**Purification of serine proteases from mango (Mangifera indica cv. Chokanan) peel using expanded bed adsorption: optimisation using response surface methodology**


## ABSTRACT

Proteolytic enzymes or proteases are a class of proteins ubiquitously found in all organisms; they act as catalysts and perform diverse vital functions. In plants, proteases of plant origin play a vital function from the mobilisation of storage proteins during germination to the initiation of cell death and senescence. Proteases derived from plants are extensively employed in food industries because of the wide range of good solubility, substrate specificity, activity over a wide pH and temperature range and high stability in extreme conditions. Plant peel could be a potential source of proteases due to the easy purification methods, low levels of interfering substances during purification, and good yield of proteases. An expanded bed adsorption (EBA) technique was used to purify serine proteases from mango peel. Response surface methodology (RSM) with a central composite design was employed to optimise the EBA technique. Analysis of independent factors as a function of flow rate, temperature, pH of buffer and salt revealed different effects of these four factors on the studied parameters (total protein, total activity, specific activity, purification factor, yield, storage, thermal and pH stability). It was demonstrated that the serine protease could be recovered with a yield of 82% and a purification factor of 11.3 after a single step elution with 1.0 M NaCl. No significant ($p>0.05$) difference was found between the experimental and predicted values, thus ensuring the adequacy of the RSM employed for describing the changes in the properties of the serine protease as a function of operating conditions using EBA.



**Keyword:** Expanded bed adsorption; Mango peel; Purification factor; Purity; Response surface methodology; Serine protease; Specific activity; Total activity; Total protein; Yield