Abstract:

The quality of fresh produce for domestic and export consumption is influenced by post harvest handling and storage. Pests and diseases can infest the produce at any point in this chain and multiply in storage or in-transit to receiving countries. Produce free of insect pests and diseases significantly contributes to quality. The use of pesticides prior and after harvest often results in residues above what is allowable for human consumption particularly produce deemed to sensitive export markets which require residue free produce. Delivery systems are needed that are more efficient in the placement of active ingredients thereby reducing active ingredients used, coupled with compounds that breakdown into acceptable by-products will minimise residues and contribute towards quality. BOC's Envirosol® application technology uses liquid carbon dioxide ($CO_2$) as a solvent-propellant to dispense active ingredients either as non-flammable gaseous mixtures or as aerosol particles. The non-water based technology allows for dry application of active ingredient onto produce. In addition to eliminating flammability, the synergistic effect of $CO_2$ enhances the efficacy of formulated active ingredient encouraging minimal use of active ingredients. VAPORMATE is a non-flammable product (BOC PCT/AU03/00087, Ryan et al 2002) which contains 16.7 wt% ethyl formate (EF) dissolved in liquid $CO_2$ (equivalent to 11 vol% EF in gaseous CO2 when vaporised). Ethyl formate is a GRAS compound approved as a food additive by the US Food and Drug Administration (FDA). The potential use of EF has been investigated by CSIRO in grain, Crop & Food Research (C&FR), New Zealand fresh vegetables and fruit and grain products, and the University of California, Davis in fruit and vegetables. This paper reports progress in the evaluation of VAPORMATE as a postharvest treatment of mostly perishable produce to minimise the effects of pests in storage and pre-shipment applications.