

Combination of antifungal edible coatings and MA packaging for postharvest preservation of fresh 'Mollar de Elche' pomegranates

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Emulsions of the polysaccharide hydroxypropyl methylcellulose (HPMC) with either beeswax (BW), carnauba wax (CW), or glycerol monostearate (GMS) as lipids, and either potassium bicarbonate (PS) or sodium benzoate (SB) as antifungal food additives, were prepared, checked for ingredient compatibility and coating stability, and applied to recently harvested 'Mollar de Elche' pomegranates. HPMC edible coatings (ECs) containing the lipids BW or CW and the antifungal salt SB were selected as the most effective to reduce fruit weight loss and natural fungal decay after seven and 14 days of storage at 20°C and 90% RH. Therefore, in further trials, pomegranates were coated with these selected ECs and cold-stored at 5 °C and 90% RH for up to four months. Additional treatments were modified atmosphere packaging (MAP) films alone (5-kg Xtend® 815-PG28/m commercial bags), the combination of ECs and MAP, the fungicide fludioxonil (FLU, Scholar® 230 SC) as the positive control (60-s dip in 0.6 g L⁻¹ FLU aqueous solution), and intact uncoated fruit as negative control (30-s dip in water). External and internal decay and the following quality attributes were evaluated after eight and 15 weeks of cold storage and one additional week of shelf life at 20 °C: weight loss, CO₂ and O₂ levels within MAP bags, rind colour, juice soluble solids concentration and titratable acidity, maturity index, ethanol and acetaldehyde content, external (rind browning, pitting, sinking, fruit shrivelling) and internal (aril browning, tegument browning, aril paleness) physiological disorders, and sensory attributes (aril flavour and off-flavours, fruit external visual aspect). In summary, the combination of the EC formulated with HPMC-BW-SB and MAP was the most effective treatment to extend the postharvest life of cold-stored 'Mollar de Elche' pomegranates, as it controlled decay (mainly caused by latent infections of *Botrytis cinerea* and wound infections of *Penicillium* spp.) similarly to FLU, reduced fruit weight loss, and did not negatively affect the fruit physicochemical and sensory quality.