RESEARCH ACTIVITY OF STUDENS-BIOTECHNOLOGISTS IN THE STUDY OF PHYSICS

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The report discusses the organization and results of a professionally oriented research of students in the field of "Biotechnology" (19.03.01). First-year students always ask questions about the role of learning not chemical disciplines (even physics course) in their future practice. Unfortunately, there is a clear lack of practical and laboratory trainings. Our aim is bridging the gap between physics and the practical orientation of training of students-biotechnologists. We organize and provide research for first-year students in high school, and pupils of Perm and Perm region (10-11classes) for many years.

The real interdisciplinary works make meaningful study of physical laws and their practical significance, show the need for the competent processing of measurement results, applications of mathematics, computers. In addition, students get the ability to work both individually and in group, to present their results, to make search of information using Russian and foreign literature and electronic resources. But the teacher does not offer ready-made the themes of the research – they must be "grown" it on the basis of particular ideas, events, interests, practical use, etc.

The report shows ways of forming subjects and results of research of elastic properties of biological materials ("onion rings", pods of pepper, algae, and others). The shapes, the magnitude of the deformations under loading, dependence on sizes, types of material were studied, also diagrams of tension were made. The transverse cutting of the ring lying on a smooth horizontal surface gives the divergence of the edges. The opening angles between the edges can be measured and associated with the elastic properties of the object. A number of other works are devoted to the study of instabilities in spreading drops and films, their deformation during drying, modeling the formation of precipitation using the model of Witten-Sander, which can be applied to other type processes (growth of colonies of bacteria).

The continuation and development of a particular theme could also be implemented in the future within the framework of the elective course "Additional chapters of physics in English" (4th year undergraduate) under the joint guidance of the Department of applied physics and Department of chemistry and biotechnology.