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Application of Microwave Energy to Control Maize Weevil (*Sitophilus zeamais*) in Maize Grains (*Zea Mays*)

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Abstract

The maize weevil *Sitophilus zeamais* (Motschulsky) is one of the most serious pests of stored cereal grains especially maize in tropical and sub-tropical regions. The major effect of infestation by maize weevil is the grain damage due to feeding activities of the adults and the development of immature stages within the grain. This has a negative impact on both quantity and quality of the grains. Despite the adverse effects of the chemical residues resulted from using chemical insecticides on humans and animals, chemical insecticides are using in a large scale for controlling maize weevil. Disinfestation of grains using microwaves can be an alternative technique for controlling grain insects. A laboratory microwave applicator operating at 2.45 GHz was used in this study to determine the mortality of maize weevil. Grain samples (300 g) each with 10, 14, and 18% moisture contents (wet basis) were infested with maize weevil (20 adults). The samples were then exposed to microwave energy at 300 watt under different target temperatures (40, 45, 50, 55 and 60°C) for 3 min. A further treatment was carried out at 50°C using four exposure times (0, 1, 3 and 5 min). Results indicated that (100%) mortality was achieved at 55 and 60°C with an exposure time of 3 min for all three grain moisture content levels. We observed that the 50°C treatment for 3 and 5 min was able to control the maize weevil. It can be concluded that a package of higher grain moisture content, higher temperature and longer application time leads to higher mortality percentage in maize weevil adults.

Keywords: Maize, maize weevi, microwave, mortaliy