

Determination of Sorptive Parameters for Organic Toxicants Solubilized by Triton X-100 During their Pre-concentration by Porous Polymer Sorbents from Water Solutions

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Pre-concentration of organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) from water containing high concentration of detergent (Triton X-100) were studied on a set of polymeric adsorbents: Amberlites XAD-2, XAD-4, XAD-7, XAD-16, XAD-1180, XAD-2000, XAD-2010, Polysorb-1 and Poros C₁₈. Influence of eluent flow rate (up to 6.4 cm³/min), concentration of the detergent (up to 4.0 mg/cm³) and organic toxicants (up to 0.13 µg/cm³) on their recovery in acidic solution with the constant adsorbent volume was investigated. The following adsorptive parameters were obtained: beginning of breakthrough time (3–47 min); 10% breakthrough time (5–59 min); mean values of dynamic adsorptive capacity (7–90 mg/cm³); values of adsorptive capacity at 100 min (16–149 mg/cm³); adsorptive rates at the initial process step (2–23). Rankings of dynamic adsorptive capacity and adsorptive capacity via 100 min were established. They may be used for pre-concentration of organic toxicants from natural waters that contain high concentrations of detergent compounds. From adsorptive capacity, it is evident that the most rapid adsorptive equilibriums of Triton X-100 are achieved for Poros C₁₈ and Polysorb-1 media. More slow – for XAD-4, XAD-1180, XAD-2010, practically equal intermediate adsorptive rates are achieved for XAD-7, XAD-2, XAD-16, and the slowest – for XAD-2000.

Keywords: pre-concentration, organochlorine pesticides, polychlorinated biphenyls, polycyclic aromatic hydrocarbons, porous polymer adsorbents, Amberlites XAD, Polysorb-1, Poros C₁₈
