The Effect of a Non-Chemical Phytosanitary Treatment on the Packaging Integrity of Unitized Products to Prevent the International Spread of Invasive Plant and Animal Species

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In a global economy international product shipments have been a source of spreading invasive animal and plant species. The impact of these “invasives” are economic as well as a decline in human health and environmental quality. When international shipments of product are quarantined, the primary method of phytosanitary treatment is fumigation with methyl bromide. The pre-shipment and quarantine treatment of internationally shipped product is the second largest use of this fumigant in the US. Under international agreement the use of this ozone depleting and dangerous chemical is to terminate when an effective alternative treatment is identified. One targeted invasive, is the Mediterranean snail that has been detected in imported unit loads of packaged ceramic and marble tiles. The USDA Animal Plant Health and Inspection Service supported research at Virginia Tech to evaluate the use of steam and vacuum to heat sanitize the unitized and packaged tiles that were inoculated with this invasive snail species. The effect of steam and vacuum, using a 56 C for 30 minute treatment cycle, on snail morbidity and the properties of the tile, corrugated sleeves, shrink wrap, and gum labels was evaluated. The entire 775 kg unit load of tiles can be treated in about 50 minutes. Snail morbidity was 100%. By using a chamber design and vacuum, to control condensation and increase the speed of the treatment cycle, the physical and mechanical properties of the tile, paper and plastic packaging were not significantly altered by the treatment. The results indicate that this heat based treatment method can effectively sanitize certain packaged commodities that can tolerate temperatures in the 55 to 65 C