

Migration of vinyl chloride monomer (VCM) and additives into PVC bottled drinking water

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Abstract: The migration of vinyl chloride monomer (VCM) and plasticizers, especially adipate and phthalate esters, from polyvinyl chloride (PVC) packaging materials into bottled drinking water was investigated. The study has shown that the concentrations of VCM in various brands of bottled-water were below 0.6 ppb, which is far below the 2 ppb maximum contamination limit set by the United States Environmental Protection Agency for VCM in drinking water. Exposure of the bottled-water to sunlight did not result in a measurable increase in the VCM concentration levels. However, several volatile and semi-volatile organic compounds were tentatively identified by GC-MS in the bottled-water after exposure to sunlight. 2,3-Dichloro-1-propanol and dichloroacetic acid were the volatile compounds repeatedly identified, moreover, the presence of benzene was confirmed in some bottled-water samples. Di-n-octyl adipate and bis(2-ethylhexyl) phthalate were the major semi-volatile organic compounds identified. Migration of these compounds were found to depend on storage time, temperature and exposure to sunlight. Di-n-octyl adipate and bis(2-ethylhexyl) phthalate are widely used as plasticizers in PVC packaging materials. The results of this study suggested that all measures used to store other foodstuffs should be applied to bottled-water to preserve its quality.