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The Impact of Phytosterols and Policosanol on Hypertriglyceridemia

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ABSTRACT

Phytosterols referred to as plant sterols and stanols which are normal constituents of the human diet. In this study the impact of bakol (phytosterols and policosanols) on the level of triglycerides was investigated. The results revealed that phytosterols supplement can improve the triglycerides level thus phytosterols consider as protect agent against hypertriglyceridemia and dyslipidemia.

1. Introduction

Phytosterols referred to as plant sterols and stanols, are public plant and vegetable ingredients, thus normal constituents of the human diet. They are structurally related to cholesterol, but vary from cholesterol in the structure of the side chain. Commercially, phytosterols are isolated from vegetable oils, such as soybean oil, rapeseed (canola) oil, sunflower oil or corn oil, or from so-called "tall oil", a by-product of the manufacture of wood pulp [1]. These sterols can be hydrogenated to obtain phytosterols. Phytosterols are high melting powders, can be esterified with fatty acids of vegetable (oil) origin. The produced esters are liquid or semi-liquid materials, having comparable chemical and physical properties to edible fats and oils, enabling supplementation of various processed foods with phytosterol- and phytostanol esters. The furthestmost common phytosterols and phytosterols are sitosterol (3β -stigmast-5-en-3-ol) sitostanol ($3\beta,5\alpha$ -stigmastan-3-ol), campesterol (3β -ergost-5-en-3-ol), campestanol ($3\beta,5\alpha$ -ergostan-3-ol), stigmasterol (3β -stigmast-5,22-dien-3-ol) and brassicasterol (3β -ergosta-5,22-dien-3-ol) [2]. Every commercial foundation has its own typical structure. Nutritional intake of phytosterols ranges from 150-400 mg/day in a typical western diet. Phytosterols and phytosterols, in free or esterified form, are added to foods for their assets to decrease absorption of cholesterol in the gut and thus lower blood cholesterol levels [3]. The regular doses, considered optimal for the purpose of lowering blood cholesterol levels, are 2-3 g of phytosterols and/or phytosterols, which converts to 3.4-5.2 g in esterified form. This suggested daily quantity is typically divided in 1-3 portions of food providing 1.7-5.2 g ester, which equals 1-3 g phytostanol and/or phyto sterol equivalents [4].

Policosanol is a combination of a small number of fatty alcohols consequent from the waxes of such plants as sugar cane [5] and yams, as well as beeswax. The most dominant alcohol in policosanol is octacosanol [6], followed by triacontanol. It is used as a nutritional supplement planned to decrease LDL cholesterol and increase HDL cholesterol and to help prevent atherosclerosis, though some studies have raised questions about the effectiveness of policosanol [7]. There is a much lower concentration of several other fatty alcohols: behenyl alcohol, lignoceryl alcohol, ceryl alcohol, 1-heptacosanol, 1-nonacosanol, 1-dotriacontanol, and geddyal alcohol [8].

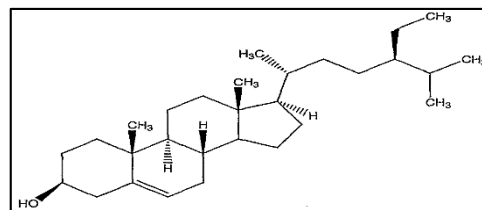


Fig. 1 The structure of phytosterols.

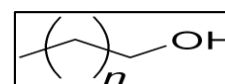


Fig. 2 The structure of policosanol.

2. Experimental Methods

In this study the impact of bakol (phytosterols and policosanols) on the level of triglycerides was investigated. The subject used bakol supplied from Arkopharma, France. The triglycerides measurement done with Reflotron plus EN device from German with Reflotron strip. The samples collected before taken the bakol and after 1, 20, 44, 55 and 72 days the measured done and the results showed in the Fig. 3.

3. Results and Discussion

This study designed to investigate the effect bakol on the triglycerides level the results from this study reveal that bakol has benefit effect on triglycerides by decrease it level as shown in the Fig. 3. A study done by Todd C. et al. recommend that nutritional phytosterols, in addition to their traditional cholesterol-lowering assets, may also protect against diet-induced hypertriglyceridemia [9].

The triglycerides-lowering response give the impression to be due to inflection of fat metabolism in the intestine and the liver as showed by a reduction in intestinal SREBP1c (SREBP-1c regulates genes required for glucose metabolism and fatty acid and lipid production and its expression is regulated by insulin) and PPAR α mRNA expression and a decrease in hepatic FAS protein (fatty acid synthase) abundance and de novo lipogenesis. These results would appear to confirm the limited animal [10]

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and human data [11, 12] that suggests a triglycerides-lowering response to phytosterols supplementation and advocate that phytosterols may be effective in protecting against diet-induced mixed dyslipidemia.

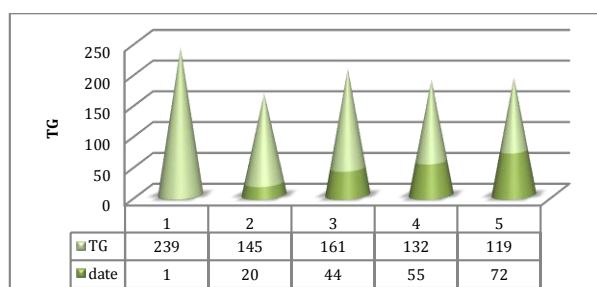


Fig. 3 The changes in levels of triglycerides.

Effect on triglycerides metabolism including reductions in blood triglycerides as our results reveal in Fig. 3 Chan DC et al. suggest that the phytosterols supplement can improve the triglycerides accumulation in hepatocytes [13]. Chan DC et al. mentioned that phytosterols may lower postprandial triglycerides by controlling intestinal fatty acid absorption and chylomicron assembly by decreasing apoB48 production and modulating the expression of intestinal lipid synthesis and transport genes in fructose and fat-fed hamsters. Todd C. et al. revealed that phytosterols supplement lead to a reduction in intestinal SREBP1c mRNA. Rideout TC et al., suggested that phytosterols supplement can reduce intestinal PPAR α mRNA expression [14]. Taken together, it give the impression that at least part of the triglycerides-lowering effects of phytosterols is associated with the modulation of multiple intestinal fatty acid regulatory targets. Todd C. et al. results additional propose that phytosterols supplementation might modify hepatic fat metabolism through a similar reduction in hepatic lipogenesis, although through a reduction in the protein abundance of FAS [9].

4. Conclusion

The results revealed that phytosterols supplement can improve the triglycerides level thus phytosterols consider as protect agent against hypertriglyceridemia and dyslipidemia.

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