

SUMMARY

Nonalcoholic fatty liver disease is emerging as a common medical problem. It is usually associated with one or more of these conditions which are insulin resistance, type 2 diabetes, dyslipidemia and obesity. Recently they collectively termed as the metabolic syndrome. It is generally accepted that high fat diets can be used to generate a valid rodent model for NAFLD.

The present study aimed to experimental induction of NAFLD by using of high fat diet (35%) in male Wister rats and to evaluate the biochemical and hormonal changes that occur in plasma and tissue which related to carbohydrate and lipid metabolism.

In addition, an attempt was made to clarify the role of some new antioxidants represented by Coenzyme Q9 derivative in extra-virgin olive oil as a supportive treatment of NAFLD.

The experiment was carried out on male Wistar rats for a period of 18 weeks and it was divided into two phases, the first phase (induction period) and the second phase (treatment period). First phase began from W1 to W10 and it was the period of induction of NAFLD. Rats were divided into two main groups (Ct and Hf groups) according to the type of the consumed diet. Control group fed with the standard normal rat chow diet and the high -fat diet group fed with the high fat diet.

The second phase began from W11 to W18 and it was the period of treatment with administration of Coenzyme Q9 derivative in extra-virgin olive oil. During this period the same pattern of feeding was continued and the high fat group of rats was subdivided into 3 subgroups. One remained

without treatment (Hf) and the second administrated with CoQ9 derivative in extra-virgin olive oil (Hf+CoQ9) and the third administrated with extra-virgin olive oil (Hf+olive oil) control group.

The effect of dietary regimens and treatment on body weight of rats, food consumption and energy intake of consumed diet were determined.

The effect of dietary regimens and treatment on plasma glucose, insulin, HOMA-IR index, VLDL-TAG, LDL-TAG, HDL-TAG, VLDL-TC, LDL-TC, HDL-TC, plasma TAG, TC, NEFA, ALT, AST, AST/ALT ratio and plasma leptin, adiponectin and TNF- α were studied. In addition, total glutathione of R.B.Cs were measured. Also peri-renal and liver weights were determined. TAG and TC concentrations of liver were measured with confirmatory analysis of the liver tissue by histopathological examination.

Results were recorded in (15) tables and (19) figures. The obtained data were statistically analyzed and showed that:

- 1)-High fat diet feeding of male Wistar rats for 18 weeks did not significantly increase the body weight of rats. Food consumption of the 3 high fat diet subgroups was significantly lower than that of the Ct group despite the significant higher energy intake of the high fat consumed diet. Energy intake of high fat consumed diet was higher in the Hf+ CoQ9 in extra-virgin olive oil group.
- 2)-An increase in fasted plasma insulin and HOMA-IR index was observed in the high fat diet subgroups of rats. This increase was significant in the Hf and Hf+CoQ9 in extra-virgin olive oil group in comparison to Ct group. Independently of the diet regimen and antioxidant treatment, fasted plasma glucose did not show any significant changes.
- 3)-A significant increase in VLDL-TAG, VLDL-TC and LDL-TAG concentrations in the all high fat diet subgroups of rats (Hf group, Hf+CoQ9 in extra-virgin olive oil group, Hf+olive oil control group) in

comparison to Ct group, while no significant changes were observed in the HDL-TAG, HDL-TC and LDL-TC concentrations.

- 4)- A significant increase in fasted plasma TAG concentration was observed in the 3 high fat diet subgroups of rats (Hf group, Hf+CoQ9 in extra-virgin olive oil group, Hf+olive oil control group) in comparison to Ct group, while no significant changes were observed in the fasted plasma TC and NEFA concentrations. The higher level was observed in the HF+olive oil control group.
- 5)- A significant increase in ALT activity and AST/ALT ratio were observed in the 3 high fat diet subgroups of rats (Hf group, Hf+CoQ9 in extra-virgin olive oil group, Hf+olive oil control group) in comparison to Ct group, while no significant changes were observed in the AST activity. The higher level of ALT activity and the higher AST/ALT ratio were observed in the Hf group and Hf+CoQ9 in extra-virgin olive oil group respectively.
- 6)- A significant increase in plasma leptin was observed in the 3 high fat diet subgroups of rats (Hf group, Hf+CoQ9 in extra-virgin olive oil group, Hf+olive oil control group) in comparison to Ct group, while no significant changes were observed in the plasma level of adiponectin and TNF- α . The higher level of plasma leptin was observed in the Hf+CoQ9 in extra-virgin olive oil group.
- 7)- Results of total glutathione concentration of R.B.Cs showed no significant changes as an effect of high fat diet and/or treatment with CoQ9 in extra-virgin olive oil.
- 8)- A significant increase in peri-renal adipose tissue weight was observed in the 3 high fat diet subgroups of rats (Hf group, Hf+CoQ9 in extra-virgin olive oil group, Hf+olive oil control group) in comparison to Ct group, while no significant changes was observed in liver weight. The

higher adipose tissue weight was observed in the Hf+CoQ9 in extra-virgin olive oil group.

9)- A significant increase in TAG concentration of liver lipid extract was observed in the 3 high fat diet subgroups of rats (Hf group, Hf+CoQ9 in extra-virgin olive oil group, Hf+olive oil control group) in comparison to Ct group, while no significant changes was observed in TC concentration. The higher TAG level was observed in the Hf+CoQ9 in extra-virgin olive oil group.