

# Evaluation of mixed organic solvent exposures in painting plants

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## - Abstract -

The exposure levels of mixed organic solvent for 66 exposed workers in 6 paint products industries were evaluated. In 66 exposed workers and 30 control subjects, we also determined the concentrations of toluene and xylene metabolites, i.e. hippuric acid, o-, m-, and p- methylhippuric acid.

The results were as follow;

1. Organic solvent exhibited 7 compounds, which on average accounted for approximately 90% of the identified mass in each painting products industry air samples, were selected for quantification:

methyl ethyl ketone, ethyl acetate, methyl isobutyl ketone, toluene, butyl acetate, ethyl benzene, o-, m-, p- xylene.

2. The average mixed organic solvent exposure levels in 66 points with workplace were 3.8 ppm of MEK, 12.2 ppm of ethyl acetate, 4.0 ppm of MIBK, 28.7 ppm of toluene, 3.8ppm of butyl acetate, 10.2 ppm of ethyl benzene, 14.6 ppm of xylene, respectively.

3. The exposure levels of each 7 organic solvents were significant difference by the paint products industry statistically.

4. For the total 66 points with workplace, thr rate of them of which mixed solvents in air was exceeded the TLV of 1.0 were obtained for 23 % ( 15/66 point).

5. The concentrations of hippuric acid in urine of exposed group and control were  $0.94 \pm 0.65$  g/g of creatinine,  $0.16 \pm 0.11$  g/g of creatinine, respectively.

There are significant difference of concentrations for hippuric acid in urine by groups statistically.

6. There was a linear correlation between the end shift hippuric acid acid levels in urine and exposed toluene in air:

$$y = 0.02079x + 494.2, r = 0.6468, n = 55$$

y: hippuric acid in urine(mg/g of creatinine)

x: toluene levels in air(ppb)

Toluene levels in air of 100 ppm have been caculated to hippuric acid in urine 2.57 g/g of creatinine.

7. There was a linear correlation between the end shift methylhippuric acid acid levels in urine and exposed xylene in air:

$$y=0.01664x+31.6, r=0.7264, n=55$$

y: methylhippuric acid in urine(mg/g of creatinine)

x: xylene levels in air(ppb)

Xylene levels in air of 100 ppm have been caculated to methylhippuric acid in urine 1.69 g/g of creatinine.