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## **Heat treatment: an effective, viable alternative to methyl bromide for controlling stored product insects in food processing facilities**

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### **ABSTRACT**

Environmental concerns, consumer preference and increased insect resistance are the drivers in search for effective alternatives to chemical fumigants such as methyl bromide. Heat treatment involves raising and maintaining temperatures of grain storage structures, warehouses, and food-processing facilities between 50 to 60°C to manage stored-product insect species. The duration of heat treatment is application-specific and may vary from 6 h for an empty storage structure (bin/silo) or portion of a food-processing facility to 24 h for an entire facility.

Using direct-fired, make-up air heaters, 'positive pressurization' is applied forcing 100% heated fresh air into the facility. The process is engineered to generate specific number of air changes per hour based on structural parameters of the facility. The process uses a combination of direct-fired make-up heaters, fans, and ductwork for airflow management and maintains a relatively constant lethal temperature profile throughout the treatment area.

Laboratory and commercial trials with high temperatures during the last decade, especially with forced air gas heaters, have resulted in a wealth of information on (1) understanding responses of insect species and life stages to heat, (2) heat distribution within a treated area, and (3) techniques necessary for gauging effectiveness of commercial heat treatments. Insect responses vary with the temperature, among species, and within a species among life stages.

Insect bioassays and monitoring insect populations before and after a heat treatment are important to understand the degree and duration of insect suppression obtained in commercial facilities. Heat treatments are safe, effective, and a viable tool for the organic and non-organic sector. High temperature treatment of whole or part of the facility by maintaining temperatures between 50 to 60°C has been shown to be safe, effective and a viable alternative to manage stored product insects.

**Keywords:** Heat treatment, Forced Air, Flour mills, MB alternative, Stored product insects