EHS Laboratory Guidance

Alternative Solvents to Dichloromethane

Introduction

In 2024, the United States Environmental Protection Agency (EPA) passed a measure banning the use of dichloromethane (DCM), also known as methylene chloride. Labs at the University of Idaho must either comply with following a Workplace Chemical Protection Plan (WCPP), which includes monitoring for specific tasks, or find alternatives for use. To aid labs in finding alternatives, EHS developed the following table.

Use Case for DCM	Alternatives	Resources and Further Information
Chromatography	3:1 Ethyl Acetate:EtOH in Heptanes	Taygerly, J. P., Miller, L. M., Yee, A., & Peterson, E. A. (2012). A convenient guide to help select replacement solvents for dichloromethane in chromatography. *Green Chemistry*, *14*(11),3020. https://doi.org/10.1039/C2GC36064K
Extractions and Purifications	Ethyl Acetate, MTBE, Toluene, 2-MeTHF	Jordan, A., Stoy, P., & Sneddon, H. F. (2020). Chlorinated solvents: their advantages, disadvantages, and alternatives in organic and medicinal chemistry. *Chemical Reviews*, *121*(3), 1582–1622. https://dx.doi.org/10.1021/acs.chemrev.0c00709
Biphasic reactions such as alkylation, amidation, nucleophilic substitution	2-MeTHF	Greener Solvent Alternatives, Sigma Aldrich
Extraction	Propan-2-one:cyclopentane azeotrope	Cayot, N., Lafarge, C., Bou-Maroun, E. & Cayot, P. Substitution of carcinogenic solvent dichloromethane for the extraction of volatile compounds in a fat-free model food system. *Journal of Chromatography A*, **1456**(2016) *77-88* https://doi.org/10.1016/j.chroma.2016.06.015

Substitutions for DCM should not be with more toxic chemicals (e.g. benzene or 1,4-dioxane, etc.) or with other chlorinated solvents (e.g. trichloroethylene, carbon tetrachloride, etc.), as some other chlorinated solvents (such as trichloroethylene) are already or will soon be added to the EPA list of highly restricted solvents.