

Effect of flavolipid extracted from *Chryseobacterium meningosepticum* on serum lipid profile of Balb/C male mice(mus musculus)

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Abstract

The effect of flavolipid extracted from *Chryseobacterium meningosepticum* on the serum lipid profile of Balb/c male mice were investigated. The mice were randomly divided into four groups (n=6), the first group was control treated with 0.9% NaCl, while that other group were (I.P.) injected with 0.2 mL of flavolipid extracted, the serum of second, third and fourth groups were collected after 24, 48 and 72 hrs respectively from treated with flavolipid.

Serum total cholesterol, and triglyceride levels were low significantly in group (G2), compared with control group, while low density lipoprotein cholesterol decrease significantly in group G4 compared with control group. There was no significant difference in high density lipoprotein cholesterol in the all treated groups. LDL-C/HDL-C ratio was reduced significantly in all groups for injected with flavolipid compared with control group ($p \leq 0.05$).

Introduction

Flavolipid which is produced by extract from *Chryseobacterium meningosepticum* (Flavobacterium sp.) [an aerobic, nonfermenting, gram-negative, rod shaped bacteria that exhibits gliding motility⁽¹⁾]. Flavolipid represents an entirely new class of emulsifying agent, the group of flavolipid features as citric acid and two cadaverine (1,5-pentanediamine) molecules⁽²⁾. This head group is different from those found in any of the currently reported classes of emulsifying agent (glycolipid lipoproteins, phospholipids and fatty salts)⁽³⁾. The flavolipid was strong and stable emulsifier, therefore, that was subjected to series of tests to begin evaluation of its ability to enhance solubilization and biodegradation of hydrocarbons and emulsification of the oil layer⁽⁴⁾. Interestingly, for application that flavolipid can be used conflict like materials that cause some of the most economically agent for serum lipid disorder. Lipid disease is among the most common metabolic disease occurring in human, it may lead to coronary heart disease (CHD)⁽⁵⁾. Excessive levels of blood cholesterol to accelerate atherogenesis, and lowering high blood cholesterol reduces the incidence of CHD. Knowledge about the levels of cholesterol subfractions is more meaningful than simple plasma cholesterol level, and higher level of low density lipoprotein cholesterol (LDL-C), that greater risk of atherosclerotic heart disease conversely the higher level of high density lipoproteins cholesterol (HDL-C) for lowering risk factor of CHD⁽⁶⁾.

A blood test or the results of a blood test that measures levels of lipids or fats including lipid profile. A lipid profile is a direct measure of three blood main components, Cholesterol (Ch), Triglycerides (TG) and HDL-C. Extensive studies on experimental animals indicate that the

addition of different types of dietary lipids have been shown to affect lipid metabolism and serum lipid profile differently^(7,8). The aim of this study therefore is to assess the effect of flavolipid extract on serum lipid profile in balb/c male mice.

Materials and Methods

Balb/c male mice, 8-9 weeks old and average of weight (25-30 g), under controlled conditions (white fluorescent light on from 6-18 hours at 20±2°C). They were fed normal diet that available (tap water and food was given *ad libitum*). The groups were divided as follows:-

Group1: - as control (n=6) which injected (I.P.) with 0.9% NaCl.

Group2: - (n=6) which injected (I.P) with 0.2 mL flavolipid and serum collected after 24 hours.

Group3: - (n=6) which injected (I.P) with 0.2 mL flavolipid and serum collected after 48 hours.

Group4: - (n=6) which, injected (I.P) with 0.2 mL flavolipid and serum collected after 72 hours.

Flavolipid, a cell wall constituent of interest for biotechnological and industrial applications, has been separated and purified from isolate of *Chryseobacterium meningosepticum*. isolate was obtained from the vagina of an in patient woman at Al-Nasseriah Hospital of Maternity and Pediatrics / Thi Qar Governorate / Iraq;

Identification of *Chryseobacterium* was achieved by examining yellow colonies grown on Blood agar and Nutrient Agar + Kanamycin, cultured with clinical sample. These colonies gave rise to Gram negative bacilli, positive for oxidase, catalase, phosphatase and indole tests. The identification kit, Api 20E has confirmed the identification of the species being *C.meningosepticum*.

Isolates were grown individually in Mineral Salt Medium + 2% Glucose in a shaking incubator at 26°C for two periods

(36hrs. & 6 days), then centrifuged in a cold centrifuge at a speed 15,300 rpm for 10min. Physicochemical and biological characteristics of the filtrate were determined, including: Solubility, Drop collapse method, Thin Layer Chromatography (TLC), chemical structure and to confirm the presence of amines and carboxyl molecules. Fasting blood samples were with drawn from heart under chlorofrom anaesthesia was taken .The blood was then transferred to the labelled centrifuged tube and allowed to clote at room temperature for one hour and centrifuged for ten minutes at a speed of 3000 r.p.m. Serum was seprated and used fresh. Serum Cholesterol (Ch),

Triglycerides(TG),High density lipoprotein (HDL-C), Low density lipoprotein (LDL- C), and Very low density lipoproteins (VLDL-C) were performed by using the enzymetic reagent standard kits.

All data were expressed as the Mean±SD,the SPSS for windows programs for statistical analysis used. Differences were considered significant when $P \leq 0.05$.

Results

Table (1) showed the significant differences ($p \leq 0.05$)in the levels of serum lipid profile between treated groups compared with control group.

Table (1):Effect of injected flavolipid extracted on serum lipid in study groups

Groups	Blood sample	Cholesterol	Triglyceride	HDL-C	LDL-C	LDL/HDL
Control	Normal	159±0.5	101±37	39.9±0.14	25±0.19	0.5±0.21
Injected Of 0.2 mL flavolipid	After 24 hrs	131±0.45	96±0.24	41±0.18	19±0.18	0.46±0.1
	After 48 hrs	102±0.41*	89±0.32*	39±0.16	8.9±0.18	0.28±0.11
	After 72hrs	117±0.31	96±0.31	43±0.14*	4.3±0.38*	0.1±0.01

Values are expressed as Mean ±SD

* There is significant difference at ($P \leq 0.05$) .

The levels of cholesterol and triglyceride were reduced significantly in group G2($p \leq 0.05$).Serum LDL -C level was decreased significantly in group G4.

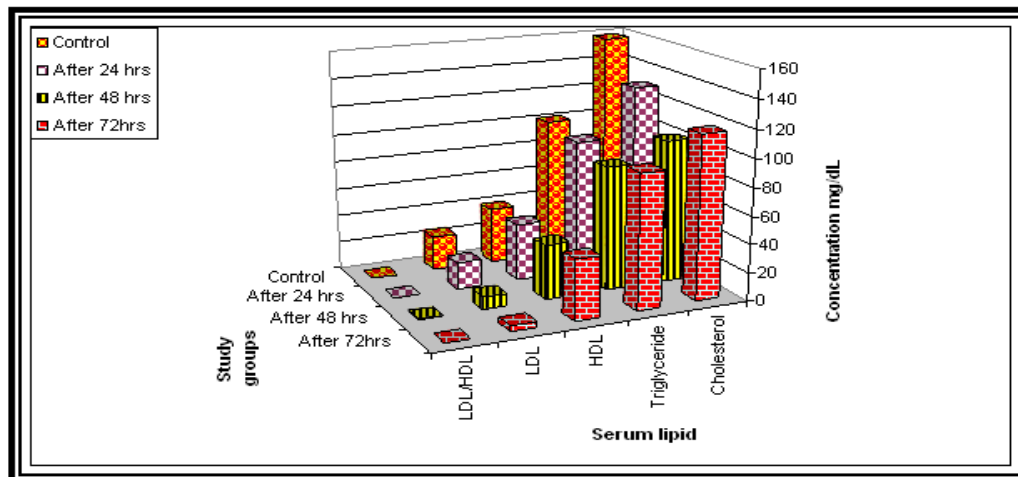


Figure 1: Compared of lipid profile concentration for study groups

While there was no significantly change in serum HDL-C in the treated groups compared with control group ($p \leq 0.05$). Of particular interest is the LDL-C/HDL-C ratio of all treated groups were significantly decreased ($p \leq 0.05$) than the control group.

Discussion

This study is an attempt to study the effect of flavolipid (0.2mL) on serum lipid profile because excessive dietary fat intake has been linked to increased risk of coronary heart disease. In contrast, there were much less information is available concerning the closely related to using of flavolipid to cause any defect in serum lipid.

This present study showed the LDL-C and cholesterol concentration is significantly reduced compared to the control. Moreover, LDL-C increase rate of triacylglycerol catabolism by mobilizing fast from the liver to adipose tissue, it carries 60% to 70% of total cholesterol in the serum⁽⁹⁾. Hence the lower level LDL-C observed in this study implies low circulatory levels of triacylglycerols and, this may reduced the possibility of deposition on arterial walls of lipid and enhance blood lipid related disease⁽¹⁰⁾.

Although in the past, an increase in the serum total cholesterol level is associated with increased risk of atherosclerosis, however, recent reports indicated that the LDL/HDL ratio is a stronger index of atherogenicity of the lipoproteins rather than the lipid profile of the individual lipoprotein fraction i.e. the lower ratio that less atherogenic the lipoprotein profile is thought to be from table 1, the LDL/HDL ratio of flavolipid extract inject to mice is significantly lower than control.

This may be due to the fact that accordance for the study of structure and characterization of flavolipids that enriched with high amino groups and straight chain of hydrocarbon that

smaller of fatty acid, there are effect for this ratio. Compared to some of the findings and studies conducted on rats using the oily plant extracts with the results of this study, which used bacterial extract (that some of the qualities that have proven oil through analysis of the crisis by some studies), found that the use of plant extracts; palm, mixed of palm and soy bean, palm olein and soy bean mixed, and, palmsterin and sesame oil had similar influence on total cholesterol, TG, LDL-C, HDL-C and there were no significant differences in serum lipids concentrations by feeding palm or others one^(11,12,13). In this our study the results showed significantly differences in the concentration of some components of lipid in study groups compared with control group.

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الخلاصة

تم دراسة تأثير مستخلص مادة الفلافوليبيد المستخلص من مكونات الجدار *Chryseobacterium meningosepticum* على الخليوي نمط صورة الدهون لمصل دم فئران مختبرية، اختبرت نماذج فئران الدراسة بصورة عشوائية بعد تقسيمها إلى أربع مجاميع تحتوي كل واحدة على ستة فار من الذكور. المجموعة الأولى والتي تمثلت بمجموعة السيطرة عوملت بالمحلول الملحي، إما المجاميع الأخرى حقنت ٠,٢ مليلتر بمادة مستخلص الفلافوليبيد، ومن ثم جمع المصل لهذه النماذج بعد فترات زمنية محددة (٤٨، ٢٤ و ٧٢ ساعة).

أظهرت النتائج وجود فرق معنوي واطئ بمستوى كل من الكولسترول والدهون الثلاثية ضمن المجموعة الثانية مقارنة مع مجموعة السيطرة. بينما كان تركيز بروتينات الدهون واطئ الكثافة يتناقص بشكل معنوي في المجموعة الرابعة مقارنة مع مجاميع الدراسة. كما أثبتت النتائج إن تركيز الدهون البروتينية عالية الكثافة لم تتأثر بكل مجاميع الدراسة المحقونة بالمستخلص أعلاه. وجد أن نسبة LDL-C/HDL-C بتناقص معنوي عالي لدى جميع المجاميع مقارنة مع مجموعة السيطرة ($p \leq 0.05$).