# Procedures for the Determination of Dislodgeable Dust on Foliage as Related to Worker Reentry Hazards

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The procedures outlined below represent an extension of the dislodgeable foliar residue method (IWATA, et al., 1977). While the determination of the *quantity* of foliar dust is not considered to be an integral part of the dislodgeable method itself, the need for this data is justified by several criteria.

Foliar dust was first implicated as the primary vehicle of worker exposure in the early observations of QUINBY and LEMMON (1958) and recently verified by the measurements of SPEAR et al. (1977). The levels of foliar dust were found by POPENDORF et al. (1975) to correlate with the aerosol levels created by workers disturbing the foliage. For tree and other high crops, this aerosol of contaminated dust appears to be the primary means of worker exposures to pesticide residues. Further, the extrapolation and utilization of foliar pesticide residue data from the few conditions actually under observation in any one study into other worker exposure situations, will require knowledge not only of pesticide concentrations on foliar dust (ppm) but also its partitioning between foliar dust, leaf surfaces, and water both at the time of application and during the aqueous extraction phase (POPENDORF and LEFFINGWELL, 1978). Finally, foliar dust plays a vital role in the pesticide decay process itself. Not only does the *type* of dust affect pesticide decay rates (IWATA, et al., 1973 and ADAMS, et al., 1977), but recent data indicates that the *quantity* of foliar dust ($mg/cm^2$) is also an important decay parameter (POPENDORF and LEFFINGWELL, 1978).

The following procedures can be incorporated directly into the dislodgeable method after the organic solvent has been drained from the separatory funnel in step 7. At that time the bulk of the foliar dislodgeable dust will be suspended in the emulsion at the solvent-water interface. A desiccated, preweighed, 4.25-cm glass-fiber filter held in an appropriate holder, such as the Millipore 300-ml sintered-glass, vacuum filtration apparatus can be used to quantitatively collect the dust. To avoid clogging



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the filter, first clear the water above the interface and decant it into the filter; the emulsion can then be broken with acetone and filtered. The separatory funnel should be washed with water and then with acetone to transfer all the dust. After policing the filter holder, the filter can be rinsed with acetone, desiccated at 105°C, and reweighed. To correct for the weight of the fibrous foliar debris which may arise from the punching process, leaf discs from leaves previously cleaned of all foliar dust should be used as control samples.

Short of determining the dislodgeable dust on all samples, the following guidelines are provided. The coefficient of variation for single samples is approximately 10%. As in the basic dislodgeable procedure, the weight determination of at least two replicate samples is recommended. During residue decay studies involving repeated samples from the same location, foliar dust levels are not expected to change appreciably over one week without rainfall, etc.; therefore, duplicate samples taken over this period would minimally represent leaf conditions during the interim. A much larger proportion of samples collected as part of human exposure investigations should be analyzed for dust levels to maximize the points of comparison with aerosol concentrations and to verify other exposure parameters. It is expected that whatever efforts can be taken to include foliar dust in reported residue data will yield long-term benefits for their interpretation and application to safe worker re-entry practices.

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