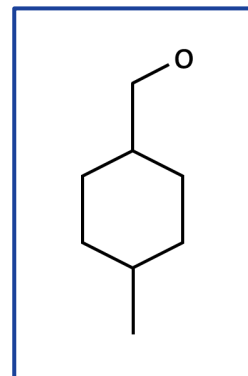


SUMMARY

Background: 4-Methylcyclohexylmethanol (MCHM) is an organic compound produced as a mixture with other compounds and used to reduce impurities in mined coal. A significant spill in 2014 leaked a 75% mixture of MCHM into West Virginia's Elk River, which contaminated nearby air and the municipal water source serving the Charleston, West Virginia area. A previously published study suggested that MCHM that had contaminated household water could become airborne when the water was used for showering, presenting inhalation as another potential route of exposure. A preliminary evaluation was conducted to determine whether short-term airborne exposure to MCHM vapors (at levels above those estimated while showering following the Elk River chemical spill) might cause adverse respiratory effects under laboratory conditions.



Methods: Cells cultured from human airway tissues were used to investigate whether exposure to MCHM in a laboratory setting could cause adverse effects to the human respiratory system. The cells were exposed to vapors of pure and crude MCHM at concentrations of 35 and 350 parts per million (ppm) for 6 hours and then allowed to rest for another 18 hours. After 24 hours had elapsed, cell health and evidence of inflammation were evaluated. Some cells were also exposed to high concentrations of MCHM vapors for a short time as a positive control (i.e., at levels that should cause cell damage).

Results: Exposure to MCHM vapors for 6 hours at concentrations of 35 and 350 ppm did not negatively affect overall cell health or cause inflammation in the laboratory human cell system evaluated. The MCHM vapor concentrations studied were 90 to 900 times higher than the MCHM levels estimated to have occurred when residents in the Elk River area showered using contaminated municipal water at the time of the spill. The high concentrations included in the tests as a positive control, by contrast, resulted in the expected severe effects on cell health and inflammation.

Conclusions: *The results of these preliminary laboratory tests showed no adverse respiratory effects after a single exposure at the concentrations of MCHM vapors evaluated. This preliminary evaluation was intended to simulate human exposures to MCHM vapors at levels much higher than those encountered by residents showering with contaminated water following the Elk River spill (i.e., >0.50 ppm of MCHM).*
