

Abstract:

Mango cubes (2x2x2cm) were subjected to different time/temperature combinations by dipping in CaCl₂ solutions at controlled temperature. The experimental conditions were identified based on a response surface methodology (RSM) using a central composite rotatable design (CCRD at five levels for each factor - independent variables). The independent variables considered were: temperature (20 to 55°C), time (5 to 60 min) and CaCl₂ concentrations [0 to 8% (w/w)]. Treated mango cubes were drained, placed in open plastic bags and stored at 5°C. The cubes were maintained at 5 °C for 24 h and evaluated for quality parameters (colour, firmness, soluble solid content and pH). Based on conclusions of the first experimental design a second trial was carried out, in order to confirm the most suitable CaCl₂ concentration (2.5, 3.5 and 4.0% (w/w)) by dipping at 35°C during 20 minutes. Sensory evaluation was performed and the best results were obtained at 3.5% w/w CaCl₂ dip; these conditions were selected for further trials. A third trial was performed in order to study the influence of storage conditions on the product shelf-life. The treated mango cubes were stored at two different modified atmosphere packaging conditions: passive mode (PM) - 20.9 % O₂ and 0.03 % CO₂ and active mode (AM) - 5% O₂ and 5% CO₂. The treated mango cubes were packaged into sealed bags (200 × 225mm) of low-density polyethylene and vinylidene chloride film, with 3000-4000 and 11000-15000 (ml/m²/24h/atm) on O₂ and CO₂ permeability respectively. The bags were stored at 5 °C and mango cubes were analysed for the same quality parameters every two days during the nine days of storage. Results showed that the most suitable conditions for quality preservation of fresh-cut mango were: dipping in a solution of 3.5% (w/w) CaCl₂ at 35°C during 20 minutes and packed under active modified atmosphere. Under those conditions, fresh-cut mango maintained good quality for 5 days at 5°C.