# Optimization of protease extraction from ridged gourd (Luffa acutangula) sarcocarp via response surface methodology

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**ABSTRACT**

Recently, the widespread use of proteases in industries, such as detergent, food, and pharmaceutical sectors, has increased the demand for proteolytic enzymes in the global market. Although the main sources of commercial proteases are animals and microorganisms, the potential of using nonconventional sources, especially plants, should not be overlooked. In this study, proteolytic enzymes were extracted from the sarcocarp of ridged gourd (Luffa acutangula), and the effect of the extraction process on protease activity was evaluated. The crude enzyme was optimized via response surface methodology (RSM) using a central composite rotatable design (CCRD). Four independent variables were studied, namely, the pH, the concentrations of Triton X-100 (TX-100) and 2-mercaptoethanol, and the mixing time. The optimum level of each variable based on the RSM model was determined: at pH 6.38, 4.99% (v/v) TX-100, 0.15 M 2-mercaptoethanol, and a mixing time of 4.09 min, the optimum protease activity was estimated at 1.35 U/g. A verification test revealed satisfactory agreement between the model and experimental results with 96% desirability, indicating that the quadratic model generated from RSM is significant.

**KEYWORDS**

Central composite rotatable design; Luffa acutangular; Optimization; Protease; Response surface methodology

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