Ain Shams University
Faculty of Women for Arts, Science & Education
Zoology Department

Study on the Pathogenesis of Experimental Nonalcoholic Fatty Liver Disease (NAFLD) in Rats as a One of Metabolic Syndrome and Possible Amelioration Effects of some Promising Antioxidants

Submitted in Partial Fulfillment for the Requirements for the Degree of Master of Science in Zoology

By

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QUALIFICATION

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Courses studied by the candidate in partial fulfillment of the requirements of the degree of M.Sc.:

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2. Physiology.
3. Histopathology.
4. Molecular Biology.
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6. English language.
7. Computer.

APPROVAL SHEET

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Title: Study on the Pathogenesis of Experimental Non-alcoholic Fatty Liver Disease (NAFLD) in Rats as a One of Metabolic Syndrome and Possible Amelioration Effects of some Promising Antioxidants.

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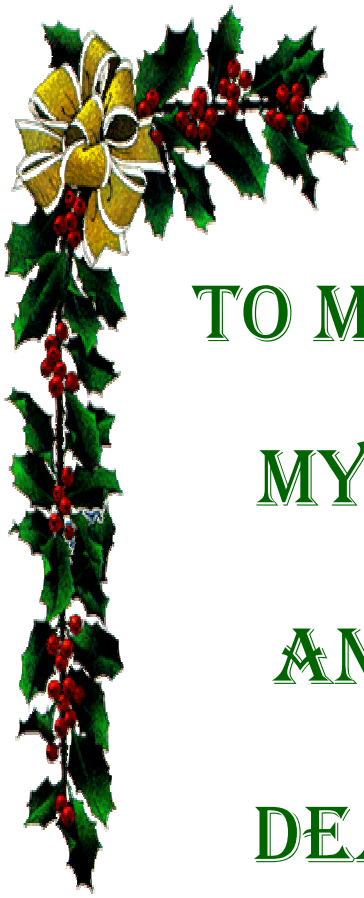
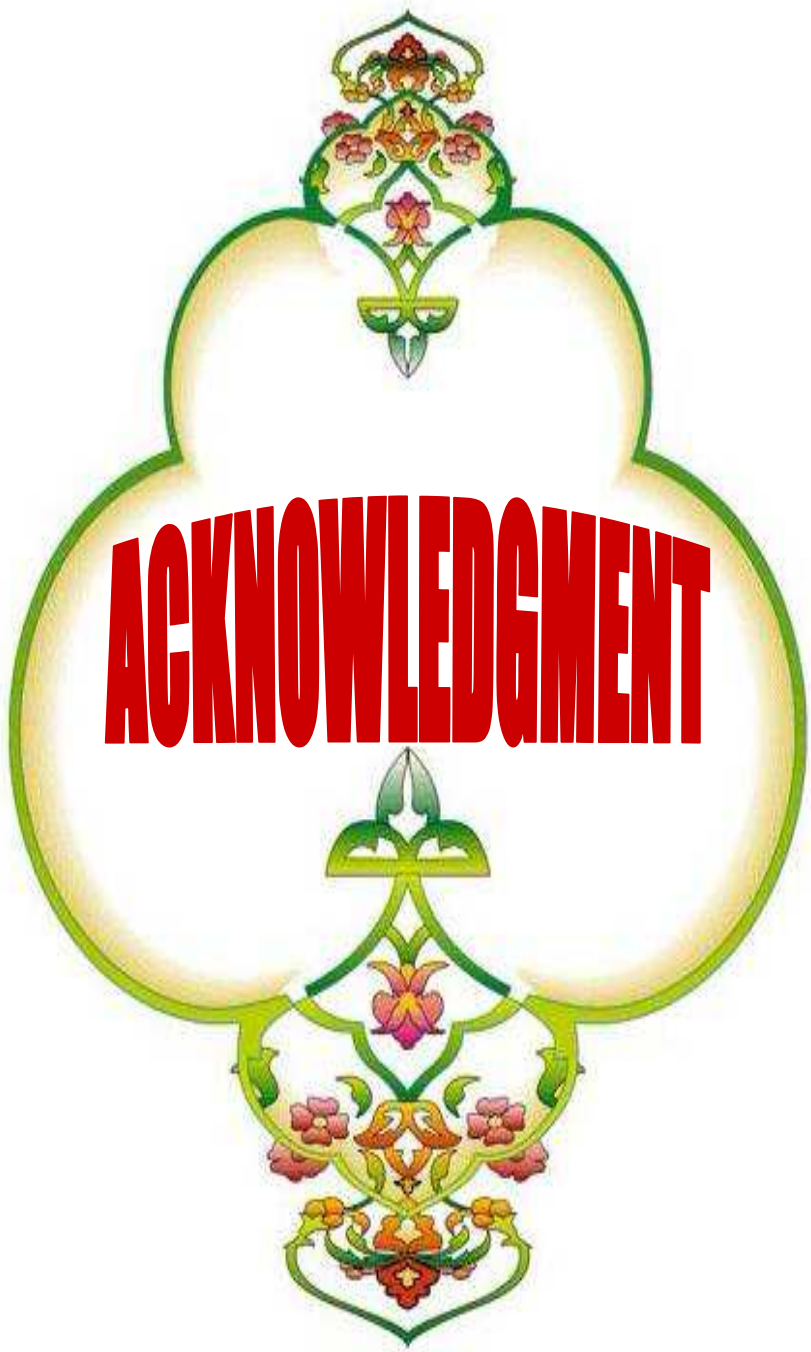


TO MY FATHER,

MY HUSBAND

AND ALL MY

DEAR FAMILY


ACKNOWLEDGMENT

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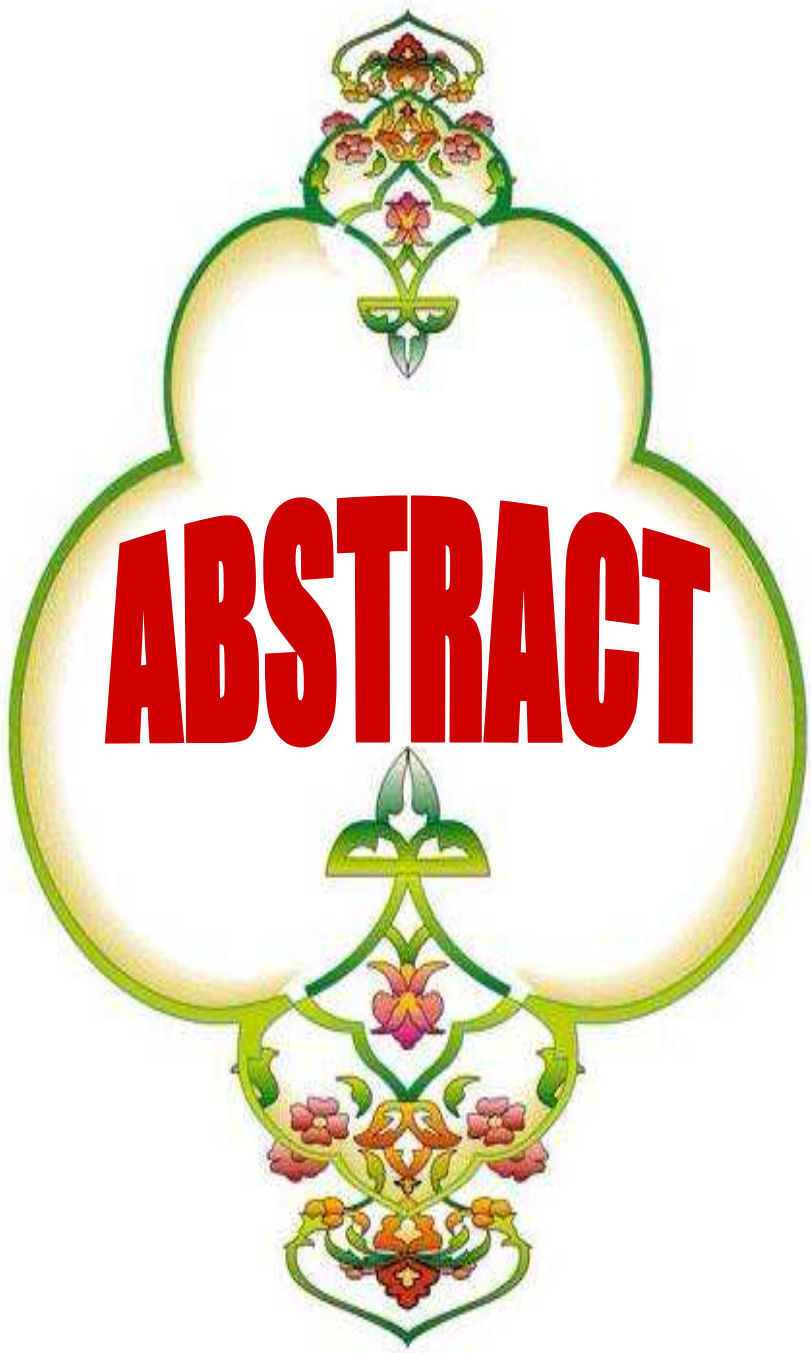
ABSTRACT

Abstract

Non-alcoholic fatty liver disease (NAFLD) represents one of the most common liver diseases. It is strongly associated with obesity and insulin resistance and thought to be parameters of the metabolic syndrome. NAFLD can progress to non-alcoholic steatohepatitis then to cirrhosis and liver failure. This study aimed to investigate whether silymarin or/and taurine can improve non-alcoholic fatty liver in an animal model and whether this therapeutic approach resulted in amelioration in carbohydrates profile (serum glucose, insulin, insulin resistance index and hepatic glycogen), lipids profile (serum total cholesterol, triglycerides, free fatty acids, leptin, adiponectin and hepatic total lipids & cholesterol), liver function profile (serum aspartate transaminase, alanine transaminase, total protein, albumin and haptoglobin) and cytokines profile (serum tumor necrosis factor-α, interleukin-1ß and interleukin-6). The obtained results revealed a significant ($p<0.001$) increase in carbohydrates profile (glucose, insulin, insulin resistance index & hepatic glycogen) in NAFLD rats than those in their control ones. Lipid parameters (serum cholesterol, triglycerides, free fatty acids and leptin as well as hepatic total lipids and cholesterol) were significantly ($p<0.001$) elevated in NAFLD rats compared with their corresponding control group. On the other hand, induction of NAFLD to rats caused a significant ($p<0.001$) decrease in adiponectin level. Liver function tests (serum aspartate transaminase, alanine transaminase and haptoglobin) were significantly ($p<0.001$) increased in NAFLD rats compared with their corresponding control group. But, the levels of serum total protein and albumin were remarkable decreased in NAFLD rats group. A considerable ($p<0.001$) elevation were occurred in all cytokines parameters (serum tumor necrosis factor-α, interleukin-1ß and interleukin-6) in NAFLD rats group compared with their corresponding control group.

When, NAFLD rats group was treated with silymarin or/and taurine, a considerable amelioration effects in all previous studied parameters were pronounced dependent on certain mechanisms and time of treatment.

In conclusion, silymarin or/and taurine reduced metabolic abnormalities associated with NAFLD via inhibition the oxidative stress, increment in the stabilization of mitochondrial membrane, reduction the lipid accumulation in the liver, enhancement in the endoplasmic reticulum (ER) and improving insulin resistance. Overall, silymarin and taurine showed as promising and novel therapies for the treatment of NAFLD.

Key Words: Non-Alcoholic Fatty Liver Disease / Metabolic Syndrome / Silymarin / Taurine / Rats.

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