

**Developmental changes in cellular structure and cell wall metabolism of torch ginger
(*Etilingera elatior* (Jack) R.M. Smith) inflorescence**

ABSTRACT

Torch ginger (*Etilingera elatior* (Jack) R.M. Smith) is a perennial clumping plant that flourishes in tropical and subtropical climates. Over the years, this crop has been gaining recognition as an ornamental and landscaping plant. However, no study was done on the characteristics of inflorescence during the flowering stage. Therefore, the present study was aimed to elucidate cell wall metabolism in bracts in relation to inflorescence opening and peduncle strength throughout the inflorescence development. The inflorescences at four developmental stages i.e. tight bud, six reflexing tip, all involucre bracts unfolded and full bloom were used in this study. Results indicate that cellulose and pectin content in involucre bracts were hydrolyzed by cellulase and pectin methylesterase during the inflorescence development from tight bud to full bloom stage. The hydrolyzed bract cell walls reduce water potential in cells and enable water inflow for cell expansion. Subsequently, the inflorescence bracts unfolded. The analysis of cell wall composition and anatomical studies on peduncle parts reveals that at tight bud stage, the peduncle strength depends on the turgidity of the cells as evidenced by the presence of higher mucilage content. As the inflorescence developmental stage progressed, the mucilage content decreased gradually. The peduncle was strengthened by cell wall thickening via cellulose deposition and vascular bundles lignification for mechanical support. Besides, the lignified vascular bundle is the key factor in increasing the transportation efficiency of stored carbohydrates and water from the mother plant for inflorescence development.

Keyword: Cellulase; Cellulose deposition; Inflorescence opening; Lignification; Pectin methylesterase; Polygalacturonase