

**Title** Identification of critical quality parameters and optimal environment conditions of intermediate moisture content banana during storage

**Author** Zhengyong Yan, Maria J. Sousa-Gallagher and Fernanda A.R. Oliveira

**Citation** Journal of Food Engineering, Volume 85, Issue 2, March 2008, Pages 163-172

**Keywords** Moisture content; Banana; Colour; Sensory characteristic; Shelf life; Temperature; Relative humidity; Principle component analysis

### Abstract

Optimal environmental conditions and adequate packaging materials can be used to guarantee high quality product through shelf life. The aim of this study was to determine the influence of environmental conditions on quality parameters of intermediate moisture content (IMC) banana and identify the critical quality parameters of IMC banana during storage. IMC banana samples were placed in air-tight containers and stored according to a two level full factorial design with four factors (the storage temperatures, relative humidity, light level condition and air composition in the container). The quality indicators (moisture content, colour, rehydration capacity, penetration force and specific volume) were measured and sensory characteristics (overall opinion/acceptance, appearance/colour and firmness/texture) were also evaluated by a consumer group. It was found that temperature and relative humidity were the most influential environment factors for colour Hunter  $L$ , brownness index (BI) and rehydration capacity, acceptance and colour for IMC banana.  $L_o$  (outer), moisture content and water activity were the critical instrumental quality parameters of IMC banana during storage. The 54% variation of overall sample quality throughout time was explained by all the quality parameters except specific volume. Shelf-life thresholds were defined from the good correlation between quality characteristics and the sensory acceptance, and for a sensory acceptance threshold of 5 (neither like nor dislike), the thresholds of  $L_o$ ,  $a_w$ , moisture content and rehydration capacity were 49.4, 0.59, 13.5% wb and 12.2, respectively.