

Electrolysed water and salt solutions can reduce green and blue molds while maintain the quality properties of ‘Valencia’ late oranges

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Abstract

The effect of four salt solutions; sodium metabisulfite (SM), potassium sorbate (PS), potassium carbonate (PC) and sodium chloride (SC) as electrolyte to generate alkaline (aEW) and acidic (acEW) electrolysed water was assessed *in vitro* and *ex vivo* under artificial and natural infection against *Penicillium digitatum* and *P. italicum*, the causal agents of green and blue molds, respectively. Generally, both components of the electrolysed water have exhibited decontaminating activity against the two tested *Penicillium* species, with clear stronger effect for the acidic component. The effect of aEW and acEW on physical and chemical properties of ‘Valencia’ sweet orange quality, including mass loss, total soluble solids (TSS), citric acid, pH, ascorbic acid and fruit color index was investigated. The results suggest that neither aEW nor acEW may have any negative impact in term of orange quality as compared to control treatments. aEW produced by PS and PC have increased citric acid content of orange fruits. The inhibitory effect of aEW and acEW against naturally occurring microbial population of filamentous fungi in the fruit washing tank was recorded. The direct effect of aEW and acEW on radial growth, conidial germination, germ tube elongation and the morphological changes of both pathogens by scanning electron microscopy (SEM) was examined. Results have shown that treatments have caused abnormal mycelia growth, irregular branching of hyphae in the apical part and loss of linearity in the tested fungal structures. Some salts, as electrolytes, have shown potential to produce robust electrolysed water that may represent valuable ecofriendly tool in controlling citrus postharvest decay.