

Title Potential non-chemical methods for use against thrips (*Thrips tabaci*) in green asparagus
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Abstract

Alternative methods for disinfestation of asparagus against thrips (*Thrips tabaci*) need to be developed for the Thai export trade, ensuring efficient thrips' mortality, while maintaining quality and environmental safety. Hot air/water using temperatures of 40-60°C and high CO₂ treatments were studied at laboratory level. An appropriate treatment involving hot water at 45°C for 15 min, with or without high CO₂ treatment, followed by hydro-cooling with water at ambient temperature (~20°C) was identified. Methods to assess quality, such as objective tests (% mass loss, force measurement, colour measurement) and subjective tests (appearance, decay, off-odour, snap-test for texture) gave no indication of significant quality deterioration. Chlorophyll fluorescence and ion leakage measurements were used to assess physiological stress. The F_v/F_m ratio which indicates the intactness of photosystem II was shown to decrease immediately after all heat treatments tested, but recovered over 24h for non-damaging heat treatments (42.5 and 45°C). A rise in % K⁺ leakage was observed that increased with treatment temperature but recovered over 24h following treatment at 45°C. High CO₂ showed neither significant detrimental effect nor indication of physiological stress, and could kill thrips although not at a sufficiently high rate. Confirmatory trials to demonstrate the efficacy of these treatments in Thailand using naturally infested asparagus were carried out. The mortality rate of thrips was as high as when this method was tested in the UK. Adoption of the selected disinfestation method into existing process lines in Thailand would not be too complicated.