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**Assesment of legalon on kidney functions and Lipids profile in broiler chickens exposed to Hydrogen Peroxide ‎**

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| **Abstract** |
| Milk thistle (Silymarin) is a worldwide valuable medical plant which has been used for many years in the modern and alternative medicine to treat liver diseases. The current study aimed to evaluate the probable effect of legalon (standard hepatic drug) on improvement the kidney functions, lipids profile and body weight in broiler chickens. Twenty-four Ross commercial broiler of thirty days old male were randomly distributed into four treatments of six birds each. The treatment was continued for 3 weeks as follows: 1st group (control) drinking tap water, 2nd group given 0.5% H2O2, 3rd group 0.5% H2O2 and 6mg/kg legalon, and 4th group 6mg/kg legalon single oral dose once daily. The birds’ weight was measured at the end of each week. At the end of the experiment, the broilers were killed and blood parameters were taken for measuring of total cholesterol, triglycerides, HDL-C, LDL-C, VLDL-C, risk index creatinine, and urea. The results indicated that hydrogen peroxide-treatment significantly increased serum total cholesterol, triglycerides, LDL-C, VLDL-C and decreased level of HDL-C, risk index as compared with control at P< 0.05. Concentration of 6mg legalon had significantly good impact on lipids profile and kidney functions, but did not affect significantly the body weight and better effect was obtained in the last two weeks when legalon was administrated alone‎.**Keywords:** Legalon, Hydrogen peroxide, Broiler, Kidney function, Lipid profile |
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**Introduction**

Chemicals of plants, especially flavonoids, are highly studied in human as well as animal trials dealing with health status, defense against diseases and food protection mechanisms [1]. In poultry farms, stress can reduce productive performance. Aqil *et al.* [2] and Ahmed *et al.* [3] associated the production of free radicals and reactive oxygen species at cellular level with fear in poultry. Scientists have reported medicinal plants positive effect on performance of broiler challenged with stress [4]. Medicinally, both growth boost and feed conversion ratio improvement in poultry farming require the herbals medicine to be involved. Milk thistle (Silybum marianum) is among them, which is a very natural popular worldwide plants used for many centuries to cure some disorders such as spleen, renal, hepatic, bile ducts, and liver cirrhosis.The mode of action is preventive through the protection of hepatocytes from the toxic effect of alcohol, drugs, medicine, heavy metals, and pesticides. In addition, it detoxifies the liver from all harmful substances [7, 8] through having a high percentage 70-80% of flavanolignans consisting of four subunits including Silybin (50-60%), Isosilybin (5%), Silydianin (10%), and Silychristin (20%). Silybin is the major component and shows better biological activities, all together known as silymarin that have been reported to have a very active biological preventive action on liver. Many studies posted the anticancer effect of silymarin through

**Materials and Methods**

*Experimental design*

The experiment was conducted in Veterinary Medicine college, University of Mosul. Twenty-four Ross broiler of thirty-day old males provided from local hatchery, were randomly assigned into four groups of six birds each. The birds of each group were housed in individual suspended wire cage, under controlled conditions of temperature, humidity and artificial light with 12 hours photoperiod. The birds kept in animals’ house for 30 days before the experimental work, feed and water were given *ad* *libitum*. After adaptation, the broilers groups were treated for 3 weeks as follows: 1st group (control) were given drinking tap water, 2nd Group 0.5% H2O2, 3rd group 0.5% H2O2 plus 6mg/kg legalon, and 4th Group 6mg/kg legalon alone.

*Treatment solutions*

Hydrogen peroxide 30% was obtained from Spain (E.L Gato perez Schar lab.) which was diluted with tap water to 0.5% [21]. Legalon (standard drug of milk thistle seeds) was obtained from Madaus, GmbH (Germany) on tablets which were powdered by an electrical mill and instantly dissolved with distil water then given to animals by oral gavege needle.

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| **Figure 1.** Statistics on the spread of COVID-19 according to WHO and Johns Hopkins University [32]. |

The chickens were slaughtered from the neck after an overnight fasting for 12 hours at the end of the trial period (3weeks). Then, the blood samples were collected in disposable plain tubes, and centrifuged at 3000 (rpm) for 10 minutes. The collected serum was stored at -20 c⁰ until biochemical analysis. Commercial kits provided by (Biolabo, Miazy, France) was used to measure the cholesterol serum total, triglycerides, HDL-cholesterol, LDL-cholesterol, VLDL-cholesterol, urea as well as creatinine. The risk index was estimated from the equation: Risk index = LDL- C / HDL-C

**Results and Discussion**

The blood parameters of lipids profile in **Table 1** show that the cholesterol, triglycerides, LDL-C, and VLDL-C concentration were significantly higher in hydrogen peroxide given at 0.5% (2nd group) compared with the control (p ˂ 0.05). Legalon administration significantly lowered the level of cholesterol, triglycerides, LDL-C, and VLDL-C in the 3rd group and 4th group compared with the 2nd group. Also, HDL-C concentration was lower significantly in the 2nd group compared with the 1st group (p ˂ 0.05). The treatment with legalon pretends significantly higher of HDL-C level in the 4th group compared with the 1st group as well as 2nd group. The risk index was higher significantly in the 2nd group compared with the control (p ˂ 0.05). The treatment with legalon shows significant reduction in the level of risk index in the 3rd group and 4th group compared with the 2nd group.

**Table 2** shows that the concentration of urea and creatinine significantly higher in 2nd group compared with the control (p ˂ 0.05). Administration of legalon significantly lowers the level of urea and creatinine in the 3rd group and 4th group compared with the 2ndgroup and 1st group **(Table 1, Figure 1).**

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| **Table 1. Legalon drug effect on lipids profile** |
|  | **1st Group****control** | **2nd Group****H2O2 0.5%** | **3rd Group****Legalon 6mg/kg + H2O2 0.5%** | **4th Group****Legalon 6mg/kg** |
| **Cholesterol** | 84.88±3.53a | 177.35±7.14B | 72.33±4.24A | 73.01±2.28A |
| **Triglyceride** | 80.49±5.39a | 111.78±1.48B | 27.80±2.59C | 75.51±4.16A |
| **HDL-C** | 34.45±0.96a | 25.00±0.95b,c | 23.72±1.85C | 50.05±2.79D |
| **LDL-C** | 64.24±5.36a | 174.71±7.87B | 54.21±3.01c,a | 38.05±2.49C |
| **VLDL-C** | 13.81±2.42a | 22.36±0.29B | 5.55±0.52C | 15.10±0.83A |
| **Risk index** | 1.87±0.16a | 7.05±0.24B | 2.33±0.24A | 0.77±0.19C |

The values represent mean ± SR of four experiments with six chicks in each group (p <0.05) as compared with the control.

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| **Table 2. Legalon drug effect on kidney functions** |
|  | **1st Group****control** | **2nd Group****H2O2 0.5%** | **3rd Group****Legalon 6mg/kg + H2O2 0.5%** | **4th Group****Legalon 6mg/kg** |
| **Creatinine mg/dl** | 2.7±0.390A | 4.16±0.306B | 2.58±0.306A | 2.79±0.237A |
| **Urea mg/dl** | 18.73±1.29a,b | 24.89±1.06a | 19.73±2.389a,b | 17.638±1.213B |

The values represent mean ± SR of four experiments with six chicks in each group compared with the control.

The values represent mean ± SE of four experiments with six chicks in each group. Means in a column followed by different small letters, or in a row by different capital letters are significantly different compared with the control.

Considering Eq. 1 as follows:

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| $$ω\_{p}=\sqrt{\frac{Ne^{2}}{ε\_{0}m^{\*}}}$$ | (1) |

 increase in the control weight compared to the rest groups, but the treatment with the 2nd group and 3rd group seemed to be insignificantly (p <0.05 different the all duration of experiment; while, the fourth group chicks’ weight was significantly increased (p <0.05) in the last two weeks.

**Conclusion**

Generally, administration of legalon alone affects growth performance especially in the last two weeks, but legalon in combination with H2O2 did not. Blood serum concentration has showed a reduction in birds treated with legalon urea, creatinine, triglycerides, total cholesterol, LDL-C, VLDL-C, risk index and greater concentration of HDL-C. H2O2 increases the kidney functions, and lipids profile except HDL-C.

In conclusion, administration of legalon significantly improved the Hydrogen peroxide induced disturbances and has good effect on lipids profile and kidney functions as well as on body weight when given alone in chickens.

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**Conflict of interest:** None

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**Ethics statement:** None

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