

**Partial purification and characterization of cellulases from digestive tracts of the African giant snail  
(Achatina achatina)**

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**Abstract:**

Crude cellulase was extracted from the digestive tracts of 30 mature *Achatina achatina* and subjected to a 3-step purification process of ammonium sulfate precipitation, dialysis, and gel filtration. This purification procedure gave 3 prominent enzyme activity peaks that coincided with protein peaks and were designated A, B, and C, corresponding to high endoglucanase,  $\beta$ -glucosidase, and total cellulase activities, respectively. Temperature optima of 50 °C were recorded for  $\beta$ -glucosidase and total cellulase while 45 °C was recorded for endoglucanase. Total cellulase, glucosidase, and endoglucanase showed maximum activities at pH values of 5.5, 4.5, and 7.5, respectively. Kinetic studies show that total cellulase has a  $V_{max}$  and  $K_m$  of 2427.18  $\mu\text{mol}/\text{min}$  and 15.12 mg cellulose and endoglucanase has values of 955.11  $\mu\text{mol}/\text{min}$  and 2.39 mg Na-CMC, while the values of  $\beta$ -glucosidase are 946.97  $\mu\text{mol}/\text{min}$  and 4.3 mM cellobiose, respectively. This study shows that cellulases from digestive tracts of *A. achatina* could be utilized for degradation of cellulose-containing materials because of their high thermostability and acid/alkali stability, which reflect the potential commercial significance of the enzyme.

**Keywords:** *Achatina achatina*, Cellulases, Purifications, Characterization, Sodium carboxymethyl cellulose (Na-CMC), Cellobiose