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Hyperlipidemia and fatty liver are considered as serious problems in broilers as they associated with oxidative stress and inflammation of the liver. Production of broiler chickens containing excess body fat is a matter of concern in the poultry industry. Several factors contribute to the tendency for broilers to accumulate excess body fat one of them is repeated fasting and refeeding cycles. It is a feeding regimen which is followed specially in tropical countries as a method for decreasing heat stress. The repeated fasting and refeeding cycles have a negative impact on broiler performance and feed conversion rate as it is associated with increase in lipogenesis. This increase is a result of up-regulation of hepatic lipogenic enzymes through increase in mRNA gene expression level of these enzymes.

The present investigation aimed to study the biochemical changes in lipid metabolism and the associated oxidative stress in broilers which are subjected to repeated cycles of fasting and refeeding only or in combination with heat stress. Also during this investigation the properties of L-carnitine and synbiotics as hypolipidemics and antioxidants were evaluated.

This study was carried out on (240) broiler chickens, these chickens were divided into eight groups (each group contains 30 chickens) as the following:

- 1) Control group: fed *ad libitum* and reared at optimum temp.
- 2) FR group: subjected to repeated cycles of fasting (9 hours) then refeeding at 28th day till the end of experiment.

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- 3) HS group: subjected to high temp (35⁰c) for 9 hours starting from 28th day till the end of experiment.
- 4) FR&HS group: subjected to repeated fasting and refeeding cycles and high temp at 28th day till the end of experiment.
- 5) FR+LC group: given L-carnitine in drinking water (1 ml / L) eight days before challenge till the end of experiment.
- 6) FR+Syn group: given synbiotics in drinking water (probiotic 1gm/L, prebiotic 1ml/L) eight days before challenge till the end of experiment.
- 7) FR&HS+LC group: given L-carnitine in drinking water (1 ml / L) eight days before challenge till the end of experiment.
- 8) FR&HS+Syn group: given synbiotics in drinking water (probiotic 1gm/L, prebiotic 1ml/L) eight days before challenge till the end of experiment.

At the end of experiment (38th day), the blood samples and liver tissues were collected. The lipid metabolism indices (total lipids, TAG, cholesterol, LDL-C and HDL-C) were measured in serum. The hepatic GSH, GR, SOD, LPO, TAC and NO levels were measured as oxidative biomarkers. Also the histopathological changes in the liver were evaluated.

Results were recorded in (10) tables and (28) figures. The obtained data were subjected to statistical analysis and revealed the following:

- The repeated cycles of fasting and refeeding alone or in addition to heat stress induced a significant increase not only in serum total lipids, TAG, cholesterol, LDL-C and HDL-C levels but also in hepatic LPO and NO levels. Moreover, it lead to a significant

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decrease in hepatic GSH content, TAC, GR and SOD activities as compared to control group.

- Our biochemical results were confirmed by histopathological investigations where many lesions were detected in the liver.
- Administration of L-carnitine or synbiotics during the challenge showed a significant improvement in the measured biochemical parameters and histopathological pictures as compared with challenged groups.

Conclusion

Severe feed restriction in the form of repeated fasting and refeeding cycles only or in combination with heat stress lead to hyperlipidemia and oxidative stress which can be ameliorated by using of L-carnitine or synbiotics as hypolipidemics and antioxidants.