Yu. Ya. Borisov and N. M. Gynkina SECTION ENTITLED "ACOUSTIC DESICCATION" IN THE MONOGRAPH ON "PHYSICAL PRINCIPLES OF ULTRASONIC TECHNOLOGY" *

Reviewed by P. S. Kuts

Acoustic desiccation is now in the laboratory research stage. Interest in this technology has been developing within the past years, owing to the necessity of desiccation of heat-sensitive materials (e.g., pharmaceuticals, biologicals, and foods). However, little has been published so far about this method of desiccation. Therefore, the section on "Acoustic desiccation" by Yu. Ya. Borisov and N. M. Gynkina in Vol. 3 of the monograph on "Physics and engineering of power ultrasonics" (late L. D. Rozenberg, editor) does somewhat fill the gap. This section is very topical and of interest in theoretical as well as practical aspects. It includes a survey of both experimental and theoretical studies published by Soviet and foreign authors. Yu. Ya. Borisov and N. M. Gynkina have performed a tremendous task in systematizing and analyzing a great deal of research material, evaluating its accuracy, and extracting from it what is most reliable. The section consists of five chapters.

In the first chapter the authors deal concisely with the mechanism of dehydrating a moist body in the absence of sound, and also with known hypotheses concerning the mechanism by which sound waves act on moist materials.

The second chapter deals with the physical factors affecting the processes of heat and mass transfer in acoustic fields. In analyzing the many factors, the authors note that acoustic flow resulting from an interaction between a wave and the processed material in an acoustic field is the most important factor to consider here.

The following two chapters deal with the effect of an acoustic field on the desiccation process during its first stage and second stage.

The author's survey of many theoretical and experimental data indicates that, while in the first stage desiccation is governed essentially by the velocity of acoustic flow at the surface of the processed material, in the second stage the desiccation rate increases due to heating caused by the absorption of sound energy in pores and capillaries whose radius is larger than the thickness of the boundary layer.

In the concluding fifth chapter the authors discuss the outlook for applying the acoustic desiccation process on an industrial scale. Considering the high cost of acoustic energy and the possibility of improving the desiccation process by other methods, the authors suggest combining those other methods with the use of acoustic energy.

Thus, the section on "Acoustic desiccation" presents a rather thorough summary of all material available on this subject; it should serve as an indispensable aid to scientists and engineers concerned with desiccation.

*Izd. Nauka, Moscow (1970).

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