

Investigation of Hydrodynamics during Continuous Vibroextraction in a Liquid–Solid Body System

Vladimir Zavalov^[0000-0001-9382-9050],
Taras Misyura^[000-0002-8016-7147],
Nataliya Popova^[0000-0003-4029-2098],
Yuliya Zaporozhets^[0000-0003-2356-2148],
Vadim Dekanskiy^[0000-0003-0923-536X]

National University of Food Technologies of Ukraine, 68 Volodymyrska St.,
Kyiv, 01601, Ukraine

Results of investigations of the hydrodynamics of flows in a counterflow continuous column-type vibroextractor for a liquid–solid body system and their generalization in the form of a mathematical description are presented. An equation for calculating the distance of propagation of pulsating turbulent jets formed by original vibrating transporting elements in a nonflowing medium, which can be taken as a scale factor in modeling the process, has been obtained. An analysis has been carried out, and a mathematical model of the structure of real flows in the vibroextractor has been developed on the basis of a combined model for the conditions of pulse perturbation of the hydrodynamic system of the apparatus. The mathematical description of the structure of flows can be taken as a base for the solution of optimization problems. We propose a new design of a vibratory extractor with a transporter for industry, which provides efficient separation of phases under the conditions of counterflow vibratory extraction of desired components from vegetable raw materials.

Keywords: Extraction, Intensification, Plant Raw Material, Hydrodynamic Flow, Longitudinal Mixing, Mathematical Modeling.

Corresponding author: Vladimir Zavalov (✉ zavalov@nuft.edu.ua)

DOI: 10.1007/978-3-319-93587-4_55