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ELABORATION OF CALCIUM PHOSPHATE STRUCTURES FOR CONTROLLING THE BEHAVIOR OF BIOLOGICAL SYSTEMS

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Introduction. Hydroxyapatite (HA) is biocompatible and widely used for drug and substance delivery due to its ability to bind and release therapeutic agents in a controlled manner [1]. In recent years, monitoring bacterial activity and controlling metabolic pathways have gained significant attention in biomedical research, especially with the need for more efficient methods. Traditional techniques for bacterial activity assessment, including titrimetric [2], chromatographic [3], and spectrophotometric methods [4], are often costly, complex, and time-consuming. As a result, there is an increasing demand for rapid, accessible approaches to study bacterial metabolic processes. These new methods, along with advancements in biomaterials like HA, could contribute to more efficient strategies in controlling bacterial behavior and developing innovative solutions.

Main part. In the study of calcium phosphate patterns to control the behavior of biological systems, a system was developed that visually allows to assess the metabolic activity of bacteria. Based on this, an indicator was selected that had no negative effect on microorganisms, but allowed visual assessment of lactic acid accumulation by bacteria, also the conditions of pattern formation were taken into account, so the composition was adjusted so that only the substances necessary for microbial growth remained in it: M17 medium, agar (10 g/L), sodium hydrophosphate (7.16 g/L), calcium chloride (1 mol/L) and bromocresol purple (0.02 g/L). To optimize the synthesis monitoring process, a chatbot was created to automatically determine the pH in the system, allowing for *in situ* experiments.

Conclusions. A smart system has been developed that presents a new approach to the determination of the concentration of lactic acid produced by bacterial culture. Future research prospects include further automation and integration of chatbots into monitoring systems for biotechnological processes. The obtained results open new opportunities for the creation of smart biomaterials capable of controlling bacterial metabolism, as well as for the development of innovative methods in various fields.

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List of sources used:

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