TurboVap® Solvent Exchanging Guide

This guide will be a quick reference on how this technique should be performed using a Biotage TurboVap® II with End-Point detection.

What is solvent exchanging?

EPA and state regulated methods such as 608.3, 8081, 8082, and Extractable Petroleum Hydrocarbons require that sample extracts final solvent must be in hexane (as opposed to DCM) for either analytical purposes or to proceed with the next part of the extraction. DCM is traditionally used as the primary extraction solvent for these methods as it can more easily extract the target compounds you are looking to analyze than hexane. As a result, a solvent exchange is required during the concentration process which involves concentrating the sample extract in DCM down to a specific point and then adding 50 mL of hexane, mixing, and re-concentrating it down to the desired endpoint.

Pesticides & Polychlorinated Biphenyls

EPA methods 608.3, 8081, and 8082 are regulatory methods used to characterize pesticides and polychlorinated biphenyls (PCBs) in a variety of different matrixes. For these methods, DCM is used as a primary extraction solvent; however, DCM is incompatible with traditional analytical practices utilizing a GC-ECD (Electron Capture Detector) as it will strip the GC column stationary phase. Thus, a pesticide or PCB sample must have a final extraction solvent of hexane, necessitating a solvent exchange. The solvent exchange itself is very straightforward, follow the extraction process as normal up to the point of putting your sample extracts on the TurboVap® II and concentrate the extracts to a 1 mL endpoint. This is required as you do not want any chance of residual DCM getting into your GC column. Next add 50 mL of hexane, mix that with the extract, and re-concentrate to your lab's desired endpoint for pesticide/PCB analysis. It is as easy as that.

Extractable Petroleum Hydrocarbons

Extractable Petroleum Hydrocarbons are a state regulated class of compounds that are commonly associated with methods such as the Massachusetts or New Jersey Department of Environmental Protection. These procedures come in two parts; the initial extraction and concentration, then followed up fractionation in which the sample extract is separated into two distinct fractions.

As with other regulatory methods the initial extraction utilizes DCM as the extraction solvent, however the fractionation portion of the extraction requires one fraction to have a final solvent of hexane (aliphatic) and the other in DCM (aromatic), meaning we have to solvent exchange the initial DCM extract. This is important since fractionation utilizes solid phase extraction techniques and requires the aliphatic fraction in hexane to occur first to properly characterize those compounds. During the initial concentration of the DCM extract allow the extract to concentrate down to roughly 5–10 mL, then add 50 mL of hexane, mix, and re-concentrate the extract down to its 1 mL endpoint so that you can be prepared for the fractionation portion of the extraction.

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