

Preparation of artificial garlic cell by spray drying process

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ABSTRACT

Bacterial resistance towards common antibiotics is considered a major threat to public health. Thereby, new alternative approaches to the treatment of bacterial illnesses are subjects of scientific inquiry. Our research is focused on mimicking a defense mechanism present in a garlic cell that allows swift and effective response to a bacterial attack without further accumulation of the antibacterial ingredient, allicin, in the environment thanks to its short half-life. Allicin is produced via alliinase-catalyzed transformation of alliin that can only occur in the case of the bacterial attack during which a cellular membrane separating the enzyme and its substrate is disintegrated. As our goal is to imitate this process in a drug product, the encapsulation of alliinase into a carrier that will take a role of the membrane barrier is the first step of our work. As alliinase is a protein inclining to degradation under various conditions, spray drying is considered a very suitable method for its encapsulation. In this work, various process parameters were investigated in order to optimize this process in terms of achieving the highest activity of encapsulated alliinase. The effect of feed composition on the rate of allicin's release was also investigated.

Keywords: biomimetics; nature-inspired; antibiotics; enzyme; encapsulation