The Torch
Vol. 2 (7)

Enzyme production through solid-state fermentation

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Enzymes have pervasive uses in industries and medicine owing to their attractive features. These enzymes for centuries have been employed through microorganisms. The applications of enzymes, particularly of microbial origin in widespread industries have demanded their culture by gene manipulations. The microbial enzyme production in general is obtained through a fermentation process. Solid-state fermentation is highly preferred for enzyme production because it offers favourable environment to bacteria, yeasts and fungi to produce increased yield than submerged fermentation. This process involves the growth of microorganisms on solid substrates under limited water conditions. The matrix used for this process can be the organic matter or inert materials. The nutrients that are present in the substrate and matrix support the growth of the microorganisms, which secrete the desired enzymes while growing on the substrate. To provide enough mass and heat transfer in fermentation processes, many new designs of solid-state fermentation reactors are being proposed. A novel gas-solid spouted bed bioreactor has been found to provide good mass and heat transfer, easier solid handling, and higher enzyme production. Enzymes that are very important as biological catalysts to catalyse the biochemical reactions could be produced highly with low costs through better characterisation of reactors. Moreover, with increased enzyme production, the quality food supply, effective therapeutic drugs and safe environment could be achieved.

Keywords: Fermentation, Solid-state, Enzyme, Matrix, Industrial production

Citation:
Karishma Singh. Enzyme production through solid-state fermentation. The Torch. 2021. 2(7). Available from:
https://www.styvalley.com/pub/magazines/torch/read/enzyme-production-through-solid-state-fermentation.