US EPA ARCHIVE DOCUMENT

AH

F.C.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 12 1997

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Review of Deltamethrin Fumigator Indoor Exposure Estimates

TO: Debbie McCall
Risk Characterization and Analysis Branch

FROM: Jim Carleton, Chemist
Occupational and Residential Exposure Branch

THRU: Jeff Evans, Acting Section Head
Special Review and Reregistration Section

Ed Zager, Acting Branch Chief
Occupational and Residential Exposure Branch
Health Effects Division (7509C)

DP Barcode:	D231814
Pesticide Chemical Codes:	097805
EPA Reg. Nos.:	4822- -UIE
EPA MRID Nos.:	441555-09
Review Time:	4 days
PHED:	N/A

Recycled/Recyclable • Printed with Vegetable Oil Based Inks on 100% Recycled Paper (40% Postconsumer)

I. BACKGROUND

Registrant S.C. Johnson Inc. has submitted to EPA the results of an applicator and post-application exposure and risk assessment for consumer use of a deltamethrin total release indoor fumigator. OREB has reviewed the submission and found it to contain critical flaws, and deficiencies which tend to underestimate exposure.

II. DETAILED CONSIDERATIONS

In assessing inhalation exposure, the document cites results obtained from an air chamber study conducted by the registrant on a fumigator containing the active ingredient permethrin. This study has apparently not been submitted to EPA for review, therefore the Agency can not at this time make any determination as to the quality and adequacy of the data for use in assessing the exposures in question.

In assessing post-application dermal exposures, the document cites data from a compound-specific indoor dislodgeable residue study (MRID 439312-01), and indoor residue transfer data available in a peer-reviewed, published study (Ross et al., 1990). While the studies themselves appear to be of reasonable quality, the data contained in them has been employed inappropriately by S.C. Johnson in their exposure calculations. Problems include the following:

The Ross et al. (1990) "transfer coefficients" are a ratio of concentrations ($\mu g/cm^2$) on dosimeter clothing to <u>extracted</u> floor dosimeter concentrations. However, S.C. Johnson's assessment inappropriately uses these numbers in conjunction with <u>dislodgeable</u> deltamethrin floor residues. Since dislodgeable residues are only a fraction of extractable (i.e. total) residues, this results in a substantial underestimate of exposure. Also, the original Ross et al. "transfer coefficients" do not have a time dimension incorporated into them. S.C. Johnson's calculations make the assumption that they represent an entire day's worth of exposure, however they resulted from Jazzercise routines of only 20 minutes duration performed on treated carpets. In a follow-up paper, Ross et al. (1991) reported a transfer coefficient of 140,000 $\pm$ 30,000 cm^2/hr for d-trans allethrin, based upon dislodgeable residues in the same study, as determined using a carpet roller.

S.C. Johnson's assessment weighted the "transfer coefficients" for each body part (shirt, pants, etc) according to the fraction of total body surface they represented. These adjusted values were then used in conjunction with the area for each *separate* part, rather than for the whole body area. This is illogical and inappropriate, and results in underestimated exposure.

The assessment assumes that a homeowner is exposed while wearing long sleeve pants and shirt, and that a 99.51% protection factor (PF) applies to covered areas (0.49% clothing permeation). Obviously, people do not always wear this much clothing in their homes, so the first assumption tends to underestimate potential exposure. The second assumption is questionable, and also may underestimate exposure. For a single layer of clothing, OREB generally assumes a protection factor (PF) of no more than 90%.

No documentation is provided to support the assumption of 1.2% dermal absorption, used in the assessment.

III. CONCLUSIONS

OREB has reviewed an assessment of consumer exposures and risks resulting from use of a total release indoor fumigator containing deltamethrin. Some key pieces of information and assumptions used are insufficiently documented. Other assumptions are used inappropriately, resulting in vast underestimates of potential exposures. For instance, using the same dislodgeable residue information, and employing a transfer coefficient also obtained from Ross et al. (1991), and assuming 15 hours/day of exposure, 70 kg body weight, and minimal clothing, OREB estimates the day 0 total dermal post-application exposure as 2.3 mg/kg/day. This is more than *six orders of magnitude* higher than S.C. Johnson's exposure estimate of 1.3×10^{-6} mg/kg/day for the same individual.

REFERENCES

Ross J., Thongsinthusak T., Fong H.R., Margetich S., and Krieger R. (1990) Measuring potential dermal transfer of surface pesticide residue generated from indoor fogger uses: an interim report. *Chemosphere* 20(3/4):349-60.

Ross J., Fong H.R., Thongsinthusak T., Margetich S., and Krieger R. (1991) Measuring potential dermal transfer of surface pesticide residue generated from indoor fogger use: using the CDFA roller method, interim report II. *Chemosphere* 22(9-10):975-84.

cc: J. Carleton, OREB
G. Larocca, RD
Correspondence file
Chemical file
Circulation