



Biochemical study of the hypolipidemic effect of rice bran oil in rats

Thesis

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ABSTRACT

High-cholesterol diet is regarded as an important factor in the development of cardiac diseases since it leads to development of hyperlipidemia, atherosclerosis, and ischemic heart disease. This study was conducted to evaluate the nutritional value of rice bran oil (RBO) and to investigate the role of RBO as hypolipidemic and antioxidant agent either alone or in combination to sunflower seed oil (SFO) in normal and atherogenic rats. Eighty male Sprague-Dawley albino rats were divided into 8 groups: Gr (I) (negative control): Rats fed on standard diet (SD) (according to AIN 93), Gr (II): Rats fed on SD plus 10% RBO, Gr (III): Rats fed on SD plus 5% RBO + 5% SFO, Gr (IV): Rats fed on SD plus 7% RBO + 3% SFO, Gr (V) (positive control): Rats fed on atherogenic diet (AD), Gr (VI): Rats fed on AD plus 10% RBO, Gr (VII): Rats fed on AD plus 5% RBO + 5% SFO, Gr (VIII): Rats fed on AD plus 3% RBO + 7% SFO. After 10 weeks of feeding on experimental diets, lipid profile, Free fatty acid (FFA), liver, kidney and heart function, β -lipoprotein (β -LP), pre β -lipoprotein (pre β -LP) percentage, serum protein fractions and oxidative stress were significantly ($P < 0.05$) lower, while serum HDL-C concentrations and α -lipoprotein percentage (α -LP) were significantly higher in RBO supplemented groups than the positive control group.

The RBO consumption improved liver and heart functions, reduced lipid peroxidation level and elevated total antioxidant capacity. Therefore, Rice bran oil antioxidant and antiatherogenic activities as well as its improving effect on liver and heart candidate it to be a suitable edible oil introduce in Egyptian markets and also use for patients with hyperlipidemia.

Key words: Cardiac diseases, atherosclerosis, rice bran oil, edible oil, lipoprotein

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List of Abbreviations

Abb.	Full Name
°C	Celsius
A/G ratio	Albumin /globulin ratio
AIN	American Institute of Nutrition
ALB	Albumin
ALNA	Alphalinolenic acid
ALP	Alkaline Phosphatase
ALT	Alanine aminotransferases
AOAC	Association of Official Analytical Chemists
Apo A	ApolipoproteinA
ApoB	ApolipoproteinB
AST	Aspartate aminotransferases
AV	Acid value
CAD	Coronary artery disease
CDU	Corrected dye units
CHD	Coronary heartdisease
CK-MB	Ceatine kinase MB
CM	Chylomicrons
CPT-I	Carnitine palmitoyltransferase- I
CVD	Cardiovascular disease
CYP7A1	Cholesterol 7-alpha-monooxygenase
EFA	Essential fatty acids
FAO	Food and Agriculture Organization
FCR	Fractional catabolic rates
FFA	Free fatty acid
GH	Growth hormone
GNO	Groundnut oil
HC	Hpercholesterolemic
HDL- C	High density lipoprotein-cholesterol

HMG CoA	3-hydroxy-3-methylglutarylcoenzyme A
IOM	The Institute of Medicine
IV	Iodine value
L.P	Lipoproteins
LA	Linoleic acid
LCAT	Lecithin cholesterolacyl transferase
LDH	Lactate dehydrogenase
LDL- C	Low density lipoprotein-cholesterol
LE	Egyptian pound
LH	Luteinizing hormone
LPL	Lipoprotein lipase
MDA	Malondialdehyde
Mg	Milli gram
MT	Million tones
MUFA	Monounsaturated fatty acid
NCDs	Non communicable diseases
NEFA	Non-esterified fatty acids
NNI	Nutrition National Institute
OECD	Organization for Economic Co-operation and Development
OSI	oil stability index
POV	Peroxide value
PRL	Prolactin
PS	Plant sterols (phytosterols)
PUFA	polyunsaturated fatty acids
RB	Rice bran
RBO	Rice bran oil
RNA	Ribonucleic acid
ROS	Reactive oxygen species
rpm	Revolutions per minute
SFA	Saturated fatty acid