

Optimization of Alkaline Protease Production by *Aspergillus* spp during SSF (Solid State Fermentation) by Fish Meal with RSM (Response Surface Methodology)

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Abstract Background and Objectives: Proteases are a group of enzymes whose catalytic function is to hydrolyze peptide bonds of protein. Proteases form a large amount of enzymes belonging to the class of hydrolases. These enzymes are widely distributed nearly in all plants, animals and microorganism. *Aspergillus niger* is one of the most important microorganisms in biotechnology. It has been already used to produce different kinds of extracellular enzymes. Fishery processing industries generate large amounts of by-products. The disposal of these waste represents an increasing environmental and health problem. To avoid wasting these by-products, various disposal methods have been applied. Interestingly, fish by-products provide an excellent nutrient source for useful microbial growth in enzyme production process.

Materials and Methods: In this study has been made optimization of alkaline protease production in solid state fermentation using *Aspergillus niger* PTCC5010 with fish meal substrate. different factors such as incubation time, inoculum size, pH, buffer volume were optimized by Response Surface Methodology (RSM) in SSF.

Results: Maximum enzyme activity was observed in the incubation time of 42/4242 hours, pH=8, inoculum size 40% (v.v) and buffer volume 20% (v.v). Moreover maximum enzyme production was gained 9/3182 U/g.d.w.

Conclusion: The results demonstrated the importance of solid-state fermentation for the production of protease using fish meal as substrate offering significance benefit due to cheaper cost and abundant availability and potential of high rate enzyme production.

Keywords: Solid State Fermentation, *Aspergillus niger*, Alkaline protease, Fish meal, Optimization.

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