CARPATHIAN JOURNAL OF FOOD SCIENCE AND TECHNOLOGY

journal homepage: **http://chimie-biologie.ubm.ro/carpathian_journal/index.html**

SIMULATION OF POLY-(HYDROXYBUTYRATE) FROM METHANE IN VERTICAL LOOP BIOREACTOR

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https://doi.org/10.34302/crpjfst/2022.14.1.3

Article history,
Received,
28 September 2020
Accepted,
28 December 2021

Keywords,
Biodegrdabale polymer;
C_1 carbon source;
Comsol;
Poly(hydroxybutyrate);
Vertical loop bioreactor.

ABSTRACT

Bio-plastics are eco-friendly biopolymer finding tremendous application in food and pharmaceutical industries. Bio-plastics have suitable physicochemical, mechanical properties, and does not cause any type of hazardous pollution upon disposal but have high production cost. This can be minimized by screening potential bio-polymers producing strains, selecting inexpensive raw material, simulation and optimization of cultivation condition. In this study, simulation of bacterial production of poly-β-hydroxybutyrate from methane in vertical loop fermentor was carried out by Comsol 5.2 software in 3-dimensional mode. Mass transfer in the process of bacterial growth was investigated via the feed of methane substrate. The graphs of cell density and growth confirmed the results of the simulation according to time. Meshing and independence analysis of the mesh carried out. The initial concentration of microorganism was 0.001 g/L than in the optimal condition and different duration of time was reached 50% of methane and 50% of gas in the reactor that was the highest value of growth microorganism. The results of the simulation were confirmed to experimental results with less than 5% error.