Sativum seeds at a dose of 200mg/kg, were 6.5 and 6.3g/dl, respectively. Trailed by dichloromethane and methanolic extract of Lepidium Sativum seeds at a dose of 100mg/kg, were 5.5 and 5.6g/dl, respectively. As compared to normal and control rats, was 4.5g/dl, respectively.

The same table reveled that the total albumins in normal rats was 2.77g/dl. The effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extract of Lepidium Sativum seeds at a dose of 300mg/kg the values for total albumins, were 2.49, 2.41 and 2.32g/dl, respectively. The effect of dichloromethane and methanolic extract of Lepidium Sativum seeds at a dose of 200mg/kg the values for total albumins, were 2.33 and 2.23g/dl, respectively. This followed by dichloromethane and methanolic extract of Lepidium Sativum seeds at a dose of 100mg/kg, were 1.85 and 1.78g/dl, respectively. This was compared with control rats, which was 1.39g/dl.

From table (3), it was notified that the total Globulins was reduced from 4.73 in normal rats to reach 3.11g/dl after bearing aflatoxin B1. While, the most effective treatments were Silymarin in concentration of

100mg/kg, dichloromethane and methanolic extract of Lepidium Sativum seeds at a dose of 300mg/kg on globulin, were 4.41, 4.29 and 4.08g/dl, respectively. Likewise, the effect of dichloromethane and methanolic extracts for Lepidium Sativum seeds, were 4.17 and 4.07g/dl, at doses 100mg/kg, respectively. Also, the effect of dichloromethane and methanolic extracts for Lepidium Sativum seeds, were 3.65 and 3.82g/dl, at doses 100mg/kg, respectively.

Table 3. Effect of Lepidium Sativum extracts on liver functions in aflatoxinB_1 intoxicated rats.

Groups	ALT (U/L)	AST (U/L)	Protein (g/dl)	Albumin (g/dl)	Globulins (g/dl)
Group 1	$38.36^{e} \pm 0.97$	$36.25^{d} \pm 0.12$	$7.5^{a} \pm 1.22$	$2.77^{a} \pm 0.08$	$4.73^{a} \pm 0.14$
Group 2	$117.78^{a} \pm 0.22$	$106.02^{a} \pm 0.16$	$4.5^{d} \pm 1.18$	$1.39^{b} \pm 0.28$	$3.11^{b} \pm 0.9$
Group 3	$42.84^{d} \pm 0.73$	$41.12^{c} \pm 0.09$	$6.9^{b} \pm 0.41$	$2.49^{a} \pm 0.05$	$4.41^{a} \pm 0.36$
Group 4	$81.94^{b} \pm 0.33$	$77.92^{b} \pm 0.34$	$5.5^{c} \pm 1.32$	$1.85^{b} \pm 0.09$	$3.65^{b} \pm 1.23$
Group 5	$46.09^{d} \pm 0.02$	$44.54^{c} \pm 0.11$	$6.5^{b} \pm 1.09$	$2.33^{a} \pm 0.43$	$4.17^{a} \pm 0.79$
Group 6	$44.12^{d} \pm 0.11$	$42.28^{c} \pm 0.09$	$6.7^{b} \pm 0.12$	$2.41^{a} \pm 0.22$	$4.29^{a} \pm 0.79$
Group 7	$83.14^{b} \pm 0.80$	$79.12^{b} \pm 0.23$	$5.6^{c} \pm 1.42$	$1.78^{b} \pm 0.15$	$3.82^{b} \pm 1.27$
Group 8	$51.11^{c} \pm 0.32$	$48.54^{c} \pm 0.51$	$6.3^{b} \pm 1.31$	$2.23^{a} \pm 0.37$	$4.07^{a} \pm 0.94$
Group 9	$49.37^{d} \pm 0.21$	$45.00^{c} \pm 0.01$	$6.4^{b} \pm 1.55$	$2.32^{a} \pm 0.55$	$4.08^{a} \pm 0.94$
LSD=0.05	1.9	4.29	2.34	1.43	1.09

Group 1: normal rats, Group 2: aflatoxin B1through single intraperitoneal injection (1.0mg AFB1/kg) body weigh

Group 3: Silymarin (100 mg/kg), Groups 4,5,6: dichloromethane (100,200 and 300 mg/kg), Group 7,8,9: methanolic (100, 200 and 300 mg/kg), respectively.

Obtained data were agreed with those by (El-Bahr et al., 2015)., who found that effect of oral administration of AFB1 on Total proteins, Albumin and Globulin, which were 5.1, 3 and 2.1g/l, in control rats compared with normal rats, were 6.56, 4.40 and 3.1g/l, respectively. While, the effect of curcumin on Total proteins, Albumin and Globulin, which were 6.80, 4.33 and 3.50g/l, respectively.

Obtained data were agreed with those by Ramamurthy and Rajakumar, (2016), who found that effect of Phyllanthus niruri extracts at doses 300mg/kg, on Protein, SGOT, SGPT, ALP and Bilirubin, which were 131U/L, 46.1U/L, 145U/L, 1.22mg/dl and 6.5g/dl, respectively. While, the effect of Silymarin at concentration 25mg/kg, on Protein, SGOT, SGPT, ALP and Bilirubin, which were 135U/L, 43.5U/L, 137U/L, 0.98mg/dl and 6.9g/dl, respectively. Compared with control rats, were 198U/L, 99.5U/L, 258U/L, 2.89mg/dl and 4.5g/dl,

respectively. When the normal rats, were 121U/L, 38.2U/L, 115U/L, 0.85mg/dl and 7.5g/dl, on Protein, SGOT, SGPT, ALP and Bilirubin, respectively.

Effect of Lepidium Sativum seeds extracts on kidney functions:

Determination of serum creatinine and urea were used as indicators for kidney functions. The effect of Lepidium Sativum extracts of investigated seeds on serum creatinine and urea levels on aflatoxin B1 during the experimental periods are tabulated in tables (4).

From tables (4), cleared that the serum creatinine in normal rats was 1.08mg/dl, although the dichloromethane and methanolic extracts of Lepidium Sativum seeds, at a dose of 300mg/kg, reduced serum creatinine to 1.22 and 1.25mg/dl, respectively. While the dichloromethane and methanolic extracts of Lepidium Sativum seeds, at a dose of 200mg/kg, reduced serum creatinine to 1.24 and 1.29mg/dl, respectively. Also, the effects of dichloromethane and methanolic extracts of investigated seeds, were 1.61 and 1.67g/dl, at a dose of 100mg/kg respectively. While, the Silymarin in concentration of 100mg/kg reduced serum creatinine to 1.21mg/dl, after 5 weeks, as compared to aflatoxin B1 control rats, which was 2.14mg/dl.

It also revealed that, the level urea of normal rats, was 44.45g/dl, while, the effect of Silymarin (100mg/kg), dichloromethane and methanolic extracts of Lepidium Sativum seeds, at a dose of 300mg/kg, were 51.81, 52.12 and 54.47g/dl. Also, the effects of dichloromethane and methanolic extracts of investigated seeds, were 54.43 and 56.15g/dl, at a dose of 100mg/kg respectively. Likewise, the effects of dichloromethane and methanolic extracts of investigated seeds, were 63.64 and 67.64g/dl, at a dose of 100mg/kg respectively. As compared to aflatoxin B1 control rats, that was 75.91/dl.

Table 4. Effect of Lepidium Sativum extracts on kidney functions in aflatoxinB_1 intoxicated rats.

Groups	Creatinine (mg/dl)	Urea (mg/dl)
Group 1	$1.08^{b} \pm 0.14$	$44.45^{d} \pm 0.34$
Group 2	$2.14^{a} \pm 0.78$	$75.91^{a} \pm 5.36$
Group 3	$1.21^{b} \pm 0.46$	$51.81^{c} \pm 0.26$
Group 4	$1.61^{b} \pm 0.92$	$63.64^{b} \pm 2.66$
Group 5	$1.24^{b} \pm 0.32$	$54.43^{c} \pm 0.09$
Group 6	$1.22^{b} \pm 0.12$	$52.12^{c} \pm 0.22$
Group 7	$1.67^{b} \pm 0.15$	$67.64^{d} \pm 0.66$
Group 8	$1.29^{b} \pm 0.08$	$56.15^{b} \pm 2.13$
Group 9	$1.25^{b} \pm 0.21$	$54.47^{b} \pm 0.09$
LSD=0.05	1.87	4.18

Group 1: normal rats, Group 2: aflatoxin B1through single intraperitoneal injection (1.0mg AFB1/kg) body weigh,

Group 3: Silymarin (100 mg/kg), Groups 4,5,6: dichloromethane (100,200 and 300 mg/kg), Group 7,8,9: methanolic (100, 200 and 300 mg/kg), respectively.

This finding was in the same line of (Soliman et al., 2012). who found that effect of curcuma longa or nigella sativa on kidney function tests (Creatinine and Uric), which were 47.34 and 1.56mg/dl, respectively. While, normal rats, were 37.01 and 1.00mg/dl, as compared to aflatoxin control rats, were 60.65 and 2.74mg/dl, respectively.

El-Bahr et al., 2015). who found that the effect of oral administration of AFB1 and/or curcumin for five weeks on kidney function test of rats, (Uric acid and Creatinine), which were 124.600 and 97 mmol/l, respectively. While, the normal rats, were 124 and 52.700 mmol/l, on (Uric acid and Creatinine), respectively. While, the control rats, were 126.300 and 123 mmol/l, after 5 weeks, respectively.

Effect of crude methanolic extracts on lipid profile:

Data recorded in table (5), revealed that serum triglycerides, total cholesterol, LDL and vLDL values increased from 69.43, 98.5, 13.36 and 19.7mg/dl in normal rats to 99.01, 157.6, 45.35 and 31.32mg/dl in control rats, respectively, by injection with aflatoxin B1 after 5 weeks.

On the other hand, tables (5), declare that there is a highly significant decrease in serum HDL level and reached 36.38mg/dl for control rats comparing to 21.35 mg/dl for normal rats at the beginning of experiment.

Effect on total cholesterol and triglycerides:

From tables (5), it could be noticed that t-cholesterol decreased with increasing the concentration of Silymarin 100mg/kg, dichloromethane and methanolic extract of investigated seeds at a dose of 200mg/kg have the most effective, which were 70.65, 70.88 and 77.11mg/dl, respectively. Though, dichloromethane and methanolic extract of investigated seeds at a dose of 200mg/kg have the effective, which were 71.89 and 79.14mg/dl, of Lepidium Sativum seeds extracts. Whereas, dichloromethane and methanolic extract of investigated seeds at a dose of 100mg/kg have the effective, which were 75.42 and 81.44mg/dl, of Lepidium Sativum seeds extracts, as compared with control rats was, 99.01mg/dl.

From tables (5), it could be noticed that triglycerides decreased by increasing the concentration of dichloromethane and methanolic extract of investigated seeds and the experimental period for all samples under investigation. Accordingly, the treatment of control rats of Silymarin 100mg/kg, dichloromethane and methanolic extract of investigated seeds at a dose of 300mg/kg have a moderate value for reducing

triglycerides levels 109.7, 110.4 and 122.7mg/dl, respectively. While, dichloromethane and methanolic extract of investigated seeds at a dose of 200mg/kg have a moderate value for reducing triglycerides levels 113.2 and 127.2mg/dl, of Lepidium Sativum seeds extracts. While, dichloromethane and methanolic extract of investigated seeds at a dose of 100mg/kg have a moderate value for reducing triglycerides levels 121.9 and 132.6mg/dl, of Lepidium Sativum seeds extracts, as compared with control rats was, 157.6mg/dl.

Effect on HDL, LDL and vLDL-cholesterol:

Data in table (5), showed that oral administration of extracts led to a gradual increase of serum HDL. Raising both of concentration of extracts and period of the experiment caused an increase in serum HDL, which reached 35.41, 35.11 and 32.19mg/dl, for Silymarin 100mg/kg, dichloromethane and methanolic extract of investigated seeds at a dose of 300mg/kg, respectively. However, the effect of dichloromethane and methanolic extract of investigated seeds at a dose of 200mg/kg, which were 34.71 and 30.66mg/dl, respectively. While, the effect of dichloromethane and methanolic extract of investigated seeds at a dose of 100mg/kg, which were 31.42 and 28.43mg/dl, respectively. Compared to normal and control rats, were 36.38 and 21.35mg/dl respectively.

The data in table (5), showed similar which effect on serum LDL. Raising both of concentration of extracts and period of the experiment caused an increase in serum LDL, were 13.9, 13.88 and 15.24mg/dl of Silymarin 100mg/kg, dichloromethane and methanolic extract of investigated seeds at a dose of 300mg/kg, respectively. Although, the effect of dichloromethane and methanolic extract of investigated seeds at a dose of 200mg/kg, which were 14.16 and 16.84mg/dl, respectively. While, the effect of dichloromethane and methanolic extract of investigated seeds at a dose of 100mg/kg, which were 18.72 and 20.31mg/dl, respectively. Compared to normal and control rats, were 13.36 and 45.35mg/dl respectively.

Data for vLDL values as a result of treatment with Silymarin 100mg/kg, dichloromethane and methanolic extract of investigated seeds at a dose of 300mg/kg, in rats, which were 21.94, 22.00 and 24.07mg/dl respectively. While, the effect of dichloromethane and methanolic extract of investigated seeds at a dose of 200mg/kg, which were 22.64 and 25.37mg/dl. While, the effect of dichloromethane and methanolic extract of investigated seeds at a dose of 100mg/kg, which were 24.32 and 26.72mg/dl, as compared with normal and control rats, which were 19.7 and 31.32mg/dl respectively.

Table 5. Effect of *Lepidium Sativum* extracts on lipid profile in aflatoxinB_1 intoxicated rats.

Groups	T-Cholesterol (mg/dl)	Triglycerides (mg/dl)	HDL (mg/dl)	LDL (mg/dl)	vLDL (mg/dl)
Group 1	$69.43^{d} \pm 0.22$	$98.5^{f} \pm 01.55$	$36.38^{a} \pm 3.53$	$13.36^{c} \pm 0.12$	$19.7^{c} \pm 1.18$

Groups	T-Cholesterol (mg/dl)	Triglycerides (mg/dl)	HDL (mg/dl)	LDL (mg/dl)	vLDL (mg/dl)
Group 2	$99.01^{a} \pm 0.06$	$157.6^{a} \pm 9.18$	$21.35^{b} \pm 4.49$	$45.35^{a} \pm 1.06$	$31.32^{a} \pm 0.48$
Group 3	$70.65^{c} \pm 2.33$	$109.7^{e} \pm 0.22$	$35.41^{a} \pm 3.35$	$13.9^{c} \pm 0.01$	$21.94^{b} \pm 0.21$
Group 4	$75.42^{c} \pm 0.43$	$121.9^{c} \pm 4.19$	$31.42^{a} \pm 3.53$	$18.72^{b} \pm 5.46$	$24.32^{b} \pm 1.08$
Group 5	$71.89^{c} \pm 0.03$	$113.2^{d} \pm 0.03$	$34.71^{a} \pm 6.44$	$14.16^{c} \pm 9.07$	$22.64^{b} \pm 0.36$
Group 6	$70.88^{c} \pm 0.22$	$110.4^{d} \pm 0.11$	$35.11^{a} \pm 3.72$	$13.88^{c} \pm 4.22$	$22.00^{b} \pm 0.04$
Group 7	$81.44^{b} \pm 3.16$	$132.6^{b} \pm 5.07$	$28.43^{b} \pm 3.56$	$20.31^{b} \pm 4.05$	$26.72^{b} \pm 2.09$
Group 8	$79.14^{b} \pm 9.07$	$127.2^{c} \pm 5.04$	$30.66^{a} \pm 8.17$	$16.84^{b} \pm 0.92$	$25.73^{b} \pm 1.32$
Group 9	$77.11^{b} \pm 1.04$	$122.7^{c} \pm 4.01$	$32.19^{a} \pm 4.09$	$15.24^{b} \pm 0.33$	$24.07^{b} \pm 0.54$
LSD=0.05	3.13	6.05	2.37	2.16	1.68

Group 1: normal rats, Group 2: aflatoxin B1through single intraperitoneal injection (1.0mg AFB1/kg) body weigh, Group 3: Silymarin (100 mg/kg), Groups 4,5,6: dichloromethane (100,200 and 300 mg/kg), Group 7,8,9: methanolic (100, 200 and 300 mg/kg), respectively.

Obtained data were agreed with those by (El-Bahr et al., 2015). who found that effect of oral administration of curcumin for five weeks on Total cholesterol and Triglycerides of rats, which were 2.17 and 2.10mmol/l, respectively. While, the level of total cholesterol and Triglycerides on normal rats, which were 2.10 and 2.0mmol/l, respectively. Compared to control rats, which were 3.87 and 2.3 mmol/l, for total cholesterol and triglycerides, respectively.

Al-Hamedan, (2010). they said that effect of Garden cress (Lepidium sativum L.) seeds extracts on some serum lipid (cholesterol and triglyceride), which were110.01 and 98.01mg/dl, respectively. While, the level of (cholesterol and triglyceride), in control rats, which were 199.77 and 155.14mg/dl, respectively. Compared with normal rats, which were 80.34 and 70.31mg/dl, respectively.

Obtained data were agreed with those by Al-Hamedan., (2010), who found that effect of Garden cress (Lepidium sativum L.) seeds extracts on some serum lipid (HDLc, LDLc and VLDLc), which were 28.88, 61.53 and 19.60mg/dl, respectively. While, the level of (HDLc, LDLc and VLDLc), in control rats, which were 20.11, 104.01 and 31.02mg/dl, respectively. Compared with normal rats, which were 32.32, 33.06 and 14.01mg/dl, respectively.

6. Effect of Lepidium Sativum extracts on haematological parameters:

The complete blood count (CBC) was used as a broad screening test to check such disorders as anemia, infection and many other diseases. It is actually a panel of tests that examines different parts of the

blood, which play an important role in metabolism and important indicators of health in both human or animals (Bain et al., 2006).

The complete blood count (CBC) includes the following tests:

Effect of HB, RBCs, PCV, MCV and MCHC:

Data in table (6), conveyed that the hemoglobin level (Hb), in normal rats, was 12.79g/dl and decreased to 8.29g/dl, in control rats. While, Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg were the most effective treatment on aflatoxin B1 increase haemoglobin levels to 12.75, 12.74 and 12.00g/dl, respectively. Likewise, the effect of dichloromethane and methanolic extracts at a dose 200mg/kg, were 12.70 and 11.88g/dl, for Lepidium Sativum seeds, respectively. Similarly, the effect of dichloromethane and methanolic extracts at a dose 100mg/kg, were 11.95 and 10.39g/dl, for Lepidium Sativum seeds, respectively.

From the same table, it was clear that the total red blood cells (RBCs), were reduced from 6.18×106/µl for normal rats to reach 3.12×10^{6}/µl after bearing aflatoxin B1. Whereas, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg were 4.81, 4.75 and 4.26×106/µl on control rats, respectively. Also, the effect of dichloromethane and methanolic extracts at a dose 200mg/kg, were 4.69 and 3.96×10^{6}/µl, respectively. Likewise, the effect of dichloromethane and methanolic extracts at a dose 100mg/kg, were 4.22 and 3.41×10^{6}/µl, respectively.

The same table showed that the total packed cell volume (PCV) of normal rats was 41.14% which decreased to 29.01% for control rats. While, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg, raised PCV to 40.34, 40.11 and 37.22%. Also, the effect of dichloromethane and methanolic extracts at a dose 200mg/kg, were 39.89 and 35.02%, respectively. Similarly, the effect of dichloromethane and methanolic extracts at a dose 100mg/kg, were 37.69 and 34.15%, respectively.

Table 6. Effect of *Lepidium Sativum* extracts on hematological parameters, were HB (g/dl) RBCs (106/µl), PCV (%), MCV (µm3) and MCHC (g/dl) in aflatoxinB_1 intoxicated rats.

Groups	Hb (g/dl)	RBCs (106/µl)	PCV (%)	MCV(µm3)	MCHC (g/dl)
Group 1	$12.79^{a} \pm 0.23$	$6.18^{a} \pm 0.29$	$41.14^{a} \pm 1.49$	$59.96^{a} \pm 0.11$	$34.12^{a} \pm 0.59$
Group 2	$8.29^{e} \pm 0.29$	$3.12^{c} \pm 0.20$	$29.01^{c} \pm 0.84$	$33.94^{c} \pm 0.08$	$19.29^{c} \pm 0.17$
Group 3	$12.75^{a} \pm 0.43$	$4.81^{b} \pm 0.77$	$40.34^{a} \pm 0.49$	$58.83^{a} \pm 0.47$	$33.92^{a} \pm 0.57$
Group 4	$11.95^{b} \pm 0.77$	$4.22^{b} \pm 0.86$	$37.69^{b} \pm 1.16$	$55.18^{a} \pm 0.45$	$31.89^{a} \pm 0.36$
Group 5	$12.70^{a} \pm 0.45$	$4.69^{b} \pm 0.67$	$39.89^{b} \pm 0.63$	$58.77^{a} \pm 0.41$	$33.86^{a} \pm 0.25$

Groups	Hb (g/dl)	RBCs (106/µl)	PCV (%)	MCV(µm3)	MCHC (g/dl)
Group 6	$12.74^{a} \pm 0.22$	$4.75^{b} \pm 0.67$	$40.11^{a} \pm 0.44$	$58.80^{a} \pm 0.33$	$33.90^{a} \pm 0.05$
Group 7	$10.39^{d} \pm 0.52$	$3.41^{c} \pm 0.96$	$34.15^{b} \pm 1.97$	$43.49^{b} \pm 1.11$	$27.97^{b} \pm 0.62$
Group 8	$11.88^{c} \pm 0.33$	$3.96^{c} \pm 0.82$	$35.02^{b} \pm 0.57$	$45.32^{b} \pm 0.28$	$29.45^{b} \pm 0.52$
Group 9	$12.00^{a} \pm 0.42$	$4.26^{b} \pm 0.82$	$37.22^{b} \pm 0.09$	$48.12^{b} \pm 0.32$	$30.71^{a} \pm 0.22$
LSD=0.05	2.28	3.09	1.13	1.43	5.79

Group 1: normal rats, Group 2: aflatoxin B_1through single intraperitoneal injection (1.0mg AFB1/kg) body weigh, Group 3: Silymarin (100 mg/kg), Groups 4,5,6: dichloromethane (100,200 and 300 mg/kg), Group 7,8,9: methanolic (100, 200 and 300 mg/kg), respectively.

Previous data revealed that the total mean corpuscular volume (MCV) of normal and control rats were 59.96 and 33.94μm^3 respectively. Although, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg, on MCV values were 58.83, 58.80 and 48.12μm^3, respectively. Furthermore, the effect of dichloromethane and methanolic extracts at a dose 200mg/kg, were 58.77 and 45.32μm^3, respectively. Moreover, the effect of dichloromethane and methanolic extracts at a dose 100mg/kg, were 55.18 and 43.49µm3, respectively.

On the other hand, table (6) declare that the total mean corpuscular hemoglobin concentration (MCHC) was reduced from 34.12g/dl for normal rats to reach 19.29g/dl after bearing aflatoxin B1. Whereas, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg, on MCV values were 33.92, 33.90 and 30.71μm^3, respectively. Likewise, the effect of dichloromethane and methanolic extracts at a dose 200mg/kg, were 33.86 and 29.45μm^3, respectively. Moreover, the effect of dichloromethane and methanolic extracts at a dose 100mg/kg, were 31.89 and 27.97μm^3, respectively.

This finding was in the same line with (Ramamurthy and Rajeswari; 2015), who described that effect of aflatoxin on haematological variables RBC, Hb, PCV, MCV and MCHC, which were 4.54(106/µl), 9.2(g/dl), 21.8(%), 44.2(fL) and 27.5(g/dl), respectively. While, the highest effect of Silymarin at concentration 25mg/kg, value increased to 7.02(106/µl), 12.2(g/dl), 41.1(%), 51.8(fL) and 34.2(g/dl), respectively. Moreover, the effect of Cynodon dactylon extracts, which were, 6.62(106/µl), 11.9(g/dl), 39.2(%), 51.1(fL) and 33.4(g/dl), respectively. Compared with normal rats, which were 7.48(106/µl), 13.8(g/dl), 45.5(%), 53.1(fL) and 35.4(g/dl), respectively.

Obtained data were agreed with those reported by Fapohunda et al., (2014) who found that effect of Ginger (Zingiber officinale), on PCV and Hgb, which were 38.33% and 12.77g/dl, respectively. While, the effect of crushed red pepper (Capsicum annuum) on PCV and Hgb, which were 38.67% and 12.90%,

respectively. Compared with control rats, were 39% and 13g/dl, respectively. When the normal rats, were, 35.1% and 11g/dl, on PCV and Hgb, respectively.

Effect of Plt, MPV, PCT and PDW:

Data in table (7), clear that the platelet blood (Plt) level in normal rats was $1277\times10^3/\mu l$ and decreased to $175\times10^3/\mu l$ in control rats. While, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg on Plt increased to $1243\times10^3/\mu l$, $1231\times10^3/\mu l$ and $1218\times10^3/\mu l$, respectively. Likewise, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 200mg/kg on Plt increased to $1221\times10^3/\mu l$ and $1199\times10^3/\mu l$, respectively. Similarly, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 100mg/kg on Plt increased to $1211\times10^3/\mu l$ and $1181\times10^3/\mu l$, respectively.

The table showed that the mean platelet volume (MPV) was reduced from $9.9\mu m^3$ for normal rats to reach $5.2\mu m^3$ after bearing aflatoxin B_1. Though, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg on (MPV) increased to 8.5, 8.3 and $8.1\mu m^3$, respectively. Similarly, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 200mg/kg on (MPV) increased to 8.1 and $7.9\mu m^3$, respectively. Likewise, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 100mg/kg on (MPV) increased to 7.7 and $7.3\mu m^3$, respectively.

The same table showed that the platelets hematocrit value (PCT) in normal rats was 8.4 which reduced to 4.6% after bearing aflatoxin B_1. While, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg on (PCT) increased to 8.01, 8.00 and $7.14\mu m^3$, respectively. Likewise, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 200mg/kg on (PCT) increased to 7.97 and $7.06\mu m^3$, respectively. Equally, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 100mg/kg on (PCT) increased to 6.68 and $6.16\mu m^3$, respectively.

On the other hand, table (7) declare that the total platelet distribution width (PDW) of normal and control rats were 12.9 and 6.2%, respectively. Although, the treatment with Silymarin slightly similar normal rats value (12.0%). As well, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds (300mg/kg), were 11.9 and 11.02%, respectively. Equally, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 200mg/kg on (PCT) increased to 11.8 and 10.9%, respectively. Similarly, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 100mg/kg on (PCT) increased to 10.7 and $9.3\mu m^3$, respectively.

Table 7. Effect of *Lepidium Sativum* extracts on haematological parameters, were Plt (103/µl), MPV(µm3), PCT (%) and PDW (%) in aflatoxinB_1 intoxicated rats.

Groups	Plt (103/ µl)	MPV (µm3)	PCT (%)	PDW (%)
Group 1	$1277^{a} \pm 93.31$	$9.9^{a} \pm 0.23$	$8.4^{a} \pm 0.08$	$12.9^{a} \pm 0.44$
Group 2	$175^{e} \pm 17.55$	$5.2^{e} \pm 0.36$	$4.6^{e} \pm 0.02$	$6.2^{e} \pm 0.13$
Group 3	$1243^{a} \pm 16.29$	$8.5^{b} \pm 0.24$	$8.01^{a} \pm 0.04$	$12.0^{a} \pm 0.06$
Group 4	$1211^{b} \pm 77.09$	$7.7^{c} \pm 0.33$	$6.68^{c} \pm 0.06$	$10.7^{c} \pm 0.65$
Group 5	$1221^{a} \pm 90.88$	$8.1^{b} \pm 0.97$	$7.97^{b} \pm 0.06$	$11.8^{b} \pm 0.89$
Group 6	$1231^{a} \pm 12.04$	$8.3^{b} \pm 0.44$	$8.00^{a} \pm 0.01$	$11.9^{b} \pm 0.99$
Group 7	$1181^{d} \pm 12.17$	$7.3^{d} \pm 0.31$	$6.16^{c} \pm 0.05$	$9.3^{d} \pm 0.18$
Group 8	$1199^{c} \pm 19.43$	$7.9^{c} \pm 0.39$	$7.06^{c} \pm 0.04$	$10.9^{c} \pm 0.37$
Group 9	$1218^{a} \pm 19.43$	$8.1^{b} \pm 0.74$	$7.14^{c} \pm 0.22$	$11.02^{c} \pm 0.19$
LSD=0.05	1.57	4.83	4.62	1.21

Group 1: normal rats, Group 2: aflatoxin B_1through single intraperitoneal injection (1.0mg AFB1/kg) body weigh, Group 3: Silymarin (100 mg/kg), Groups 4,5,6: dichloromethane (100,200 and 300 mg/kg), Group 7,8,9: methanolic (100, 200 and 300 mg/kg), respectively.

This finding was in the same line with (Ramamurthy and Rajeswari; 2015), who described that effect of aflatoxin on haematological variables Platelet increased to 1315(10^3/µl), while, the highest effect of Cynodon dactylon extracts, value decreased to 119510^3/µl), moreover, the effect of Silymarin at concentration 25mg/kg, which was, 1225(10^3/µl), compared with normal rats, which was 894(10^3/µl), respectively.

Obtained data were agreed with those reported by Fapohunda et al., (2014) who found that effect of Ginger (Zingiber officinale), on Platelets, was >1000(x10^9/L), while, the effect of crushed red pepper (Capsicum annuum) on Platelets, was 360(x109/L), compared with control rats, was 630(x10^9/L), when the normal rats, was 592(x10^9/L).

Effect of WBCs, Lym, Mono and GRA:

Data in table (8) cleared that white blood cells (WBCs) level in normal rats was 11.24 which raised to 24.25×10^3/µl in control rats. While, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg, which decreased to 12.47, 12.88 and 13.66×10^3/µl, respectively. Also, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 200mg/kg on WBCs decreased to 13.17 and 14.83×10^3/µl, respectively. Furthermore, the effect of

dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 100mg/kg on WBCs decreased to 13.38 and 16.89×10^3/µl, respectively.

From table (8), it was informed that the level of Lymphocytes (Lym) increased from 5.36×µm^3 for normal rats to reach 7.11×10^3/µl after bearing aflatoxin B_1. Even though, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg, on (Lym) which decreased to 5.52, 5.55 and 6.00×10^3/µl, respectively. Equally, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at doses of 200mg/kg, on (Lym) decreased to 5.64 and 6.11×10^3/µl, respectively. Likewise, the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at doses of 100mg/kg, on (Lym) decreased to 5.98 and 6.51×10^3/µl, respectively.

Table 8. Effect of *Lepidium Sativum* extracts on hematological parameters, were WBCs(103/µl), Lym(103/µl), Mono(%) and GRA(%)in aflatoxinB_1 intoxicated rats.

Groups	WBCs (10^3/µl)	Lym (10^3/µl)	Mono (%)	GRA (%)
Group 1	$11.24^{j} \pm 0.25$	$5.36^{c} \pm 0.29$	$0.45^{a} \pm 0.01$	$38.3^{a} \pm 0.25$
Group 2	$24.25^{a} \pm 0.37$	$7.11^{a} \pm 0.01$	$0.77^{a} \pm 0.03$	$25.1^{b} \pm 0.31$
Group 3	$12.47^{f} \pm 0.54$	$5.52^{c} \pm 0.20$	$0.48^{a} \pm 0.01$	$38.2^{a} \pm 0.17$
Group 4	$15.38^{c} \pm 0.93$	$5.98^{c} \pm 0.31$	$0.54^{a} \pm 0.15$	$35.5^{a} \pm 0.49$
Group 5	$13.17^{e} \pm 0.34$	$5.64^{c} \pm 0.07$	$0.52^{a} \pm 0.00$	$37.7^{a} \pm 0.21$
Group 6	$12.88^{f} \pm 0.34$	$5.55^{c} \pm 0.11$	$0.50^{a} \pm 0.02$	$38.0^{a} \pm 0.33$
Group 7	$16.89^{b} \pm 0.89$	$6.51^{b} \pm 0.46$	$0.63^{a} \pm 0.02$	$32.7^{a} \pm 0.19$
Group 8	$14.83^{d} \pm 0.75$	$6.11^{b} \pm 0.21$	$0.60^{a} \pm 0.03$	$35.4^{a} \pm 0.21$
Group 9	$13.66^{e} \pm 0.75$	$6.00^{b} \pm 0.08$	$0.58^{a} \pm 0.01$	$37.2^{a} \pm 0.01$
LSD=0.05	1.17	1.06	1.01	1.13

Group 1: normal rats, Group 2: aflatoxin B_1through single intraperitoneal injection (1.0mg AFB1/kg) body weigh, Group 3: Silymarin (100 mg/kg), Groups 4,5,6: dichloromethane (100,200 and 300 mg/kg), Group 7,8,9: methanolic (100, 200 and 300 mg/kg), respectively.

Previous data revealed that the Monocytes (Mono) values of normal rats was 0.45% which raised to 0.77% for control rats. Whereas, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg, on (Mono) which decreased to 0.48, 0.50 and 0.58%, respectively. Similarly, the effect of dichloromethane and methanolic extracts of Lepidium Sativum seeds at doses of 200mg/kg, on (Mono) decreased to 0.62 and 0.60%, respectively. Also, the effect of dichloromethane and methanolic extracts of Lepidium Sativum seeds at doses of 100mg/kg, on (Mono) decreased to 0.54 and 0.63%, respectively.

On the other hand, table (8) declared that the Granulocytes (GRA) of normal and control rats, were 38.3 and 25.1%. While, the effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts at a dose of 300mg/kg, on (GRA) which decreased to 38.2, 38.0 and 37.2%, respectively. Also, the effect of dichloromethane and methanolic extracts of Lepidium Sativum seeds at doses of 200mg/kg, on (GRA) decreased to 37.7 and 35.4%, respectively. Similarly, the effect of dichloromethane and methanolic extracts of Lepidium Sativum seeds at doses of 100mg/kg, on (GRA) decreased to 35.5 and 32.7%, respectively.

This finding was in the same line with (Ramamurthy and Rajeswari; 2015), who described that effect of aflatoxin on haematological variables WBC, Lymphocyte and Neutrophils, which were 15.5(10^3/µl), 70.2% and 23.2%, respectively. While, the effect of Cynodon dactylon extracts, which were 9.1(10^3/µl), 82.5% and 19.8%, respectively. Furthermore, the effect of Silymarin at concentration 25mg/kg, which were 8.87(103/µl), 82.8% and 22.5%, respectively.

Obtained data were agreed with those reported by Fapohunda et al., (2014) who found that effect of Ginger (Zingiber officinale), on WBC, Lympho and Monocytes, which were 11.57(x10^9/L), 75.33% and 0.00(x10^9/L), respectively. While, the effect of crushed red pepper (Capsicum annuum), which were 12.73(x10^9/L), 85.33% and 0.00(x10^9/L), respectively. Compared with control rats, which were 10.23(x10^9/L), 86% and 2(x10^9/L), respectively. when the normal rats, which were 10.7(x10^9/L), 91.6% and 7.5(x10^9/L), respectively.

Conclusion

The effect of Silymarin in concentration of 100mg/kg, dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 300mg/kg showed the highest positive values of decreased of aflatoxin B_1 in rat blood. Moreover, the data showed the highest optimistic morals of serum marker enzyme parameters, liver functions, kidney functions, lipid profile and complete blood count (CBC) as a haematological analysis, followed by the effect of dichloromethane and methanolic extracts of *Lepidium Sativum* seeds at a dose of 100 and 200mg/kg, respectively.

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الملخص: هدفت الدراسة إلى استخلاص المركبات الفعالة لبذور حب الرشاد عن طريق النقع في الداى كلوروميثان والميثانول ثم التركيز تحت تفريغ بغرض الحصول على المستخلص الخام للبذور تحت الدراسة ومقارنتها بالمركب النقي السيليمارين. ثم دراسة تأثير تلك المستخلصات على بعض مكونات دم فئران التجارب المصابة بالأفلاتوكسين. وكان مستخلص الداى كلوروميثان أعلى نشاطا في التأثير على نسبة الأفلاتوكسين وتخفيضها من 7.5 الى 1.0ppb بالحقن بتركيز 300مليجرام لكل كيلوجرام مقارنة بالسيليمارين بتركيز 100 مليجرام/كيلوجرام الذى خفضه الى 0.97ppb بعد 5 أسابيع من المعاملة. يليهم في التأثير بنسبة متوسطة المستخلص الميثانولى والذى كان 1.2ppb. كذلك فإن التأثير الأعلى نشاطا يكون للمركب النقي السيليمارين يليه مستخلص الداى كلوروميثان ويكون نشاط مستخلص الميثانول متوسط التأثير في اختبارات الدم المختلفة في الفئران المصابة بالأفلاتوكسين مثل مضادات الأكسدة والانزيمات، وظائف الكبد، وظائف الكلى، صفات الليبيدات، وصورة الدم من الهيموجلوبين وكرات الدم الحمراء والبيضاء والصفائح الدموية، مقارنة بالفئران المصابة بالأفلاتوكسين لمدة 5 أسابيع.