

# THE SECOND NORTH AND EAST EUROPEAN CONGRESS ON FOOD

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«Higher Educational Institutions and  
Enterprises of Food Industry  
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In cooperation with:



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**ANALYSIS OF THE ENERGY EFFICIENCY OF HEAT EXCHANGERS OF SUGAR INDUSTRY**

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Heat exchangers of heat exchanging engineering system of sugar industry are a part of general energy supply allocation of an enterprise as the major secondary heat and electrical energy user, which makes it difficult to analyze and optimize these apparatus. That consequently requires systematic approach with the usage of applicable methods.

Nowadays such major characteristics as “area of thermoexchange surface” and “coefficient of efficiency” are traditionally used in sugar industry. That is not enough, as while comparing constructionally different heat exchangers it makes no sense to compare relation between area of thermoexchanging surface and its characteristics. The usage of exergy method of thermodynamic analysis (which is widely used while analyzing technical systems – work generators) contradicts the fundamental principles of methodology of optimization of thermoexchanging processes and systems.

According to non-cycle entropy method technique, integrated thermodynamic analysis assumes the determination of measure of irreversibility of processes, that occurs in heat exchangers, the sources of which are heat exchanging at the finite variance of temperatures, the dissipation of mechanic energy of heat transfer medium currents and heat exchanging with the environment.

Suggested technique of thermodynamic analysis assumes scientifically proved systematic approach to comparative analysis and different construction, that, obviously, is suitable to do with the help of entropy coefficient of efficiency, as well as for defining their thermodynamic efficiency in margins of sugar plant. The last can be achieved with the help of using entropy coefficient of thermodynamic perfection and allows to analyze different heat exchanging systems for defining the level of their influence on general energetic efficiency of sugar plant.

**KEY WORDS:** food, thermodynamics, heat exchange, process, entropy, exergy