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DETERMINATION OF THE KINETIC REGULARITIES OF THE PROCESS OF EXTRACTION OF SOLUBLE WOOD COMPOUNDS WITH WHISKEY DISTILLATE DURING ITS MATURATION WITH ARTIFICIAL OXYGEN SUPPLY

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ABSTRACT

The main stage in the production of high-quality whiskey is the process of aging whiskey distillates in specially prepared oak containers, on which the bouquet of an alcoholic beverage is finally formed. During the aging process, water and distillate evaporate through the pores of the container, and recently it has been practiced to replace it with oxygen, reasonably believing that this approach leads to a reduction in the duration of the whiskey maturation procedure, without losing its quality characteristics, while this procedure in the technology of obtaining alcohol drink is by far the least studied and therefore of scientific interest to researchers. The objects of the study were young whiskey distillates (State standard 33281-2015) with an alcohol concentration of 50% with the addition of French oak chips "Sweet Vanilla" and "Sweet Coffee". Three samples of reagents were prepared for the analysis - the main experiment, control No. 1 and control No. 2. In the process of studying the kinetic regularities of the process of maturation of whiskey distillates when exposed to oxygen, a series of experiments was carried out, on the basis of which the results were obtained in the form of graphical and mathematical dependencies. Based on the analysis of the data obtained, the extraction mechanism was identified at various stages of the maturation of the object of study under permanent exposure to oxygen, and the influencing factors on the mass transfer process were determined, in particular, the activation energy, which, for example, is necessary to find the rational duration of this procedure. Analysis of the data obtained leads to the conclusion that they can be recommended for use in the engineering practice of whiskey production, while the indicated research results do not contradict known published data and are based on the provisions of the mass transfer theory.

Keywords: whiskey distillate, aging in oak containers, extraction, oxygen saturation, process kinetics, degree of dissolution, activation energy, dissolution rate constants.