

Blank Level Control for the Determination of Trace Amounts of Alkyl Phthalates in Water

Kikuo Takeda*, Taketoshi Fujimoto, Yoshitaka Kimura, Makoto Imai, Toshikazu Taira, Hiroyuki Iida, Yoshio Koda¹, Masatoshi Morita²

Sumika Chemical Analysis Service, Ltd., ¹Research Institute of Environmental Chemistry, ²National Institute for Environmental Studies, Japan

Introduction

Many chemicals in the environment potentially disrupt the endocrine system. Alkyl phthalates such as di-(2-ethylhexyl)phthalate (DOP) are also suspicious compounds as endocrine disrupters. Although the importance evaluating concentration levels of alkyl phthalates in the environment has attracted a growing interest, there are some difficulties in the analytical process. Especially, it is most difficult to control the contamination of DOP in analytical procedures and to decrease the blank level of DOP. This paper describes the blank level control in analytical operations for alkyl phthalate determination in environmental water. Furthermore, DOP and DBP as endocrine disrupters were discussed by the location on “The Organic Conceptual Diagram”

Experimental and discussion

For the determination of alkyl phthalates in water, the analytes in sample water were extracted in hexane and measured by gas chromatography-mass spectrometry using surrogate materials. The main sources of DOP contamination can exist in all the analytical procedures such as the atmosphere in the laboratory, reagents, apparatus, tools, operator and all of handling procedures. Especially, for the improvement of contamination from the atmosphere in the laboratory, the use of a cleanroom constituted of chemical filter such as active charcoal filter was fairly effective. The one-pass supplied air was more effective than recycle air. Next, DOP and DBP were located on “The Organic Conceptual Diagram” and compared with endocrine disrupters. Dibutyl phthalate (DBP) was located in the region of estrogen. On the other hand, di-(2-ethylhexyl) phthalate (DOP) was located away from the estrogen region. This difference of location on the diagram will be considered in our further study.

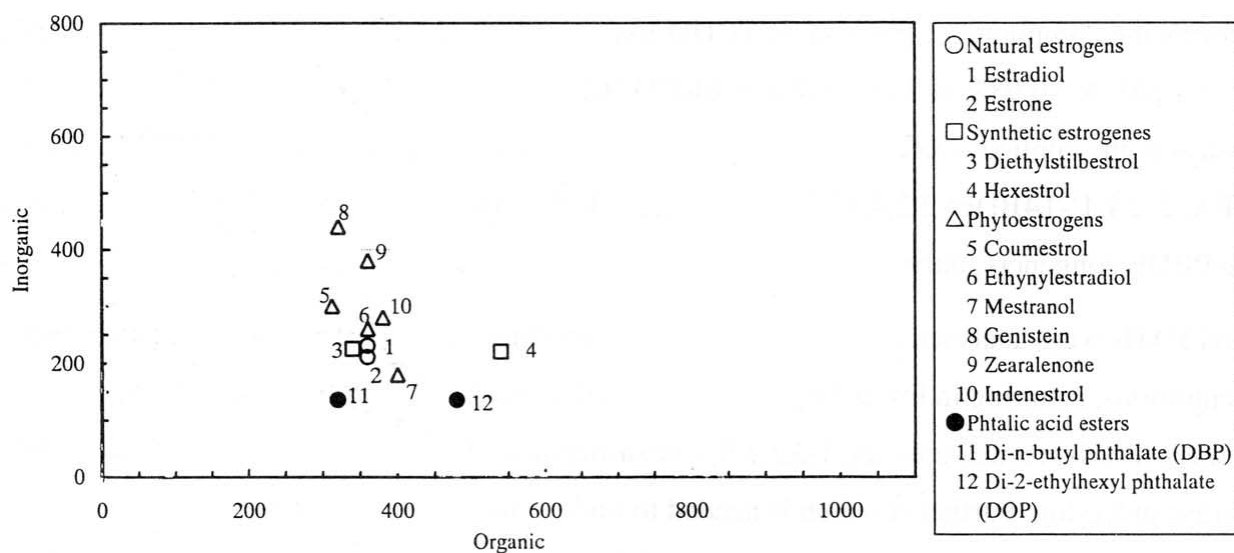


Fig.1 The location of DOP, DBP and other endocrine Disrupters “The Organic Conceptual Diagram”