

*Full Length Research Paper*

## Mixture of residual fish hydrolysate and fish extract hydrolysate to activate *Bacillus licheniformis* 6346

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Microbes are first activated in appropriate media before cultivation/fermentation. *Bacillus licheniformis* 6346 activated in nutrient broth-starch was inoculated to a locally formulated solid medium (paddy husk, rice flour,  $(\text{NH}_4)_2\text{SO}_4$ , cuttle fish powder, murate potash, table salt, triple super phosphate, sesame oil, coconut oil and tap water) and the highest  $\alpha$ -amylase activity was obtained on day 5 ( $1075 \text{ U g DBM}^{-1}$ ) at  $42^\circ\text{C}$ . Replacement of nutrient broth-starch with residual fish hydrolysate-starch led to the enzyme production to  $1100.3$  and  $1180.4 \text{ U g DBM}^{-1}$  on days 5 and 6, respectively. Supplementation of residual fish hydrolysate-starch with  $3 \text{ gL}^{-1} (\text{NH}_4)_2\text{HPO}_4$  increased the  $\alpha$ -amylase production to  $1426 \text{ U g DBM}^{-1}$  on the 4th day. Supplementation of residual fish hydrolysate-starch- $(\text{NH}_4)_2\text{HPO}_4$  with yeast extract reduced the  $\alpha$ -amylase production to  $877 \text{ U g DBM}^{-1}$ . Mixing residual fish hydrolysate with fish extract hydrolysate in the volume ratio of 1: 32.6 and supplementing starch and  $(\text{NH}_4)_2\text{HPO}_4$  increased the enzyme production to  $2328 \text{ U g DBM}^{-1}$ . Maintenance of amino acid content in terms of glycine or tyrosine in activation medium did not show significant correlation with  $\alpha$ -amylase production by *B. licheniformis*. This study shows that, to activate *B. Licheniformis*, residual fish hydrolysate - starch -  $(\text{NH}_4)_2\text{HPO}_4$  - fish extract hydrolysate could be used instead of nutrient broth-starch.

**Key words:**  $\alpha$ -Amylase, *Bacillus licheniformis*, fish extract hydrolysate, paddy husk, solid state fermentation.