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M E M O R A N D U M

TO: Gary Sprock, Registration Specialist **HSM-99025**
Pesticide Registration Branch

FROM: Michael H. Dong, Staff Toxicologist
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SUBJECT: ASSUMPTIONS FOR AND ESTIMATION OF HUMAN AND WORKER EXPOSURES TO METHYL ANTHRANILATE (BIRD SHIELD®)

Presented below are assumptions and algorithms used for estimating the human and worker exposures to the active ingredient methyl anthranilate (MA) contained in Bird Shield Repellent Concentrate (EPA Reg. No. 66550-1). **These assumptions and calculations may also be used to further support the earlier consideration (Dong, 1999) that significant human or worker exposure to MA would *not* occur, *if* the bird repellent product were used according to the mitigation measures proposed earlier by WH&S**. These suggested mitigation measures are now included in the revised proposed label which you had attached to the review package.

The bird repellent active ingredient MA is currently on the GRAS (Generally Recognized As Safe) list. Human exposure to MA at its *natural occurrence* level is thus considered to be insignificant under current regulations. It was estimated (Dong, 1999) that the *average* total daily intake of MA from natural sources was around 10 mg/person for at least a sector of the general population. This total intake estimate was calculated from summing the average daily intake of 5.0 mg from food flavors (e.g., chewing gum, frozen dairy, pudding, etc.) for ages 2 years to 65+, the average intake of 3.5 mg per liter (4 cups) from grape juice in a summer day, and the average daily intake of 0.5 mg per liter from wine. It is true that the estimates as calculated for intakes from food flavors might have been inflated (Askham, 1997), and that those individuals who had a liter of grape juice might not want to drink wine on the same day. However, neither did the above estimate for overall daily intake take into account other potential natural and non-occupational sources, such as natural foods (including fruits other than grapes) and pharmaceutical uses (e.g., cough medicine with grape flavor).

The above estimation also reflected a *maximum* daily natural occurrence level of MA that is likely more than two-fold above the calculated daily average of 10 mg/person. In fact, the use levels of MA from the 1970-71 surveys conducted by the Flavor and Extract Manufacturers' Association and the National Academy of Sciences (Askham, 1997) indicated that, for ages 2 years to 65+, the *highest* daily intake from food flavors was 9.9 mg/person, of which nearly 60% was from MA used in baked goods alone. Some individuals, especially young children, might also have a craving for up to 6 cups of grape juice on certain days. It was based on this estimated maximum level that the mitigation measures were proposed in the earlier review (Dong, 1999).

It was expected that, when implemented, those proposed mitigation measures would reduce the worker exposures in question to ≤ 10 mg/person/day which, together with the average daily dietary intake, would still be within the maximum daily natural occurrence level. As assumed previously (Dong, 1999), after a day's work in the field as either handlers or harvesters, workers are not expected to have the time or desire to consume more foods that are (highly) rich in MA.

Because the bird repellent product is to be registered for use on ripening cherries, blueberries, and table grapes, there might be more MA residues present *in* treated than non-treated fruits. However, as justified below, this additional dietary intake is inconsequential when compared to what had been considered as the maximum daily natural occurrence level.

The dislodgeable foliar residues (DFR) data submitted by the registrant (Askham, 1997) were from foliar samples analyzed through agitation, not through blending (which would otherwise lead to the collection of *total* residues). These DFR data (which reflect how much *surface* residues would *remain* over time in a turbulent environment), together with the fact that MA is basically a photosensitive compound, suggest that *much less* than 50% of the initial deposition of MA would be translocated into the cherry flesh proper by harvest time. As estimated earlier (Dong, 1999), the initial deposition of MA on foliage surface (and hence the cherry skin as well) is expected to be around 2.0 μg/cm^2 per lb AI/acre, or 4.6 μg/cm^2 per (revised) maximum label use on cherries (which have a higher application rate than grapes).

Even at a translocation rate of as high as 50% (of initial deposition), at most there would be 16 μg [= (50%) x (4.6 μg/cm^2) x (7 cm^2] of MA added to each cherry with an average weight of 1.8 grams [= (surface area x d)/6 = $\pi(d^3)/6$ = 3.1416 x (1.5^3 cm^3)/6, for the volume of a sphere with a diameter d = 1.5 cm; assuming 1 gram = 1 c.c.]. That is, from label uses there would be at most 4 mg of MA added to one pound (450 grams) of cherries. It is unlikely that an individual who drinks one liter of grape juice that day would also consume one pound of cherries or grapes. Even if the (calculated) MA content in grape juice would double or triple in that the grape juice could be processed from treated grapes, the overall daily intake so increased would still be within the estimated maximum daily natural occurrence level, which is at least two to three times above the daily average of 10 mg/person.

References

Askham LR, 1997. Methyl Anthranilate – Residue Data. Cal/EPA Department of Pesticide Regulation Registration Document No. 52037-029.

Dong MH, 1999. *Document Review*: Dislodgeable Foliar Residue. Worker Health and Safety Branch, Cal/EPA Department of Pesticide Regulation, dated May 19.

cc: Chuck Andrews