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Production of Tannase and Gallic Acid by Utilizing Agro-Industrial Wastes as Economical Raw Material and Purification of Tannase

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Aspergillus F1; *Syzygium Cumini*; *Acacia Nilotica*; Tannase.

ABSTRACT: Research on utilization of agro wastes as economical raw material for the production of industrially important products are gaining importance these days. This boosts up high economic returns in many industrial practices and restricts the quantum of organic wastes reaching the landfills, helps to solve/minimize pollution problem. Present study was focused on exploring the abilities of laboratory isolates of *Aspergillus* F1 and bacterial strains (2.2 and 2.7) to produce value added products such as tannase and gallic acid by utilizing agro- residues. Different agro residues like jamun (*Syzygium cumini*), keekar (*Acacia nilotica*), corn husk powder, spent tea powder and powdered banana peel that were used in solid-state fermentation (SSF) both individually as well as in specific combinations with an intention to maximize enzyme production. Co-culture of bacterial and fungal isolates were explored for production with the optimization of SSF parameters. Optimum pH and temperature for the enzyme production were observed to be 5.5 and 30°C respectively. At optimal growth conditions, the maximum tannase and gallic acid production observed was 39.24 U/g and 0.409 mg/ml, respectively with 0.75% w/v tannic acid supplementation. Tannase was partially purified by ammonium sulfate precipitation method and acetone precipitation method. In ammonium sulfate precipitation method 7.48 fold and yield of 26.76% was observed. In case of acetone precipitation method to 3.13 fold and yield of 84.58% was observed. Scanning electron microscopy and Energy Dispersive X-ray Spectrometry of the best tannase producing combination revealed the presence of gallic acid crystals, spores of the fungal isolate. Morphological change in substrate indicated the growth of organism, efficient utilization of agro residue and production of gallic acid. The current research offers a agro-industrial waste as a good alternatives to synthetic tannic acid for production of tannase and gallic acid with high yield.

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