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CHEMICAL SCIENCES

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INFLUENCE OF TRANS FATTY ACIDS ON THE HUMAN BODY

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Introduction. For humans, fatty acids are an integral part of life, because they are a depot of nutrients. They enter the body with food and have high biological activity, which affects cellular and tissue metabolism, ensures function and response to hormonal signals. Also, fatty acids affect the structure and functions of membranes, the activity of transcription factors and gene expression, and participate in metabolism. In general, there are several types of fatty acids that have a significant impact on the human body: saturated, polyunsaturated, monounsaturated and trans fatty acids. As for their effect on the body, they can all cause cardiovascular diseases, but it is more appropriate to consider each class separately, so we will consider trans fatty acids next.

Aim. To analyze the impact of trans fats on human health, which diseases they cause, which products contain them, and which substitutes exist.

Materials and methods. An analysis of scientific literature and Internet sources was made regarding the effect of trans fats on humans.

Results and discussion. As already mentioned, fatty acids enter our body with food, but a large number of them are trans fats. So, to begin with, let's find out what they are. Transients are artificially formed as a result of hydrogenation of vegetable oils, and the problem is that due to their artificial structure, they almost do not participate in metabolism and cannot leave the body naturally, but instead settle on

the walls of blood vessels and clog them.

Nowadays, trans fats are found in almost all food products, but why does everyone use them if it is so harmful to health? The answer is simple – when using them, food products retain their fresh appearance for a long time and have a longer shelf life. So manufacturers try to add more trans fats to their product to keep them looking good for longer, but they don't think about the consequences that long-term consumption of trans fats can cause. Trans fatty acids are found in ready-to-eat semi-finished products – chips and crackers, in confectionery – cookies, cakes, waffles, candies, as well as in fried foods – french fries, donuts, that is, in most of the usual food that we eat every day.

So let's consider what the constant use of trans fats leads to. The greatest danger they can lead to is cardiovascular diseases, type 2 diabetes, obesity, and they also significantly increase the risk of coronary heart disease, strokes, and negatively affect homeostasis. The impact on the development of oncological diseases has also been clarified. And these are only the main diseases caused by trans fats, because they have a negative effect on the whole body. This is a big problem, because they are really in many products and pose a great threat to the health of all people.

Based on this situation, in order to preserve the health of people all over the world, measures aimed at reducing the consumption of trans fats have been developed. Their substitutes also began to be developed, and studies have shown that stearic acid is a good substitute for trans fatty acids in the production of products, having an effect close to theirs, but without harming humans.

Stearic acid (IUPAC systematic name: octadecanoic acid) $C_{18}H_{36}O_2$ or $CH_3(CH_2)_{16}COOH$ – is one of the useful types of saturated fatty acids that comes from many animal and vegetable fats and oils. Stearic Acid is a saturated long-chain fatty acid with an 18-carbon backbone. Stearic acid is found in various animal and plant fats, and is a major component of cocoa butter and shea butter. Stearic acid is a white solid with a mild odor. Floats on water. It is a waxy solid. Stearic acid was discovered in lard in 1816 by the French chemist Chevrel. Stearic acid is obtained by hydrogenation of oleic acid: $C_{17}H_{33}COOH + H_2 \rightarrow C_{17}H_{35}COOH$. Stearic acid is also

obtained synthetically by the oxidation of saturated hydrocarbons with manganese compounds. The main industrial method for obtaining stearic acid is to extract it from stearin, a product of the hydrolysis of fats in the manufacture of soap. Although stearic acid can also be obtained from vegetable fats, animal fat is usually used to produce it.

Although the effect of stearic acid on the human body has not yet been thoroughly studied, it is the most appropriate substitute for trans fatty acids.

Conclusions. Trans fats are hydrolyzed vegetable oils that have a negative effect on the human body. They pose a great threat to health, because they are contained in most food products, such as semi-finished products, ready-to-eat products, confectionery, fried dishes, etc. At the same time, they almost do not participate in the metabolism and are not removed from the body naturally. An excessive amount of trans fats in the body can lead to cardiovascular diseases, diabetes, obesity, coronary heart disease and cancer. So each of us should watch what we eat and try to consume less trans fats. Today, the main substitute for trans fats is stearic acid, which has a similar effect to them in food products, but does not harm the human body.