

EFFICACY OF MICROWAVE IRRADIATION OF WOOD PALLET MATERIALS FOR ERADICATION OF PINEWOOD NEMATODE AND WOOD-BORING INSECTS

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Abstract

Commercialization of microwave systems to eradicate exotics pests infesting wood materials is being considered as a phytosanitary treatment alternative to conventional heating or methyl bromide fumigation to prevent introductions of exotic pests infesting wooden packing materials. Currently, heat treatment and fumigation are the only two phytosanitary treatments internationally approved for solid wood packing materials under the auspices of the United Nations (U.N.). However, the U.N. phytosanitary commission will consider alternative technologies, such as microwave energy, when “sufficient data are available.” The goals of this study were to determine the feasibility of killing pinewood nematodes and cerambycids (using cottonwood borers as the test organism) in

commercial microwave equipment using temperature as the critical treatment parameter. We also examined the efficacy of microwaves for killing these organisms using a batch processing system versus continuous movement of the target in the field (pass-through microwave or turntable). Our studies using large scale microwave equipment showed that temperatures greater than 62 °C were lethal to both pinewood nematodes (*Bursaphelenchus xylophilus*) and cottonwood borer (CWB) larvae (*Plectrodera scallator*) within red pine lumber under stationary microwave irradiation. Movement through a microwave field increased efficacy of eradication such that all pinewood nematodes and cottonwood borer larvae were killed even when temperatures did not reach 62 °C.