

Title Methyl bromide alternatives for postharvest insect disinfestation of california walnuts
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Abstract

Before shipment, California inshell walnuts destined for the valuable export market must be disinfested of both field pests (codling moth and navel orangeworm) and common storage pests (Indianmeal moth and red flour beetle). Until recently fumigation with methyl bromide has been the most common disinfestation method, but access to methyl bromide is now greatly restricted in developed countries, causing walnut processors to seek alternative methods. In addition to alternative chemical fumigants, non-chemical physical treatments are being developed. One treatment uses radio frequency energy to rapidly heat walnuts to an average temperature of 60°C for 5 minutes. Large-scale tests using an industrial radio frequency heater successfully disinfested walnuts of navel orangeworm while maintaining good product quality. A second alternative treatment is the use of cold storage (0-5°C) to either disinfest product or prevent reinfestation of clean product. At temperatures of 0 and 5°C, 95% mortality of test insects was achieved at 10 and 18 days, respectively. Storage at 10°C prevented reproduction, product damage and reinfestation, but 127 day exposures were required to kill 95% of Indianmeal moth larvae. A third alternative treatment exposes product to a low pressure (vacuum) environment of 50 mm Hg in flexible polyvinyl chloride containers. Temperature and moisture content of the product strongly affects treatment efficacy, with complete mortality of test insects achieved at treatment exposures of 48 hours or less under optimal conditions.