J20 The Characterization of Black Inkjet Computer Printer Inks Using Chromatographic and Spectrophotometric Techniques

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After attending this presentation, attendees will understand how various analytical techniques can be used in the analysis and identification of black inkjet computer printer inks. Through the analysis of black inkjet computer printer inks using both spectrophotometric and chromatographic techniques a characterization of the various manufacturers, and the differences between the manufacturers, will be identified. In addition, a classification scheme will be developed, and tested using a blind study, that will aid in the identification of unknown black inkjet ink samples.

This presentation will impact the forensic science community by providing a mechanism for the analysis of inkjet generated documents. This research will provide key information on the differences between, and within, the various inkjet ink manufacturers that will aid in the examination of questioned documents. Once the differences between, and within, the various inkjet ink manufacturers is known, it will be possible to identify unknown ink samples, which can aid in an investigation.

Documents are prevalent in every aspect of daily life and hardly a day passes without using some sort of document. Problems arise; however, when the authenticity of these documents is raised. Forensic science has long been involved in the investigation and examination of suspect documents. One of the steps in the examination of questioned documents is for the examiner to analyze the type of material used to create the document. This could involve the analysis of the paper substrate and/or the medium used to create the written word, namely pen ink, typewriter ink or photocopied documents.

This is the age of the computer, and as a result new challenges are facing the questioned document examiner. With more and more individuals using computers to produce their documents, and with the advancement of more sophisticated computer and printer systems, it has become harder for the analyst to distinguish and individualize a suspected document based on physical appearance alone. Once again, the forensic scientist must focus on the material used to produce the document, namely the computer printer ink. An examination of these ink samples may allow for the differentiation between the many manufacturers, as well as within the products of a specific manufacturer. In time, it may also be possible to date a computer printer generated document based on the drying and decomposition rates of the different computer printer ink components. Unfortunately, this is still just a theory. There have been few studies on the different types of computer printer inks and how, or if, they differ from each other. The identification of the various black inkjet computer printer ink manufacturers, and the creation of a classification procedure, is the first step in the analysis of a questioned inkjet produced document.

The goal of this study is to produce a detailed document on the forensic identification of black inkjet computer printer inks. The analysis of black inkjet computer printer inks by the various analytical methods will result in the production of data that will aid in the establishment of a classification procedure that can assist the forensic scientist in the examination, identification, and discrimination of the different inkjet computer generated documents they receive.

Results obtained through the analysis of the ink samples on Thin Layer Chromatography (TLC), High Performance Liquid Chromatography (HPLC), Pyrolysis Gas Chromatography/Mass Spectrometry (PyGC/MS) and Attenuated Total Reflection Fourier Transform Infrared Spectrophotometry (ATR-FTIR) will be presented. In addition, the results of the blind study, which was conducted to test the accuracy of the classification scheme that was developed will be presented.

Inkjet, Chromatography, Spectrophotometry