COMMERCIAL USE OF PROFUME® ON STORED COCOA BEANS

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Cocoa beans are shipped to the U.S. and stored in warehouses, usually near the port of arrival, until they are needed for processing. The beans often arrive with infestations of common stored-product pests and therefore are fumigated upon arrival. They are subject to re-infestation during their time in the warehouse because of storage practices and the fact that they may remain in the warehouse for a year or more. The beans, then, may be fumigated several times before they are processed into the ingredients for making chocolate and other cocoa products. The fumigant of choice for cocoa beans historically has been methyl bromide, but as most of the fumigations are not considered quarantine treatments, critical use methyl bromide must be used.

Royal Fumigation, in conjunction with Dow AgroSciences, has worked to develop the commercial application of ProFume® (sulfuryl fluoride) to cocoa beans in lieu of methyl bromide. All of these efforts have taken place since July 2005, when the ProFume® label was revised to include cocoa beans. In the same time frame, the Food and Drug Administration, which imposes an automatic detention upon cocoa beans from certain countries, has accepted treatment with ProFume® as a remediation for adulterated product. The Chocolate Manufacturers Association has conducted sensory testing due to concerns that sulfuryl fluoride would impart an “off odor” or “off taste” to cocoa beans. The CMA’s findings of no sensory effects from ProFume®, in conjunction with the other regulatory actions, have paved the way for commercial field trials of the fumigant.

Field trials of ProFume® have involved bio-assay testing for optimum application rates and performance and verification that those rates can be consistently attained and maintained. Assessments have also been made of the penetration, dispersion and aeration characteristics of the fumigant under the circumstances common to cocoa bean fumigation. One important outcome of the trials has been the determination that only one application rate is needed for stacks of cocoa beans fumigated under tarps, and one rate for container fumigations. Dow has pioneered the ProFume® Fumiguide®, a software application that enables precision fumigation and real-time adjustments in complex circumstances such as large food processing facilities. While it is a very valuable tool, the time pressures and other logistical factors involved in cocoa bean fumigations make a single application rate very attractive to fumigators.

Royal’s experience in fumigating cocoa beans with ProFume® has proven comparable to methyl bromide. The efficacy of the fumigants is on a par, although Royal intends to obtain more data on fumigations under colder

temperatures as the seasons change. The time requirements for use of the two fumigants are also similar, with some subtle differences in areas such as aeration. Almost all of the same equipment can be used to fumigate with either product, with the most notable difference being the need for an infrared device for clearing after a ProFume® fumigation. The transition from methyl bromide to ProFume® is minimal for a fumigation crew once Dow's stewardship program has been completed. Finally, the cost of ProFume® is competitive with methyl bromide.

Customer acceptance of ProFume® for cocoa bean fumigations has been good, with some remaining concern over multiple fumigations of the same beans with the product. Royal currently is using ProFume® on approximately 30% of its cocoa bean fumigations and expects that this percentage will increase once this last concern is resolved.