

Effects of Canola oil, soy oil, cocoa butter and coconut oil on lipid profile and morphological modifications in aorta in rats

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Dietary recommendations aimed to improve health benefits against coronary heart diseases are focused on reduce the saturated fatty acids (SFA) intake. It seems important to compare the effects of widely used fats with varying proportions of SFA on lipid profile and lipoproteins.

OBJETIVE

Evaluate the effect of diets with different quantities of fatty acids on the lipid profile in rats and their relationship with morphological modifications in aorta.

MATERIALS Y METHODS

Forty male Sprague-Dawley rats with a mean body weight of 110 g were used for this study. The rats were divided into four groups fed with their respective diets: A (10% soy oil); B (10% canola oil); C (10% cocoa butter) and D (10% coconut oil) for 3 months. Body weights were measured each seven days and consumption everyday. At the end of the experiment, the rats were food-deprived for 12 h before intraperitoneal injection of an overdose of sodium pentobarbital and euthanized by exsanguination. Blood samples were withdrawn from the heart, then transferred to the labeled centrifuge tube and allowed to clot at room temperature for one hour and then centrifuged for ten minutes at a speed of 3000r. p.m. Serum was separated and used fresh. Serum triglyceride (TG), total cholesterol (TC), HDL-c concentrations were measured through enzymatic methods. The value of serum low density lipoprotein cholesterol (LDL-C) was calculated based on Friedwald's equation $LDL-c = TC - TG/5 - HDL-c$. The VLDL-c was calculated based on equation $VLDL = TG/5$. Aorta was fixed in neutral buffered 10% formalin, embedded in paraffin, and processed by routine histological procedures. Hematoxylin and eosin-stained 5 m thick sections from aorta were examined in a blinded manner by light microscopy

RESULTS

The results showed that the diets C and D elevated the total cholesterol (Fig 1), LDL (Fig 2), VLDL (Fig 3) and triglycerides (Fig 4) significantly. Diets B increased HDL-c (Fig 5). Lipid infiltrations and cellular changes in the walls of the respective vessels were observed only on group D. Cocoa butter was significantly less cholesterolaemic and atherogenic than coconut oil. Serum lipids and aortas of rats fed with A and B diets were not affected.

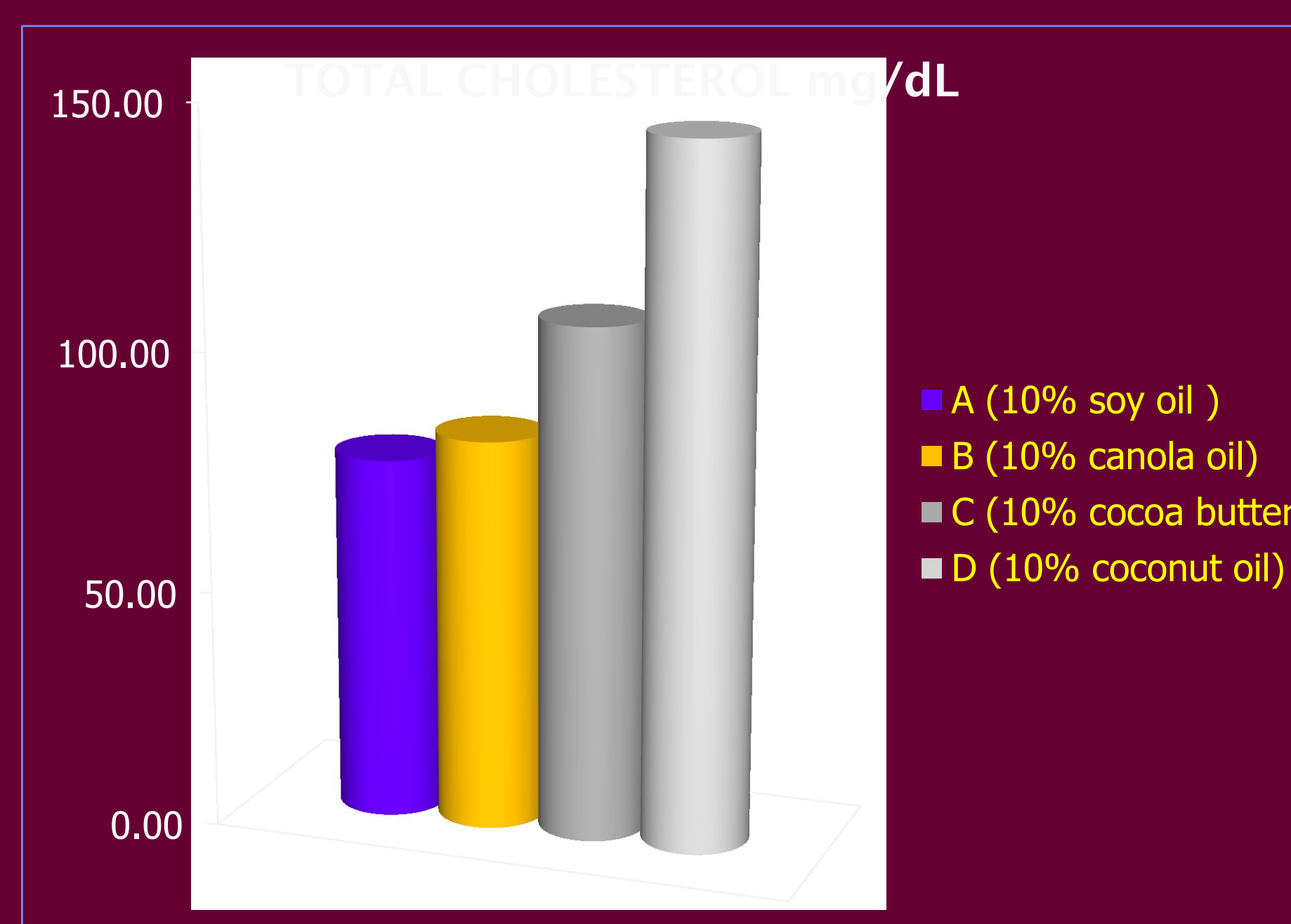


Fig.1. Total Cholesterol (mg/dL) of rats fed with diets containing Soy oil, Canola oil, Cocoa butter and Coconut oil for 3 months

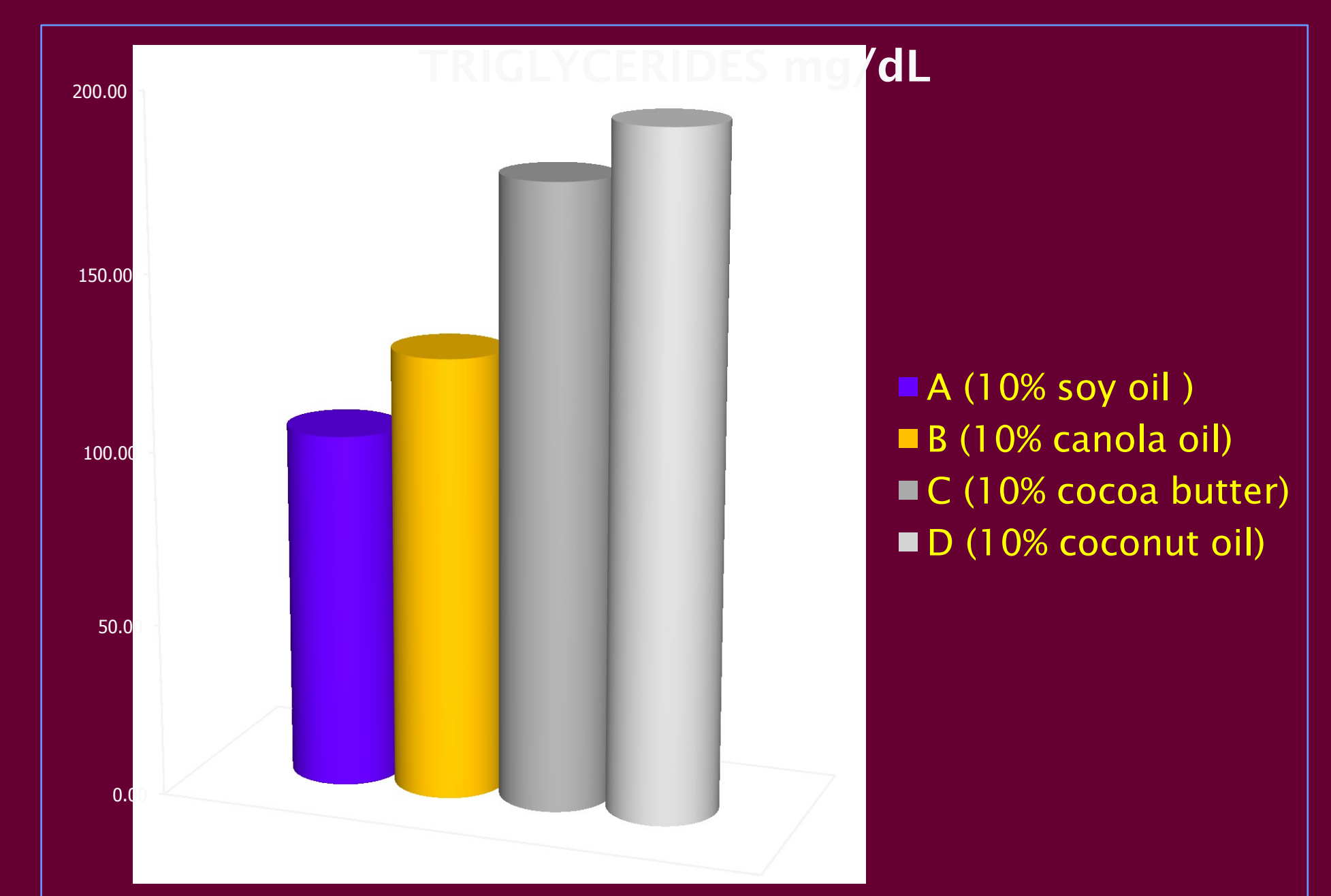


Fig.4. Triglycerides (mg/dL) of rats fed with diets containing Soy oil, Canola oil, Cocoa butter and Coconut oil for 3 months

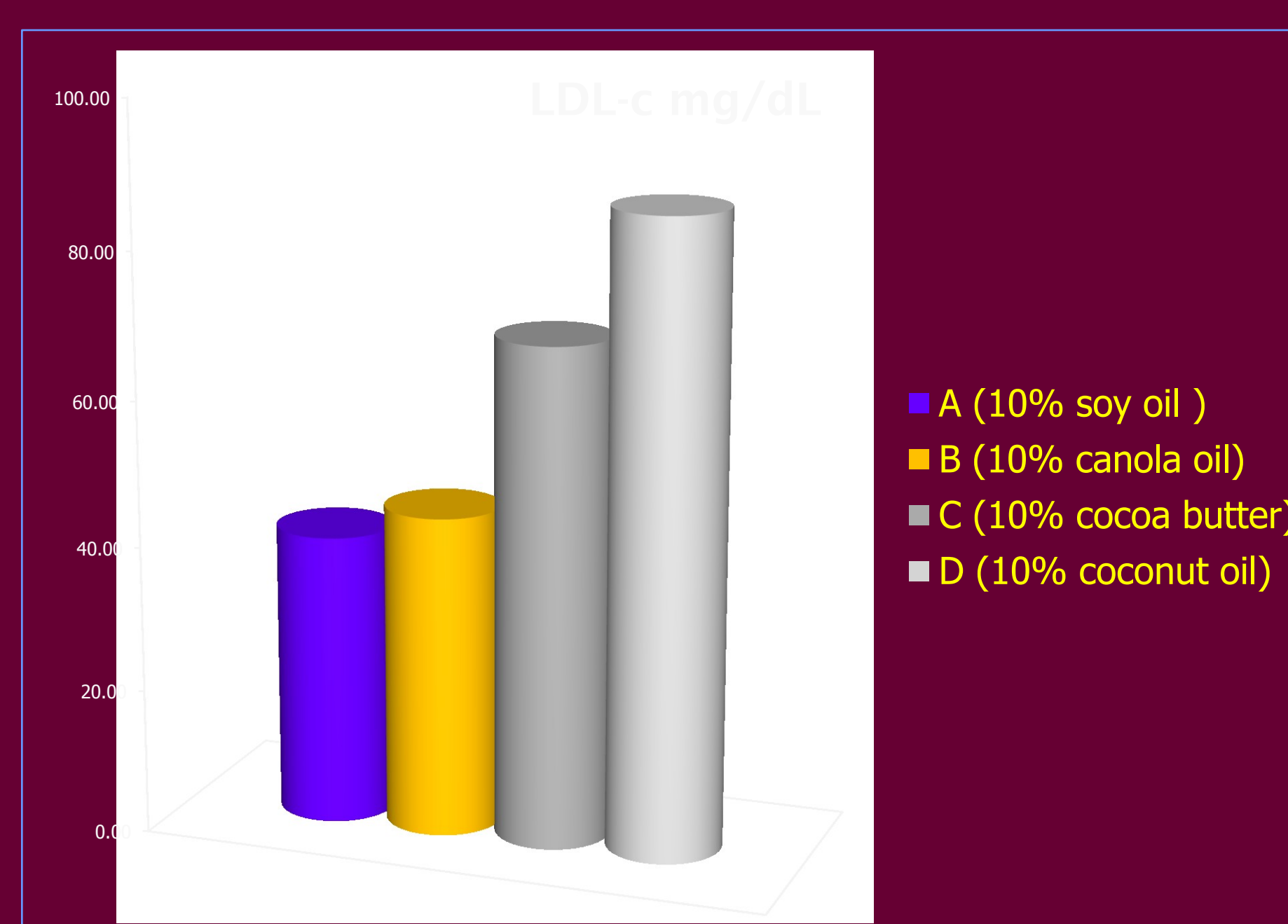


Fig.2. LDL-c (mg/dL) of rats fed with diets containing Soy oil, Canola oil, Cocoa butter and Coconut oil for 3 months

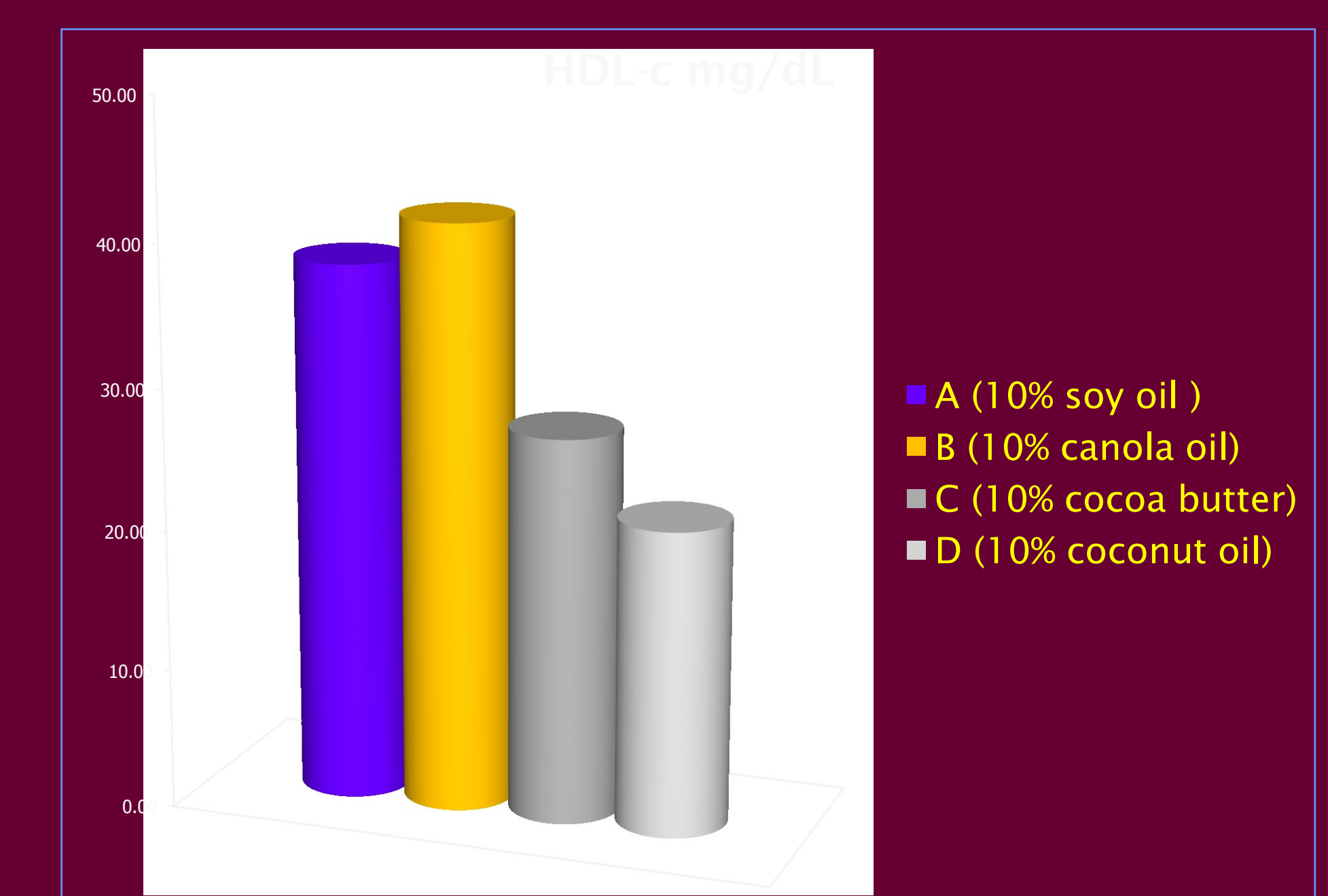


Fig.3. HDL-c (mg/dL) of rats fed with diets containing Soy oil, Canola oil, Cocoa butter and Coconut oil for 3 months

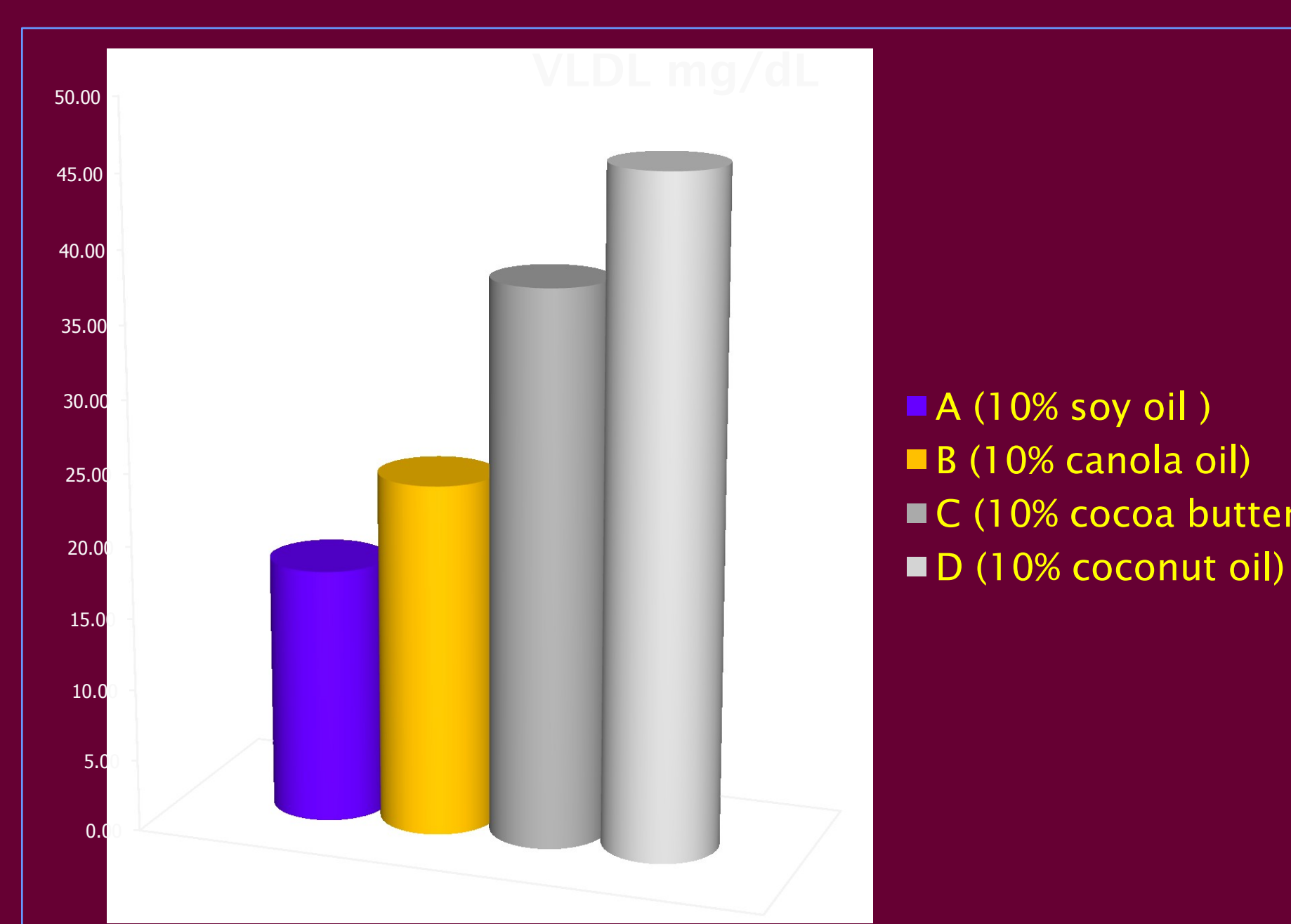


Fig.3. VLDL-c (mg/dL) of rats fed with diets containing Soy oil, Canola oil, Cocoa butter and Coconut oil for 3 months

CONCLUSION

Canola and Soy oils improve health benefits and suggest anti-atherosclerotic properties by modifying plasma lipids.

The findings suggest that, in certain circumstances, cocoa butter might be a useful alternative to coconut oil and hydrogenated vegetable fats.