

ANALYSIS OF SELECTED PRINTING INK AND THEIR DEGRADATION PRODUCTS

J.N. Meepage^{*} and R.C.L. De Silva

Department of Chemistry, Faculty of Science, University of Kelaniya, Kelaniya, Sri Lanka
**jeew321@gmail.com*

With the improvement in printing technology and the wide accessibility of advanced printers, printing products have become part of human life. With this worldwide usage, a need of determining the effect of the used printing products has become essential. The study was carried out to identify the constituents in representative common printing ink samples. It was also tested to see whether the selected ink samples release any toxic components to the environment during the common disposal methods practiced in Sri Lanka. After determining the constituents, the ink samples were burnt in an incineration setup and their fire debris and smoke were analyzed. In addition, the ink samples were buried in soil, dumped in open space and water. The effect was tested for soil, air and water respectively after six months. The instrumental techniques such as FTIR, FTIR-ATR, GC/MS, GC/FID and AAS were utilized in the study. The copper and zinc concentrations in the representative ink samples analyzed were in the range of $2.960 \pm 0.020 \text{ mg g}^{-1}$ of ink to $9.129 \pm 0.108 \text{ mg g}^{-1}$ of ink. Both a petroleum-based solvent and a natural oil were found in the tested samples. During the burning of ink samples, it was observed that pigment containing dust was released along with the emitted fume. The copper concentration in the collected particles in the smoke when burning the representative ink samples was in the range of $2.152 \pm 0.018 \text{ mg g}^{-1}$ of ink to $3.522 \pm 0.010 \text{ mg g}^{-1}$ of ink. When the tested ink samples were buried in the soil, persistence of the product could be seen and it was also found to be degraded to microparticles. The ink samples showed no signs of degradation within the six months of disposal to water and air. As analysis revealed, the tested samples release toxic components, therefore, it is highly recommended to implement a proper disposal method.

Keywords: Disposal methods, Environmental pollution, Heavy metals, Pigments in ink, Printing ink