

Abstract

The production of industrial enzymes, mostly lipases, has gained significant attention due to their extensive applications in food processing, pharmaceuticals, cosmetics, textiles, and bioremediation. This study focuses on lipase production from a locally isolated strain, *Bacillus* sp. ZEE-10, under submerged fermentation conditions. The primary objective was to optimize nutritional and physical parameters to enhance lipase yield. Various parameters, including carbon and nitrogen sources, substrate concentration, inoculum size, pH, temperature, and agitation speed, were systematically varied to identify the optimal conditions for lipase production. The results have demonstrated that *Bacillus* sp. ZEE-10 has maximum lipase activity using olive oil as substrate (1.5% v/v), urea as nitrogen source, and fructose as carbon source. The optimized conditions were determined to be a TB medium at pH 7.0, 200 rpm agitation, and a 72-hour incubation at 35°C. The maximum lipase activity was obtained with 54 U/mL/min which was only 12 U/mL/min before optimization. To address the increasing need for industrial lipases, more research should concentrate on using bioreactor systems for the large-scale production and purification of this enzyme.