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HYPOLIPIDEMIC ACTION OF ORAL APPLICATIONS OF EDIBLE FATS

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Abstract

Background. To determine the effect of oral fatty applications on the content of triglycerides in the serum and liver of rats.

Methods. As edible fats, ordinary sunflower oil, high-oleic sunflower oil “Olivka” and butter, as well as the same oils after heat treatment, were used. Application of oils (0.5 g) on the oral mucosa was carried out once a day for 3 days. After euthanasia on the 4th day, the content of triglycerides (TG) in the serum and in the liver was determined. The content of malondialdehyde (MDA) was also determined in the liver. The ratio of the level of TG in serum and in the liver was calculated fat-incretory function of the liver.

Results. Oral fatty applications cause a decrease in serum TG and increase them in the liver. In the liver, the content of MDA and the fat-incretory function decreases.

Conclusion. Oral fatty applications cause hypotriglyceridemia, reduce the level of

peroxidation in the liver and cause hepatosteatosis.

Keywords: fat diet, oral cavity, liver, serum.

INTRODUCTION

In our previous work [1], it was shown that fatty applications of edible fats on the oral mucosa of the rats (cheek, gums) cause a decrease in the level of lipid peroxidation (LPO) processes in these tissues due to activation of antioxidant systems.

The purpose of this work was to determine the effect of oral applications on the content of triglycerides in the serum and liver of rats.

MATERIAL AND RESEARCH METHODS

The following edible fats were used in the work: sunflower high-linoleic oil, refined, high-olein sunflower oil "Olive" [2] and butter (fat content 82%). A more detailed description of these fats is presented in our previous work [1].

Heat treatment of oils was carried out by heating at 125 ° C for 60 minutes in the presence of 1.5% hydrogen peroxide (30%).

The experiments were carried out on 35 white Wistar rats (males, 13 months, average live weight 232 ± 15 g), divided into 7 equal groups: 1st – control, 2nd – received applications to the oral mucosa 0.5 ml of native sunflower oil, the 3rd group – 0.5 ml of heat-treated sunflower oil, the 4th group - received oral applications of high-oleic sunflower oil (0.5 ml per rat), the 5th group - applications of 0.5 ml of the heat-treated high olein sunflower oil, 6th - 0.5 ml of butter and 7th - 0.5 ml of heat-treated butter.

The duration of the experiment was 3 days and on the 4th day, the rats were killed under thiopental anesthesia (20 mg / kg) by total bleeding from the heart. Serum was obtained and the liver part was excised for biochemical research.

The content of triglycerides (TG) in the liver homogenate was determined by an enzymatic method [3] and the content of malonic dialdehyde (MDA) using the reaction with thiobarbituric acid [4].

In the serum was determined by the content of TG and MDA. The ratio of the content of TG in the blood serum and in the liver was calculated fat-incretory function (FIF) of the liver by the formula:

$$FIF = \frac{TGserum}{TGliver} \times 100$$

RESULTS AND DISCUSSION

In fig. 1 presents the results of determining the content of MDA in the liver, which shows (with one exception, perhaps an artifact) a significant decrease in the content of MDA, similar to what we observed in the gums of rats [1].

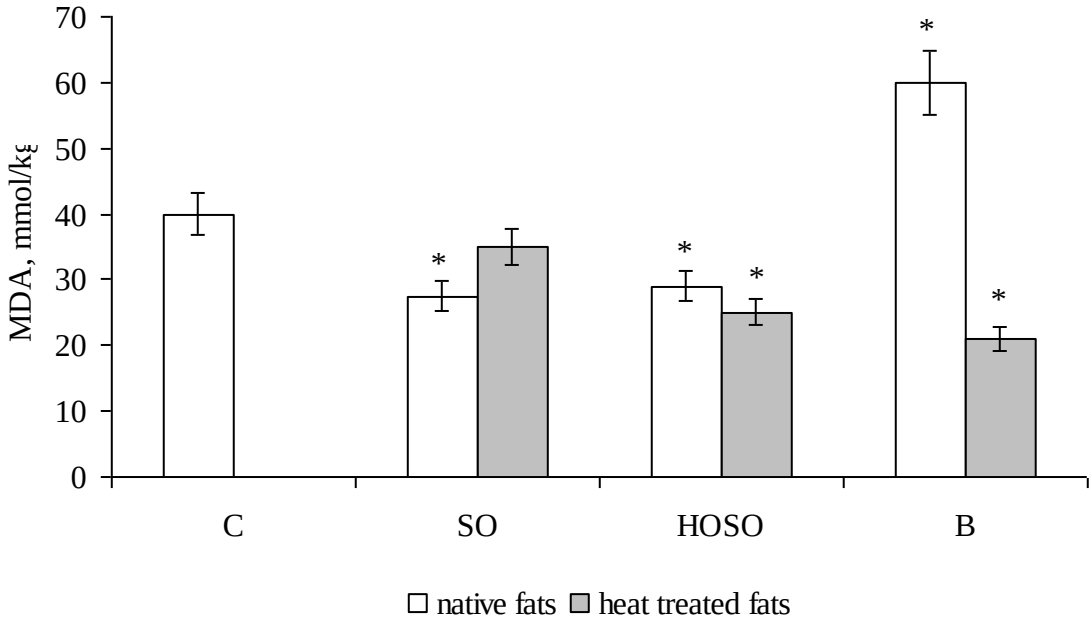

Fig. 1. Influence of oral application of edible fats on the content of MDA in rat liver (C – control, SO – sunflower oil, HOSO – high oleic sunflower oil, B – butter)

In fig. 2 presents the results of the determination of the TG content in the liver of rats treated with oral fatty applications. It is seen that in almost all cases there is an increase in the fat content in the liver after oral application of fat.

On the contrary, in the serum of rats after oral fat application, the TG content is significant decrease, especially after the application of heat-treated fats (Fig. 3).

Since the serum TG is represented in the composition of very low density lipoproteins (VLDL), which are produced exclusively by the liver [5], we propose to evaluate the liver fat-incretory function (FIF) by the ratio of serum TG and liver TG. The results of this assessment are presented in fig. 4, from which it follows that oral fatty applications significantly reduce this indicator, indicating the suppression of this liver function.

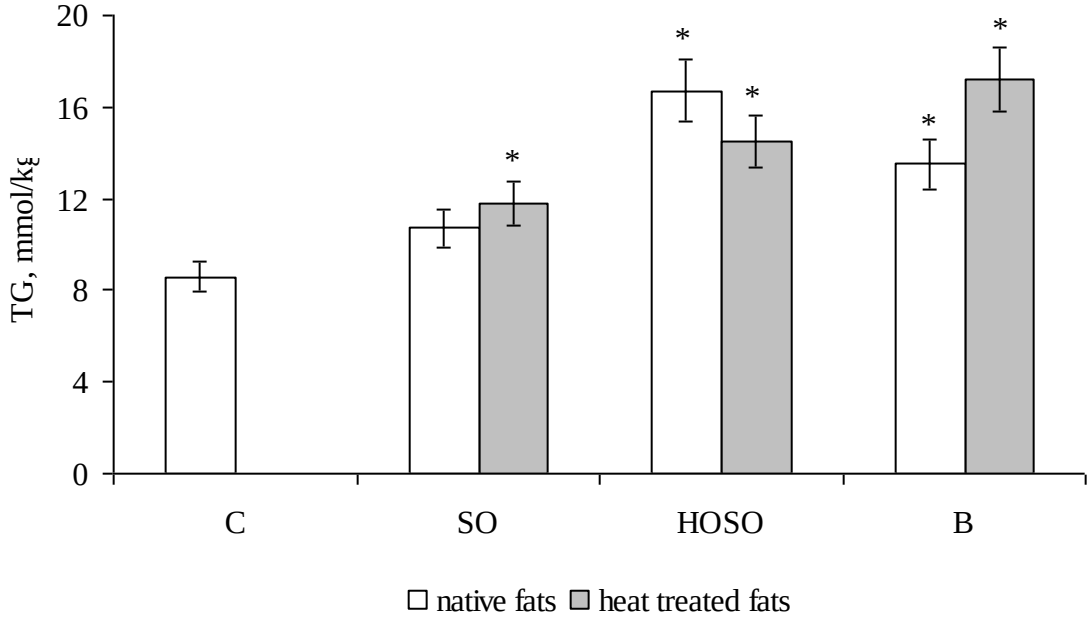

Fig. 2. The effect of oral application of edible fats on the TG content in the liver of rats (C – control, SO – sunflower oil, HOSO – high oleic sunflower oil, B – butter)

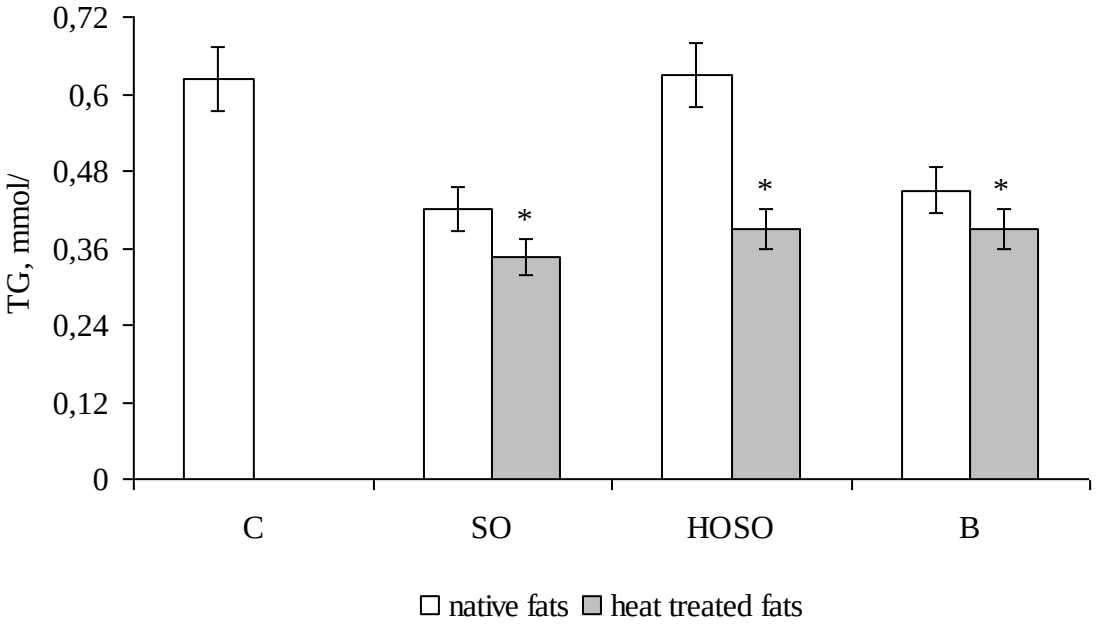

Fig. 3. The effect of oral applications of edible fats on the TG content in the serum of rats (C – control, SO – sunflower oil, HOSO – high oleic sunflower oil, B – butter)

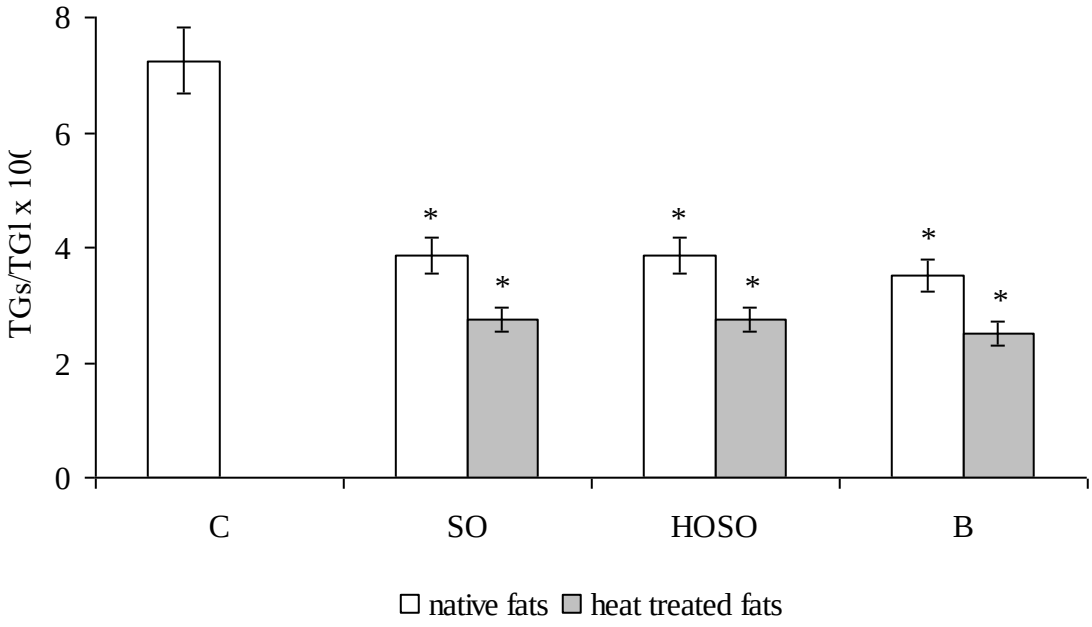

Fig. 4. Influence of oral application of edible fats on the fat- incretory function of the liver (C – control, SO – sunflower oil, HOSO – high oleic sunflower oil, B – butter)

One can only assume that the observed hypolipidemia and a decrease in the fat- incretory function of the liver are the result of a reflex reaction to the fatty application to the oral mucosa [5]. Further studies should shed light on the possible physiological mechanism of this reflex.

CONCLUSIONS

1. Oral applications of edible fats cause hypotriglyceridemia, steatosis and a decrease in the level of LPO in the liver in rats.

2. Oral applications of fats, especially those thermally treated, significantly inhibit the fat-incretory function of the liver.

3. The lipid-lowering effect of oral fatty applications may have a reflex character.

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