BOOK
OF ABSTRACTS

CEFood & Congress

8th Central European Congress on Food

Food Science for Well-being

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Kyiv, 2016

Mykola ROMANOV
gluk7c5@gmail.com
National University of Food Technologies, Kyiv
UKRAINE

MULTI-CRITERIA OPTIMIZATION OF
BREWING TECHNOLOGICAL PROCESSES

Process control of brewery is a multistep decision-making process. Each step in the procedure of the decision selection is associated with a certain objective function of control and is a set of control actions for the i-th stage of brewing.

When setting a problem of optimal control one of the main issues is the choice of optimality criterion $Q(\vec{x})$. On the one hand, the criterion must have specific physical meaning, on the other hand it has to characterize the control object as good as possible. However, the requirements of functional completeness are difficult to meet with just one scalar index because it usually describes a specific feature of the object. In this regard, we have to examine a set of parameters $(Q_1,...,Q_n)$, each of which has a clear physical interpretation and allow us to evaluate the quality of the optimal solution $\vec{x}^*$ from different views.

Solution of the multi-criteria problem is based on subjective information and is compromise solution by its nature. The process of finding a solution consists of two stages: the first is the recognition of the situation, and then, using embedded scripts performed the Optimal management in accordance with the criteria of technological processes of beer production. Optimal values are found in the Pareto region.

For complex processes of brewing it is not always possible to clearly distinguish single main criterion. Typically, these processes are characterized by a set of partial criteria that often contradict each other when improving of one leads to deterioration of another and vice versa. In addition, often the criteria and limits are set on a verbal level in the form of general statements about the superiority of a certain parameter in a certain range. With increase of the problem complexity the role of such quality information grows and become decisive.

Development of algorithms of brewing process multi-criteria control based on criteria situational priority and fuzzy limits will increase technological complex productivity and the quality of the finished product.

KEY WORDS: *beer production, multi-criteria optimization*