Disinfestation of Cocoa Beans in Warehouses in the United States

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The authors reviewed the logistics of cocoa bean imports and storage in the U.S., pest pressure, fumigation practices and prospects for alternatives to methyl bromide under the current circumstances. An additional purpose of the case study was to consider alternatives to methyl bromide fumigation and particularly re-fumigation of cocoa beans.

Logistics of Cocoa Bean Receipt and Storage in the United States

The warehouse quality control program of the Cocoa Merchants Association of America and good operating procedures does not allow the storage of beans with chocolate products. Doing so could lead to cross contamination with a food product, with resulting implications for food safety and loss of products.

Just a few companies operate cocoa warehouses in the importing ports. The warehouse operators typically do not own the buildings; instead the local port authority rents the buildings to them. This decreases or eliminates the potential for construction or retrofit of buildings.

New shipments enter the warehouses and are stored adjacent to other stored cocoa beans. There is no segregation of new and old shipments. The warehouse operators hold cocoa beans for numerous cocoa brokers and traders. A broker's stack of cocoa beans may be next to its competitor's stack and a broker may have many separate stacks of cocoa beans in various parts of the warehouse. New shipments are packed into the space left by the recently departed shipment, immediately tarped, and fumigated over the weekend.

Chocolate manufacturers typically purchase whole or partial shipments of cocoa beans from various brokers weekly; their choice of cocoa beans depends on quality attributes, price and condition of the cocoa beans, production needs, country of origin, and other factors.

Near Term Considerations

Inbound cocoa bean shipments are frequently infested, and after being off-loaded from waiting ships are stored in the same dockside warehouses as previous shipments. In light of these logistics and storage factors it is necessary to implement a rapid disinfestation method. Currently, only methyl bromide is used for this purpose and that use appears necessary and reasonable.

Some cocoa beans are imported from countries on the US Food and Drug Administration (FDA) automatic hold list. These treatments are performed in the same dockside warehouses as other shipments. Another option would be to treat cocoa beans with phosphine in separate dockside warehouses.

The cocoa merchants should explore options for improving their IPM programs by, for example, making the warehouse structure more conducive to successful fumigation, adopting and complying with the cocoa warehouse quality control program and/or implementing other logistical approaches to eliminate or reduce the need to refumigate stored cocoa beans with MB. If cocoa beans destined for long-term storage could be stored separately, they could be treated with phosphine.

Methods to avoid the need or frequency for methyl bromide refumigation, especially the routine refumigation done immediately before shipment to chocolate manufacturers should be investigated. Cocoa merchants and chocolate manufacturers wishing to continue to use methyl bromide as a critical use should comply with a valid warehouse quality control program, such as the warehouse IPM program managed by the Cocoa Merchants Association of America (CMAA), which promotes high standards and good industry practices.

Longer Term Considerations

The use of phosphine might be feasible if structural changes could be made to short-term dockside warehouses so that phosphine treatments could be conducted in areas separated from workers in other parts of the building.

Irradiation treatment could be considered for use when cocoa beans are moved to long-term warehouses or when they are shipped to the chocolate manufacturers. However, sensory research on irradiated cocoa beans and an economic and logistics analysis would be required.

Cocoa beans could be shipped to propylene oxide chambers that could be built near the long-term warehouses or as part of chocolate manufacturing facilities. This possibility would require further investigation and economic analysis.

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Case study available upon request to marcotteconsulting@comcast.net