

**DISCRIMINATION OF STAMP PAD INKS USING
SPECTROSCOPIC METHODS**

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ABSTRACT

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Ink analysis is an important forensic procedure that can reveal useful information about questioned documents by comparison of the inks used to produce the questioned documents. In such cases, it is necessary to apply chemical methods that normally do not cause partial destruction of the examination materials. The aim of this work is to evaluate the possibility of discrimination between stamp pad inks by the use of spectroscopic methods; FTIR spectroscopy, UV-Vis spectroscopy and VSC 5000. Nine samples of different brands and colors of stamp pad inks were examined. Artline and Unicorn red inks and Colop and Artline blue inks cannot be differentiated based on the absorption of visible radiation. It could be due to the two brands use similar chemical compounds and they probably are of similar chemical compounds or compositions. However, all brands of black inks can be differentiated. It could be due to the inks may not have similar compositions. The IR spectra of all inks are similar although they are from different colors and brands probably due to the inks are comprised of chemical compounds having similar functional groups. The three brands of all the three colors, however, can be differentiated based on colorimetry measured on VSC 5000.

CHAPTER 1

INTRODUCTION

1.1 Background and problem statement

Ink components may be classified by their functions in the ink matrix. The liquid components are collectively referred to as the vehicles and include materials such as oil, solvents and resins that help shape the ink flow characteristic, drying mechanism, drying time, polarity and cost. Coloring matters may be added as a combination of dyes and pigments. Dyes are distinguished by their solubilities in the vehicles, whereas pigments are included as very finely ground dispersions that are not solubilised. Other components such as waxes, plasticizers, driers and other miscellaneous materials may also be added.

The composition of ink depends on its intended function. Alternation of ink components during the manufacturing process will change source properties such as tackiness, drying, color, cost, fluidity or resistance to degradation by light, heat, water and other environmental factors.

Ink analysis is an important forensic procedure that can reveal useful information about questioned documents. Most of forensic applications regard the detection and confirmation of alterations to documents with significant values such as insurance claims, wills, contracts and tax returns. These modifications can be