

Purification and recovery of serine protease from mango (*Mangifera indica* cv. Chokanan) waste using aqueous two-phase system: potential low cost of enzyme and purification method

ABSTRACT

Serine proteases are one of the most important groups of protease enzymes which have been used widely in different types of industries and biotechnological applications. Plant peel could be a potential source of proteases due to easy purification methods, low levels of interfering substances during purification and good yield of proteases. Thus, in this study, serine protease as valuable component for the first time was purified and recovered from mango (*Mangifera indica* cv. Chokanan) waste using aqueous two-phase system based on polyethylene glycol and salt. Response surface methodology (RSM) with a central composite design (CCD) was employed to optimise the aqueous two phase system. The effectiveness of important parameters such as different molecular weight of polyethylene glycol (3000-8000 g/mol, X1), tie lie length (23-34% w/w, X 2) and NaCl (0-10% w/w, X3) on purification factor (Y1), yield (Y2), partition coefficient (Y3) and selectivity (Y4) of serine protease from mango waste was determined. Purity and molecular weight of the enzyme was determined by sodium dodecyl sulphate polyacrylamide gel electrophoresis. The partition coefficient of enzyme was decreased by increasing of the polyethylene glycol molecular mass. In addition, the phase composition showed a significant effect on yield and partition coefficient of the enzyme. Based on this system, the purification factor of serine protease from peel of *Mangifera indica* cv. Chokanan was increased to 12.51 with a high yield of 89%. Therefore, this study proves that aqueous two-phase system can be an inexpensive and effective method for purification of serine protease from mango peel.

Keyword: Amylase; Aqueous two-phase systems; Mango waste; Optimization; Partition coefficient; Polyethylene glycol; Purification factor; Selectivity; Yield