

## Workers Exposure to Mancozeb Pesticide, in Korean Pesticide Formulation factories

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Five pesticide formulation factories were investigated to identify workers exposure to a pesticide named mancozeb. Mancozeb is a complex of zinc and maneb containing 20% of manganese and 2.55% of zinc and chemical name is ethylene bis(dithiocarbamic acid) manganese zinc complex. The wettable powder pesticide sampled on cellulose ester membrane filters through personal air sampling with 2 LPM sampling rate were gravimetrically weighted for calculation of dust concentrations and analyzed manganese and zinc by ICP. Forty two workers were participated in this study for two consecutive days monitoring program. The data of mancozeb dust and metals in the pesticide distributed log-normally rather than normally. Geometric means (geometric standard deviations) for dust, manganese and zinc were 0.566 mg/m<sup>3</sup> (2.16), 5.360 mg/m<sup>3</sup> (4.94), 1.061 µg/m<sup>3</sup> (3.71) respectively. ACGIH-TLVs of 2005 are 0.2 mg/m<sup>3</sup> and 5 mg/m<sup>3</sup> for manganese and zinc oxide. AIHA-WHEEL for mancozeb is 1.0 mg/m<sup>3</sup> in 2005, while ACGIH has not published a TLV. Day to day variations using paired t-test showed no statistically significant differences for dust, manganese, and zinc. Dust concentrations were highly correlated to manganese and zinc concentrations ( $R^2=0.552$  and  $0.4472$  respectively), indicating that metals were well-suited as identification methods for airborne mancozeb at pesticide

formulation sites. Least solvents could dissolve the pesticide, which make it difficult to be analyzed by GC or HPLC. Currently there are no methods for mancozeb analysis in NIOSH or OSHA methods.

**Key words** : Endocrine disruptors, Mancozeb, Pesticede dust, Manganese, Zinc