

FUMIGATION OF TABLE GRAPES WITH ETHYL FORMATE AGAINST QUARANTINE PESTS

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Fumigating table grapes with methyl bromide as a quarantine treatment can cause fruit damage. Research was conducted into the effectiveness of ethyl formate and carbon dioxide against light brown apple moth, aphids, mites and redback spiders. The new treatment had no negative effect on the quality of the Red Globe, Thompson Seedless and Crimson Seedless varieties tested.

To obtain sufficient data, a series of laboratory trials were conducted at 10°C, 15°C and 20°C to establish a dose which would kill all stages of the insects and spiders. These trials showed that eggs of light brown apple moth and the early instars of red back spiders were the most tolerant to the treatment.

Complete disinfestation could be achieved by using 27g/m³ of ethyl formate at 20°C for four hours. Further trials showed that complete control of all these pests could also be obtained using a higher dose of 54g/m³ for a shorter two hour exposure period. In 2005 BOC Gases received permission to produce commercial quantities of ethyl formate in carbon dioxide under the name Vapormate®.

Vapormate® was used in large-scale trials to confirm the initial test results. As part of the large-scale trials, vials of live red back spiders, mealy bugs, light brown apple moth and mites were placed in a refrigerated shipping container alongside table grapes. In March 2006, further proving trials were done in a grower's fumigation room in Mildura in the state of Victoria in Australia.

In a shipping container Vapormate® is effective at 20°C using 42g/m³ for four hours, or at 10°C in a two hour 81g/m³ treatment. When grapes are treated straight from the field and cooled down during fumigation to 10°C over four hours, a 54g/m³ treatment can be applied. This treatment is suited to the table grape cool chain process.