A CLOUD POINT EXTRACTION APPROACH BY USING TRITON X-100 FOR REMOVAL OF 4-CHLOROPHENOL FROM AQUEOUS SOLUTIONS

Duygu ÖZDEŞ1, Ali GÜNDOĞDU1, Hasan Basri ŞENTÜRK1, Mustafa SOYLAK2

1Department of Chemistry, Faculty of Arts & Sciences, Karadeniz Technical University, 61080 Trabzon, Turkey,
2Department of Chemistry, Faculty of Arts & Sciences, Erciyes University, 38039 Kayseri, Turkey

Key Words: 4-chlorophenol, Cloud Point Extraction, Triton X-100, Spectrophotometric determination

Chlorophenols constitute a group of serious environmental pollutants that must be eliminated. They are extensively used chemicals for the synthesis of pesticides, herbicides and dyes. These chemicals possess a weak acid character and may permeate human skin. They are also readily absorbed by gastro-intestinal tract, causing acute toxicity. Some symptoms of poisoning with chlorophenols are; increased respiratory rate, vomiting, and nausea. Also, chlorophenols can be formed during water chlorination, causing taste and odour problems even at very low (ppb) levels [1]. Therefore the removal of chlorophenols from waters and wastewaters is an important application in order to protect the public health and environment. Cloud point extraction (CPE) method is an easy, safe, rapid and inexpensive technique which is widely used for the separation, purification and preconcentration of a variety of substances including metal ions and organic compounds [2].

We have developed a methodology for removal of 4-chlorophenol (4-CP) from waters and wastewaters by CPE technique using a nonionic surfactant, Triton X-100. The effects of various analytical conditions such as pH, temperature, Triton X-100 concentration, equilibrium time, electrolyte concentration, initial 4-CP concentration, etc. were investigated on the extraction of 4-CP. Maximum removal efficiency (89%) was observed when solution pH was 5.0 (Figure 1).

Figure 1. Effect of pH on the removal efficiency of 4-CP

References