

Utilization of Agro-Industrial Waste for Production of Protease Equipped with Industrially Desired Attributes

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Microbial proteases, due to their huge application potential, have attracted research attention and account for more than 60% of the world wide enzyme sale. However, large scale industrial application of proteases is hindered due to their poor performance under relatively hostile industrial conditions (extremes of temperature, pH), and high production cost of enzymes. The cost-effective production of a thermostable and wide range pH stable protease from a newly isolated *Bacillus subtilis* K-1 strain (BSK-1) was done using agro-industrial residues. Process optimization for protease production was conducted by one-variable-at-a-time and statistical approaches. The most significant variables for protease production were identified as incubation time, soybean meal, mustard cake and wheat bran. Optimization of these variables by central composite design of response surface methodology resulted in a substantial enhancement in protease yield. Purification of BSK-1 protease was done by chromatography and the purity was confirmed by zymogram and SDS-PAGE analysis. The BSK-1 protease was stable at wide pH and temperature range with optimum of pH 9.0 and 50°C. Kinetic study of protease suggested high affinity for substrate and sequence analysis of encoding gene showed that K-1 protease is a serine alkaline protease. The enzyme was stable in presence of detergents and metal ions but strongly inhibited by PMSF. It is envisaged that the isolate BSK-1 could be a potential source of alkaline and thermostable protease for applications in industries like detergent, photographic and leather industry. Moreover, exploitation of agricultural wastes as substrates may pave the way for cost-effective production of industrially-suitable protease.

Biography:

Satbir Singh has completed Ph.D. Biotechnology (2010-15) from Fermentation Biotechnology Lab, School of Biotechnology, University of Jammu J&K, India. His thesis title is "Process optimization for production of thermo-alkalstable bacterial protease and its characterization". He has qualified Jawaharlal Nehru University combined entrance examination for Biotechnology (Master's programme) and availed research fellowship from Council of Scientific and Industrial Research during his doctoral research. He has published 15 articles including research papers, reviews and book chapters in reputed journals.