

Title Factors within the fruit chain that impact on postharvest fruit quality.

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Abstract

Postharvest fruit quality and product safety were monitored throughout the citrus and litchi postharvest production chains. The impact of preharvest production practices on product quality were assessed by monitoring litchi fruit development, microbial population dynamics, wax composition and presence of *Penicillium* spp. from flowering till harvest. Comparing production practices, temperature, humidity, rainfall, irrigation schedules, fertiliser programmes and quality parameters i.e. weight, Hunter colour values, titratable acidity, soluble solids concentration etc. provided a best practices profile using Multivariate Canonical Variate Analysis (CVA). Different integrated treatments in combination with modified atmosphere packaging (MAP) low-density polyethylene (LDPE) packaging or biorientated polypropylene (BOPP) was evaluated as alternatives to replace commercial sulphurdioxide litchi treatments. Quality and sensory analysis were performed to determine the colour retention of the pericarp and aril, flavor qualities, taste, odour, juiciness and overall acceptability. Dip treatments alone or in combinations with EDTA or 4-Hexylresorcinol, prochloraz or *Bacillus subtilis* (10^7 cfu ml⁻¹) effectively reduced *Penicillium* decay while MAP could retain the colour up to 32 days after harvest without compromising taste and flavour. Survival of *B. subtilis* and of total bacterial populations were higher, with low yeast populations in BOPP. *Candida*, *Cryptococcus* and *Zygosaccharomyces* were predominant yeasts in all LDPE treatments. The presence of *Penicillium* spp. and foodborne pathogens throughout the litchi and citrus fruit chains were monitored using standard microbiological assays on selective media. The diversity of *Penicillium* spp. increased significantly towards the end of the chain as the products became exposed to different fruit types and increased temperature deviations. *Staphylococcus aureus* was prevalent throughout the chain.