EVALUATION OF NON-THERMAL METABOLIC STRESS DISINFESTATION AND DISINFECTION (MSDD) ON SELECTED PESTS OF PERISHABLES

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A new treatment regime known as "metabolic stress disinfestation and disinfection (MSDD) was evaluated in the laboratory. MSDD combines short term pressure/vacuum cycling with a fixed period of chemical exposure in a controlled atmosphere chamber. This technology has been in development at the University of California, Davis, under the direction of Dr. Manuel C. Lagunas-Solar[1]. Emphasis was placed on treating perishable pests of quarantine significance (or a suitable surrogate) originating from South America. Treatment time was also a critical consideration in experimental design. Prospective treatments for perishables should approximate the current methyl bromide schedule in terms of duration.

The MSDD testing apparatus was designed and built at the University of California, Davis for use by USDA-APHIS-PPQ. The system consists of a 12 liter Lexan vacuum chamber, a vacuum pump, an ethanol heater, and a PLC driven control station. Program parameters were set to allow an initial pump down of the chamber to 20 inches of Hg for a period of 15 seconds. Immediately following, a CO2 gas valve opens and allows pressure to build to 1.6 psi for an additional 15 seconds. This vacuum/pressure cycling is repeated 10 times, and on the 10^{th} cycle, the chamber is pumped down to 26.3 inches of Hg for one hour. The chamber is then pressurized to 1.6 psi for 5 minutes, followed by a final pressure release back to ambient. During the final one hour vacuum, volatilized ethanol is released into the chamber until 1.4 psi vapor pressure is achieved. The entire treatment lasts approximately 70 minutes.

Testing included the following pests of perishable commodities: *Copitarsia incommoda* (Lepidoptera: Noctuidae), two-spotted spider mite (*Tetranychus urticae),* and green peach aphid (*Myzus persicae).* *Copitarsia* is a quarantine pest of asparagus imported into the United States from Central and South America. Two-spotted spider mites were chosen as a surrogate for the False Chilean mite, *Brevipalpus chilensis,* a quarantine pest of South American grapes. Green peach aphids were similarly used as a representative replacement for a host of plant feeding aphids of quarantine significance.

Results are forthcoming and will be included in a Powerpoint presentation at the MBAO conference in San Diego, 2005.

[1] Non-Chemical Disinfestation Method with Induced Metabolic Stress in Modified Environs. Manuel C. Lagunas-Solar (Inventor). UC Case #2002-160-1.