European Journal of Biology and Medical Science Research

Vol.3, No. 2, pp.52-61, May 2015

Published by European Centre for Research Training and Development UK (www.eajournals.org)

STUDY THE EFFECT OF PROBIOTIC CONSUMPTION ON THE IRAQI HUMAN BODY WEIGHT AND LIPID PROFILE

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ABSTRACT: *The effect of probiotic strains on the human were studied. Sixty healthy volunteers were participation in this study , which are divided in three groups, G1 treated with 3 probiotic strains with diet , G2 treated with 2 probiotic strains with diet and G3 (control group) with diet and exercise. The effect of probiotic strains on the body weight showed significantly differences between treated groups .The G1 were decreased the body weight by 8.05% (85 kg to 78.15) and G2 decreased the body weight by 6.4% (82.75 to 77.45) compared with G3 which decrease by 6.63% (87.2 to 81.41). The statistical study showed positive effect of treated by probiotic stains on the W.C. The G1 was decreased it by 7.36% while G2 was decrease it by 7.46%, compared G3 that showed decreasing by 5.16% . The effect of probiotic strains on the lipid profile in human showed that the cholesterol concentrations decreased by 14.41% (149.35)gm/dl vs (170.2)mg/dl after six weeks in the G1 , compared to the G2 9.28% (158.35) mg/dl vs (174.55)mg/d ,in the contrast with G3 was elevated from (167.20) mg/dl vs (174.50) mg/dl. The mean concentration of triglyceride was decreased in the G1 by 28.1% (74.05 mg/dl) to(53.2)mg/dl and in the G2 was decrease by 17.73% (70.30)mg/dl to(57.85)mg/dl , contrast with G3 was decreased by 14.05% (69.38)mg/dl to (59.63) mg/dl the HDL was elevated in G1 by 8.77%. and in G2 by 4.25 %.comperd with G3 .The LDL was decreased in G1 BY 22% (95.64) to (74.18) mg/dl and by 17.2% (102.61) to (84.92) mg/dl G2 after 6 week intervention compared to the control group (98.93) to(81.93) mg/dl). This study was showed the significant effect of probiotic strains in different parameters.*

KEYWORDS: Probiotics, lipid profile, (BMI) body mass index

INTRODUCTION

The obesity defined as body mass index (BMI) over 30kg/m2 and massive expansion of fat , is related to significantly increased mortality and risk factor for many diseases including diabetes mellitus, hypertension , respiratory disorders ,ischemic heart disease, stork and cancer(1).The obesity can be considered as transmissible disease because maternal obesity predisposes children to adulthood ,the obesity now considered a worldwide epidemic as, for example 30% of the population of North America is obese , the WHO data indicated that obesity currently affects at least 400 million people worldwide and 1.6 billion are overweight. The WHO further project that by 2015 , 2.3 billion will be obese (2) . Recently ,obesity has been associated with specific profile of the bacterial gut microbiota, including a decrease in the Bacteroidetes , firmcutes ration (3) and decrease in *methanobacteria smithi* (4), the *Bifidobactirium* levels will be increases , and gut microbiota composition is related to body weight ,weight gain (5). Probiotics are viable, nonpathogenic microorganisms (bacteria or yeast) that are able to

ISSN 2053-406X(Print), ISSN 2053-4078(Online)

reach the intestines in sufficient numbers to confer benefit to the host (6) and may play an important role as anti obesity drugs(7). Probiotic are commonly consumed as part of fermented foods with specially added active live cultures; such as in yogurt, soy yogurt, or as dietary supplements World health reports (2002).The benefits include immune modulation, antagonistic activity towards gastrointestinal pathogens, effects on cholesterol and lactose metabolism and antimutagenic and anticarcinogenic properties Probiotics can also produce bacteriocins and organic acids and promote the reduction of pathogenic bacteria adherence to the epithelial cells (8). Commonly used bacterial probiotics include *Lactobacillus* species, *Bifidobacterium* species, *Escherichia coli*, and *Streptococcus* species. *Lactococcus lactis* and some *Enterococcus* species have also been used. Most probiotic bacteria were originally isolated from healthy humans, since these were considered to be safe for human consumption, this means that probiotics have virtually no distinguishing characteristics from commensally organisms, except their beneficial effects when consumed (9). Iraq has witnessed an epidemiological transition with increasing prevalence of non communicable diseases (NCD) with their contributory risk factors. Being one of the leading causes of morbidity & mortality, obesity was considered as one of the (NCDs). According to the "chronic non communicable risk disease" survey that was held in Iraq at 2006, the mean BMI of the whole sample was 28.1. Furthermore, the mean in females was found to be higher than in males. WHO definition indicates that two – thirds (66.9%) of the respondents were found to be overweight, (BMI≥ 25). It was also shown that one third of the respondents were obese. Obesity was proportionally higher than overweight among females, while overweight supervened among males (Al-wan A.2004) . Regarding Waist & hip circumference, Results showed that the females' waist circumference measurements exceeded the standard limits (91.9 cm), where as that of the males' were found to be within the acceptable standards (93.3 cm).

SUBJECTS AND METHODS

Probiotic strains

Four probiotic strains were used this study*(L.acidophilus , L. Casei, L. Rhamnosus, L. Plantarum*) ,were produced by Vitane Pharma-GmbH_Germany .To re identification of strains, biochemical tests were used [14].

Study design

60 healthy Volunteers were collected from the patient of obesity treatment Centre of al_ kindy University of Medical. The inclusion and exclusion criteria to enter the study .Volunteers were checked to see if their complete blood counts (CBC) were normal and if their cholesterol and triglyceride level and other criteria met the criteria to enter the study. A one-week pre-adjustment period was designated, during which all subjects had to refrain from taking yoghurt or any other fermented food. Written informed consent was taken from each volunteer who took part in the study. Subjects were randomly assigned into three groups, each group consisting of 20 individuals. The first groups consumed probiotic with 3 strains and the second group consumed probiotic with two strains of bacteria for two time per day with diet and exercised. The third group, as the control group, did not consume any probiotic only exercised and diet.

ISSN 2053-406X(Print), ISSN 2053-4078(Online)

Lipid profile test:
To determination of the lipid profile for all study case there were used Spin react – Spain kit (Cholesterol kit, HDL kit ,Triglyceride kit and LDL kit, and following the company instrument)

Statistical Analysis
The Statistical Analysis System- SAS (2004) was used to effect of difference factors (group) in study parameters. The least significant difference (LSD) test at the comparative between means in this study. The usual methods, which used in order to analysis and assess the results, they include: -Descriptive statistics: a- Statistical table's b- Graphic presentation

Ethical consideration :
-The research proposal was approved by the scientific & ethical committee of Baghdad university .A written informed consent was obtained from each participant in the study for participation in the study with commitment of following the instructions in it

RESULT AND DISCUSSION

The effect of probiotic strains on the body weight showed significantly differences between treated groups (table 1) The 3 probiotic strains were decreased the body weight by 8.05% (85 kg to 78.15) while the 2 probiotic strains decreased the body weight by 6.4% (82.75 to 77.45) compared with control group which decrease by 6.63% (87.2 to 81.41). This result agree with Kadooka *et al. (*2010) (10), they reported that the administration of probiotic showed lowering effect on abdominal adiposity and body weight and suggesting the beneficial influence on metabolic disorders . An *et al.(*2011) (11) reported that the administration of LAB was able to reducing the body weight.

The effect of probiotics on lipid profiles
Blood lipid parameters of subjects were included; total cholesterol, triglyceride, HDL and LDL cholesterol. The results showed that there were no statistical significant differences among the three groups before the treatment excepted HDL table (2 a). The concentration of cholesterol for all groups less than 200 which was in the optimal level and the mean concentrations of triglyceride for all groups were below 150 mg/dl, which is within the optimal level. Based on the NCEP(2005) (National Cholesterol Education Program), high density lipoprotein cholesterol less than 50 mg/dl for patient is low and is considered a risk factor for heart disease. HDL cholesterol values above 60 mg/dl are optimal and are considered to offer some protection against coronary heart disease. The mean concentration of HDL cholesterol in the present study was more than 50 mg/dl. There were differences among the three groups in HDL cholesterol concentration. The value less than 100 mg/dl implies a desirable level of LDL cholesterol. The values between 100-129mg/dl are near optimal and values between 130-159 mg/dl are borderline high. The mean concentrations of LDL cholesterol for the three groups were near the optimal level. Based on the NCEP (2005) the optimum ratio for the total to HDL cholesterol is less than 3.5, and ratio less than 4.0 is considered as low risk for patient . The mean values for total cholesterol to HDL cholesterol ratio for the three groups were between 3.5 and 4.0. The ratio increases when the total cholesterol increases and HDL cholesterol decreases. Low ratio shows lower risk of heart attack, while high rate indicates higher risk. (12).

ISSN 2053-406X(Print), ISSN 2053-4078(Online)

Cholesterol

Cholesterol level after treatment showed there was highly significant differences in cholesterol among three groups table (2 b) .There were statistically significant changes in total cholesterol concentrations between three groups before , mid and after treatment. The cholesterol concentrations decreased by 14.41% (149.35)gm/dl vs (170.2)mg/dl after six weeks in the group treated with 3 probiotic strains , compared to the group treated with 2 probiotic strains 9.28% (158.35) mg/dl vs (174.55)mg/d in the contrast with control the level of cholesterol is elevated from (167.20) mg/dl vs (174.50) mg/dl .There was a decrease in both group treated with probiotic and an increase in the control group. The decrease was greater in the group treated with 3 probiotic strains ($P<0.005$) than the group treated with 2 probiotic strains, (figuer3-9).

Triglyceride

The means and standard deviations of triglyceride throughout the study were presented in table (3 a,b) The mean concentration of triglyceride was decreased in the patient treated with 3 probiotic strains by 28.1% (74.05 mg/dl) to(53.2)mg/dl and in the groups treated with 2 probiotic strains was decrease by 17.73% (70.30)mg/dl to(57.85)mg/dl , contrast with control group it was decreased by 14.05% (69.38)mg/dl to (59.63) mg/dl). The result showed there were no statistically significant changes throughout the study at the three intervals for any group ($p < 0.05$), (figure 3).

This result was agree with (13), they reported that LAB supplementation has hypocholesterolemic effects in rats fed a highcholesterol diet. The ability to lower serum cholesterol varies among LAB strains. Hatakka *et al (*2008) (14) reported that the LAB able to reduced the lipid parameters. The administration of probiotic strains were given a positive effect on the triglyceride and this result agree with (Ataie *et al* .,2009*)(.15)*

HDL cholesterol

The HDL cholesterol concentrations of the three groups at the three intervals of the study are presented in table (3a ,b) There were improvements in HDL cholesterol concentrations in both probio tic treated groups. The highest increase in means was in the group treated with 3 probiotic strains by 8.77%. The increase in the group treated with 2 probiotic strains by 4.25 %.While there was a decrease by 0.93% in the control group. The changes in HDL cholesterol concentration during the course of the study within a group were shown to be not significant for any group. There was an improvement in HDL cholesterol concentration in both probiotics treated groups. The improvement in the 3 probiotic strains was more than 2 probiotic strains and the control group. Figure (4).

LDL cholesterol

LDL cholesterol Low Density lipoprotein cholesterol concentration decreased by 22% (95.64) to (74.18) mg/dl in the 3 probiotic strains treated group and by 17.2% (102.61) to (84.92) mg/dl in the 2 probiotic strains treated group after 6 week intervention compared to the control group (98.93) to(81.93) mg/dl) (Table 3 a,b) .The mean concentration of LDL cholesterol showed an ascending trend in the third week of intervention for the both probiotic groups followed by a decrease in the sixth week. The differences between baseline and sixth week concentrations of LDL cholesterol were not significant. Many studies were reported the anti obesity effects of some bacterial strains such as *Lactobacillus* spp. (16), was observed that feeding of a high fat diet for 5 weeks produced significant increases in body weight, and administration of LAB reduced body weight gain and fat weight. Our results demonstrated that

ISSN 2053-406X(Print), ISSN 2053-4078(Online)

the cholesterol, HDL, and LDL levels in serum were decreased in the probiotic groups. The reduction of TG or LDL in serum is reported to lower the risk of coronary heart disease (17). Recent studies showed that probiotic, including *Bifidobacterium longum*, *Lactobacillus acidophilus* had hypocholesteremic effects in both rat and human (18). The mechanisms involved may be as follows: (1) fermentation products of lactic acid bacteria inhibit cholesterol synthesis enzymes and thus reduce cholesterol production; (2) the bacteria facilitate the elimination of cholesterol in faces ; (3) the bacteria inhibit the absorption of cholesterol back into the body by binding with cholesterol; (4) the bacteria interfere with the recycling of bile salt (a metabolic product of cholesterol) and facilitate its elimination, which raises the demand for bile salt made from cholesterol and thus results in body cholesterol consumption; and (5) the assimilation of lactic acid (19) , (20) carried out a study on mice to investigate the effect of *L.acidophilus* and dietary yogurt on lipid and triglyceride levels. Besides the control group, the other two groups were given either *L.acidophilus* or ordinary yogurt. There was a significant reduction of total cholesterol by 17% and low density lipoprotein levels by 33% in the acidophil group. However, the decrease in total cholesterol and low density lipoprotein cholesterol of respectively 7% and 11% in the ordinary yogurt group was not significant. Kiessling *et al*.(21) demonstrated that the intake of yogurt with 3.5% fat and cultures of *L. lactis* and *S.thermophilus* did not change the mean values of total or low density lipid cholesterol.

CONCLUSIONS

The probiotic strains showed lowering effects on abdominal adiposity, body weight and other measures of subjects with obese tendencies, suggesting its beneficial influence on metabolic disorders.

1. The consuming of pobiotic strains lead to decrease on the body weight of the animals model, the 3 probiotic strains showed more effect than 2 probiotic strains, and it's possible to used as anti obesity effect.
2. The consuming of probiotic strains lead to decrease in the lipid profile and lead to regulation of lipid metabolism.
3. The use of probiotic strains in human showed significant decreased in BMI in the treated group compared with control group. Its prospectively used to treated obesity and solving the most important problem.

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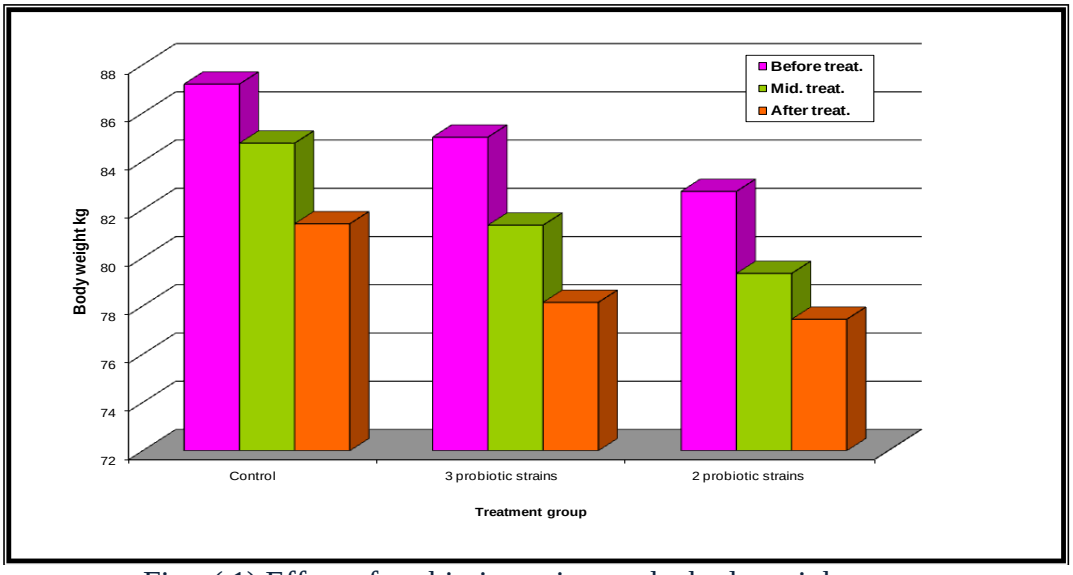
ISSN 2053-406X(Print), ISSN 2053-4078(Online)

Table(1) Effect of probiotic strains in body weight (before, mid. & after treatment)

Stage	Body weight Mean ± SE (gm)			LSD Value
	Control	Treatment with 3 probiotic strains	Treatment with 2 probiotic strains	
Before treat.	87.20 ± 1.83 A	85.00 ± 1.30 AB	82.75 ± 0.95 B	4.000 * P<0.0317*
Mid. treat.	84.75 ± 1.79 A	81.35 ± 1.29 AB	79.35 ± 1.00 B	3.977 * P<0.05*
After treat.	81.41 ± 1.88 A	78.15 ± 1.29 A	77.45 ± 0.95 A	4.047 NS P<0.0427
* (P<0.05), NS:Non-significant				

Means having different letters at the same row are significant different.



Figur(1) Effect of probiotic strains on the body weight.

ISSN 2053-406X(Print), ISSN 2053-4078(Online)

Table (2a). Effect of probiotics on the lipid profile of human before treatment.

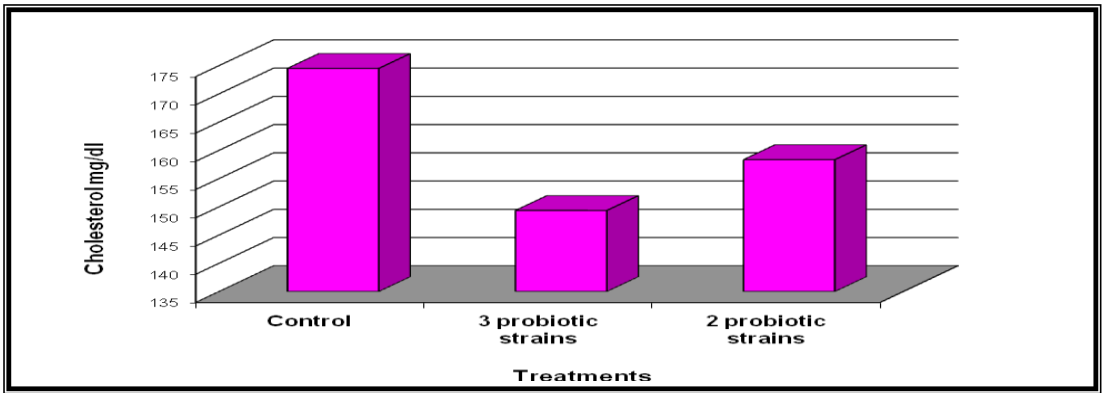
Blood characteristics	(Mean ± SE)			
	Control	Treatment with 3 probiotic strains	Treatment with 2 probiotic strains	LSD Value P Value
Cholesterol	167.20 ± 3.36 A	170.20 ± 3.67 A	174.55 ± 3.61 A	10.060 NS P=0.328
Triglycerid	69.38 ± 3.95 A	74.05 ± 3.60 A	70.30 ± 4.28 A	11.217 NS P=0.417
LDL	98.93 ± 3.39 A	95.64 ± 4.01 A	102.61 ± 3.19 A	10.067 NS P=0.339
HDL	64.53 ± 2.62 A	56.20 ± 2.11 B	57.61 ± 2.58 AB	6.944 * P=0.027
VLDL	13.64 ± 0.69 A	14.81 ± 0.72 A	14.06 ± 0.85 A	2.155 NS P=0.452

Means having different letters at the same row are significant different

Table (2 -b). Effect of probiotics on the lipid profile of human after treatment

Blood characteristics	(Mean ± SE)			
	Control	Treatment with 3 probiotic strains	Treatment with 2 probiotic strains	LSD Value P Value
Cholesterol	174.50 ± 4.60 A	149.35 ± 3.44 B	158.35 ± 3.30 B	10.842 ** P=0.0041
Triglyceride	59.63 ± 3.23 A	53.20 ± 3.10 A	57.85 ± 3.45 A	9.252 NS P=0.362
LDL	81.93 ± 2.43 AB	74.18 ± 3.36 B	84.92 ± 2.80 A	8.181 ** P=0.017
HDL	63.60 ± 2.15 A	64.97 ± 2.27 A	61.86 ± 2.25 A	6.315 NS P=0.354
VLDL	10.85 ± 0.68 A	10.64 ± 0.62 A	11.57 ± 0.69 A	1.886 NS P=0.282
(P<0.05), NS: Non-significant				

ISSN 2053-406X(Print), ISSN 2053-4078(Online)



Figur (2) The effect of probiotic strains on cholesterol level

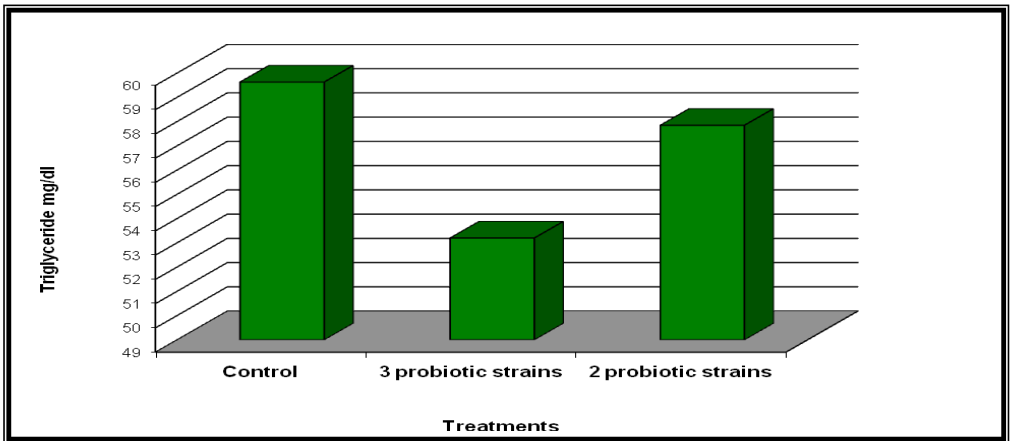


Figure (3-10) The effect of probiotic strains on T.G level .

ISSN 2053-406X(Print), ISSN 2053-4078(Online)

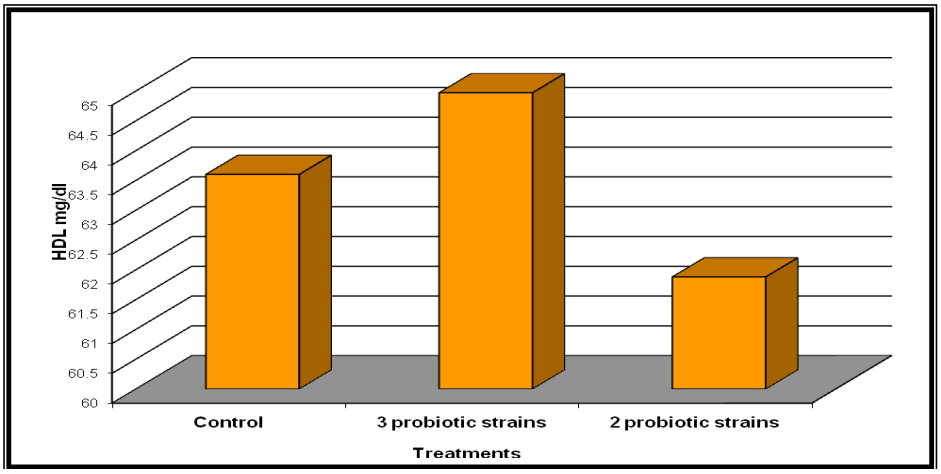


Figure (4) The effect of probiotic strains on HDL- in human after treatment

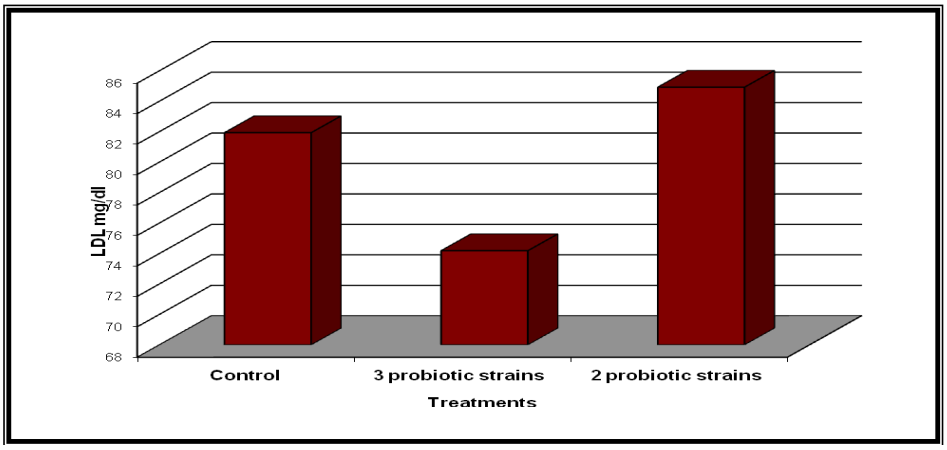


Figure (5) The effect of probiotic strains on LDL level

ISSN 2053-406X(Print), ISSN 2053-4078(Online)