

Alternative to methyl bromide for preshipment treatment of export fruits

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Abstract

Australia is recently becoming one of the major exporters of fruits to different countries, especially there has been significant increase in export of citrus fruits from Australia to Asian countries and export of apples particularly Pink Lady™ apples to European market. Pink Lady™ apples are significantly affected by infestations of adult eucalyptus weevil, as a result apples infested with live eucalyptus weevils leads to rejection for export. Methyl bromide has been one of the common fumigant for pre-shipment treatment to control pests in Australia. However, methyl bromide has been eliminated for use as commercial fumigants owing to unfavourable properties, especially with regards to chemical residues, work safety, environmental and ozone depleting issues. There is now an urgent requirement for the development of a fumigant which can kill all stages of insects quickly, particularly for pre-shipment treatment, and be economic in comparison with existing methods. Ethyl formate which is a naturally occurring volatile chemical, has been evaluated as fumigant for control of Fuller's rose weevil, Californian red scale and citrus mealybug on the naturally infested citrus at dose rate of 15 - 62 g/m³ at 15°C with fill rate of 40% for 6 hours exposure. Bioassay data shows that mealybugs were completely killed at 20 g/m³ and all stages of Fuller's rose weevil and adult of Californian red scale were completely killed at 60.1 and 61.8 g/m³ ethyl formate respectively at 15°C fumigation for 6 hours exposure. Bioassay data with Pink Lady™ apples showed 100% control of eucalyptus weevils at 30 g/m³ of ethyl formate at 25°C for 24 hours and 100% mortality at dosage of 50 g/m³ at low temperature (4-8°C) for 24 hours exposure. Ethyl formate has a great potential as a biosecurity fumigant for control of pests on exported fruits.

Keywords: fumigation, ethyl formate, methyl bromide, citrus, apple