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Airborne Concentrations of Ethyl and Methyl Cyanoacrylate in the Workplace

A survey was conducted of persons who manufacture, mix, bottle, and package methyl 2-cyanoacrylate (MCA) and ethyl 2-cyanoacrylate (ECA). Airborne concentrations of these cyanoacrylates also were measured during waste-handling operations. During a 1-week period, 162 personal and area samples were collected. About 90% of the samples were analyzed for ECA (the predominant adhesive being manufactured at the facility). About 50% of the samples were collected during periods of 15 min or less, the remainder for 15 to 240 min. Some 8-hour time-weighted average (TWA) samples also were collected. Samples were collected using Tenax[®] tubes with subsequent analysis by high-performance liquid chromatography. Most samples were collected where highest exposure was likely (e.g., during mixing, bottling, and packaging). Peak concentrations of exposure (duration of 15 min or less), measured during a variety of tasks, ranged from 0.003 to 1.5 ppm. In particular, personal mean short-term airborne concentrations of ECA for the mixing operators ranged from 0.039 ppm to 0.650 ppm, while various 10-min to 1-hour activities were performed, with a TWA concentration of 0.07 ppm. Personal short-term airborne concentrations of ECA for bottling and packaging workers (n = 60) were 0.040 ppm \pm 0.016 ppm (mean \pm standard deviation), with similar 8-hour TWA concentrations due to the continuous nature of bottling and packaging. Other personal samples were not significantly different. The area samples were normally within a factor of 2 of the peak personal sampling results. These data indicate that, when handled at room temperature and relative humidity ranging from 40–69%, both MCA and ECA produce airborne concentrations that are nearly always less than about 0.1 ppm, which is less than the threshold of irritation.

Keywords: air sampling methods, ethyl 2-cyanoacrylate, methyl 2-cyanoacrylate, occupational exposure, sensory irritation