

RESEARCH ARTICLE

Effect of Probiotic from Different Sources on Lipid Profile and Sugar on Patients with Hypercholesterolemia

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ABSTRACT

For managing the digestive tract and immune system, probiotic has been recommended more frequently as an effective therapy and are known as the agent of cholesterol-lowering. The definition of hypercholesterolemia is, increase of plasma cholesterol levels excessively above 200 mg/dL, the patients may have a strong risk to cardiovascular disease. The aims of this study is used different types of probiotic sources of treating patients with hypercholesterolemia with no cardiovascular disease for 30 days. The results show that, there are significant differences ($p < 0.05$) between cholesterol, Low-density lipoprotein (LDL) and High-density lipoprotein (HDL) before and after the consumption of probiotics from different sources, while triglyceride and glucose show there are no significant differences after 30 days ($p > 0.05$).

Keywords: Glucose, Hypercholesterolemia, Lipid Profile, Probiotic

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INTRODUCTION

For managing digestive tract and immune system, probiotic has been recommended more frequently as effective therapy.¹⁻⁵ Probiotic were discovered in the beginning of the 20th century, and they are widely used in the last two decades. Scientists adopted a definition to understand the mechanisms of action of it, defined the importance of probiotic and try to obtain the clinical evidence supporting its benefit and the quality of product.⁶⁻¹⁰ Probiotic are defined as live microorganisms that when consumed in adequate amounts, can reflect benefit on the health of the host.² This definition was applied by the International Scientific Association of Probiotics and Prebiotics (ISAPP).² A probiotic must be colonized and adherent to the gastrointestinal tract (GIT), it must be replicated to reach high numbers, as well as antimicrobial substances must be produced by it, beside provided an acidic environment in the GIT.¹¹⁻¹⁸

The definition of hypercholesterolemia is, an increase of plasma cholesterol levels excessively above 200 mg/dL, the patients may have a strong risk to cardiovascular disease.⁴ The cholesterol totally can be degraded into a diagnostic profile of lipoprotein, including LDL, intermediate density lipoproteins

(IDL), HDL, very low-density lipoprotein (VLDL), and triglyceride.⁵ The beneficial health of probiotics received a great focus of attention due to their effects of lowering blood cholesterol in humans, and the research intended to determine the effects of many types of probiotic strains on lipid profiles; because a major problem of public health in developed and developing countries.⁶

MATERIALS AND METHODS

Study Design as a Follow-up of Patients with Hypercholesterolemia

The patients with hypercholesterolemia diagnosed by a physician with no cardiovascular disease were divided into three groups Group A (n = 30) treated by Activia consumption and Group B treated by milk consumption (n = 30) and Group C (n = 30) treated by kashk for 30 days for each group separately. And the lipid profile and glucose were recorded before and after the treatment. The study was done in Baghdad, Iraq.

In this study, Activia yogurt, milk with probiotics and Kashk from local markets were used as a source of probiotics.

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Table 1: The result of lipid profile and glucose of patients before probiotic consumption

Groups	Lipid profile				Glucose (mg/dL)
	Cholesterol (mg/dL)	LDL (mg/dL)	HDL (mg/dL)	Triglyceride (mg/dL)	
Group A (activia)	253 ± 3.26	85.60 ± 1.54	47.40 ± 2.20	182 ± 1.60	97 ± 1.60
Group B (milk with probiotics)	280 ± 1.66	100.20 ± 2.15	53.00 ± 1.42	165 ± 2.44	110 ± 2.30
Group C (kashk)	272 ± 2.24	77.60 ± 3.66	40.33 ± 1.31	178 ± 2.65	92 ± 1.50

Collecting Blood Samples

The blood samples were collected at the beginning and after 30 days of probiotic consumption of each group about (8–5) mL of blood in test tubes and serum was obtained by Centrifuge at 3000 rpm/minute and kept at -20°C. The lipid profile (cholesterol, triglycerides, HDL and LDL) were detected for each group besides the determination of glucose. Biolabo kits (France) were used to determine the lipid profile and glucose according to the manufacture's directions.

The statistics were analyzed by calculated of ANOVA analysis, using the general linear model of the Statically Analysis System (SAS Institute, 2001) and *p*-value with confidence interval of 95% (95% CI). A *p* ≤ 0.05 was considered as significant.⁷

RESULTS AND DISCUSSION

This study included 90 patients diagnosed with hypercholesterolemia divided into three groups treated with different sources of probiotics Activia yogurt, milk with probiotics and Kashk, and the lipid profile and glucose measured before and after 30 days of consumption of probiotic sources.

The results of lipid profile and glucose for each group of patients were measured, and the results before consumption listed in Table 1. And the results of consumption of different sources of probiotics on Lipid profile and glucose listed in Table 2.

The results show that, there are a significant differences (*p* < 0.05) between cholesterol, LDL and HDL before and after the consumption of probiotics from different sources while triglyceride and glucose show there are no significant differences after 30 days (*p* > 0.05).

Probiotics known as the agent of cholesterol-lowering; and the results of current study agreed with (Abdolamir Baroutkoubl *et al.*) who revealed that there is an indication of reducing cholesterol and LDL, on the other hand raising

HDL levels due to the effects of probiotic in yoghurt; and the reducing effect was statistically significant, probiotic yoghurt containing. The results show that, there are a significant differences (*p* < 0.05) between cholesterol, LDL and HDL before and after the consumption of probiotics from different sources while triglyceride and glucose show there are no significant differences after 30 days (*p* > 0.05).

Probiotics known as the agent of cholesterol-lowering; and the results of current study agreed with (Abdolamir Baroutkoubl *et al.*) who revealed that there is indication of reducing cholesterol and LDL, on the other hand raising HDL levels due to the effects of probiotic in yoghurt; and the reducing effect was statistically significant, probiotic yoghurt containing Bifidobacteria and Lactobacillus acidophilus, which may lead to decrease total cholesterol and LDL level and increase HDL.⁸ Moreover, yogurt supported by probiotic lead to increase the concentration of HDL due to its content of sphingolipid in milk as a basic ingredient of yogurt and the sphingolipid in the membranes of probiotic bacterial cell, this component influenced on the metabolism and transportation of cholesterol, which later effects on the metabolism of HDL.⁹

Condensed processed yogurt (Kashk) determined as low energy diet, and as a high probiotic enriched product, calcium and protein, with the effect on glycemia control as well as, lipid profile. And when compared between patients with high cholesterol levels and control group, found a significant reduction in triglycerides and cholesterol) levels.¹⁰ The kashk, has a role in potential new probiotic bacteria selection. Not only because using raw cow's milk as a source of fermenting microorganisms, and their physicochemical properties, but due to the presence of viable lactic acid bacteria in high levels at the current moment of consumption.¹¹

In opposite there are several studies, revealed that, the combination of probiotics has no proof of effectiveness in reducing the biomarkers of cardiovascular disease like total

Table 2: The result of lipid profile and glucose of patients after 30 days of Probiotic consumption

Groups	Lipid profile				Glucose (mg/dL)
	Cholesterol (mg/dL)	LDL (mg/dL)	HDL (mg/dL)	Triglyceride (mg/dL)	
Group A (activia)	178 ± 1.24	60.22 ± 4.23	57.10 ± 2.50	175 ± 2.32	99 ± 1.30
Group B (milk with probiotics)	190 ± 2.12	65.90 ± 3.10	66.00 ± 1.29	162 ± 3.60	100 ± 4.50
Group C (kashk)	182 ± 1.30	61.40 ± 4.30	52.20 ± 3.15	172 ± 1.10	92 ± 7.20
<i>p</i> -value	0.001*	0.00*	0.01*	0.1	0.1

cholesterol, LDL and triglycerides) and these are required further researches.^{12,16} Many studies showed that, a lot of strains can produce an effect to improve at least one fraction of lipid in both models of animal and human, in spite of results from studies on animal have fairly consistent, the findings of on humans studies have varied, so numbers of strains when evaluated in studies on human shown effects on lipid fractions insignificantly, Although several cholesterol removal mechanisms by probiotic have been proposed, we need for further investigations to improve it.¹³

The effect of probiotics on glucose levels found that there were no significant differences in the control and patients groups. So the milk and dairy products can effect on metabolism of carbohydrate, according to numerous studies dealing with it. However, the results were obtained may still controversially.¹⁴ And it is known that, consumption of protein has the same capacity of insulin secretion stimulation, like consumption of carbohydrates, moreover, it was revealed that, not all products that containing protein may exert the same effect on secretion of insulin and modulation the sensitivity of insulin in tissues in different manner.^{15,16}

CONCLUSION

The results show that, there are significant differences ($p < 0.05$) between cholesterol, LDL and HDL before and after the consumption of probiotics from different sources while triglyceride and glucose show there are no significant differences after 30 days ($p > 0.05$).

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