Optimization of Production Conditions for A-Amylase as an Important Biodesizing Agent

Summayya Asghar[1]*, Sidra Pervez[1], Aqeela Bibi[1], Muhammad Asif Nawaz[2]
[1]Department of Biochemistry, Shaheed Benazir Bhutto Women University (SBBWU), Peshawar, Pakistan.
[2]Department of Biotechnology, Shaheed Benazir Bhutto University (SBBU), Sheringal, Pakistan.
*E-mail: Somikhan839@gmail.com

ABSTRACT

The textile sector has seen an increase in the usage of enzymatic procedures due they are non-toxic, environmentally benign, and energy efficient. Enzymes are almost universally relevant to all stages of textile chemical processing. Among the most widely used enzymes for commercial biotechnology, amylase finds use in food, detergent, and textile production (Uddin 2021). In clothing wet treatment, amylase is utilized for a first step known as desizing, in order to eliminate starches from gray fabric made of cotton. To guarantee a secure and rapid weaving process, starch is added to the yarn before fabric manufacturing. After weaving, starch must be eliminated, and this is done by amylases (Aggarwal, Duttaetal.2019). Amylases selectively reduce size without damaging the fabric, adding to their importance in the textile industry. Advances in textile manufacturing methods can be linked to a country's economic success. These techniques frequently concentrate on integrating many procedures to decrease the energy and time consumption associated with fabric production. To enable the simultaneous completion of the desizing, scouring, and bio-polishing processes, amylases can thus continue to beemployedincombinationwithotherenzymeslikecellulasesandpectinases along with chemicals in one operation (Mojsov 2019). Amylases have advantages for both textile processing and the purification of textile waste materials. Several factors, including species, culture techniques, development of cells, nutritional needs, metal ions, temperature, pH, culture duration, and thermal stability, influence the synthesis of amylase (Rehman, Saeed et al. 2023). Additionally, choosing an appropriate material is essential in fermentation operations, because investigating agro wastes' capability to produce amylase might result in the development of innovative substitute media (Naik, Kumaretal.2023).

Keywords: α-amylase, Aspergillus Niger, Biodesizing.

OBJECTIVES

The current research look potential of amylase derived from indigenous environmental *Aspergillus niger* isolated from guava fruit for textile desizing.

METHODOLOGY

Different microbial sources, including bacterial (*Bacilluslicheniformis*) and fungal (*Aspergillusniger*, *Aspergillusfumigatus*) Thestrains with the highest potential to make amylase were selected for additional study after they were evaluated for this capacity on astarch-based medium. Founded on gathering shape besides the microscopic base, the strains were identified as *A. niger* and *A. fumigatus*. Morphological, microscopic, and molecular characterization (16S and 18S rDNA studies) were used to identify a fungus strain. A qualitative and quantitative screening of a natural isolate generating-amylase was carried out. Using bioinformatic methods, a phylogenetic tree for *A.niger* was created.

RESULT

The optimization of critical process factors impacting amylase action by the fungal strains. The great estaction(199.9Umg^{-1})was detected by pH7.0,while the optimal temperatura for amylase activity (198.9 U mg^{-1}) was determined to be 35°C. The highest amylase production (201.7 U mg^{-1}) was found on the fifth day of incubation, followed by the third, fourth, and seventh days. The optimal carbón and nitrogen sources were discovered to be carbón and yeast extract. The crude fungal amylase was extracted via submerged fermentation (SmF).

CONCLUSION

Overall, the results indicate that recovered unpolished amylase might remaina viable enzyme option aimedat the weave industry, with commercial potential following further characterization.

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