## B16 Use of an Optimized 1,2-Indanedione Process for the Development of Latent Prints

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After attending this presentation, attendees will have a knowledge of the impact of percentage relative humidity upon moisture content of paper substrates and the resultant effect upon 1,2-indaneione performance. Additionally, information will be presented regarding the advantages of use of a combined indanedione-zinc formulation over those of DFO.

This presentation will impact the forensic community by demonstrating an optimized reagent and process to more effectively develop latent prints on paper substrates.

1,2-Indanedione belongs to a class of compounds which have demonstrated great potential in the processing of latent prints, particularly in the area of fluorescence. However, variability in results achieved worldwide has precluded it from being used extensively. For this research, various components of the formulation were analyzed, including purity level of the indanedione, type of carrier solvent, and the use of $ZnCl_2$ both as a secondary application and incorporated into the reagent. Using a resultant optimized formulation, performance comparisons were then made in the areas of visible color development, fluorescence, and degree of substrate staining with those of DFO for both fresh and aged prints. In that incorporation of zinc into a 1,2- indanedione solution (Ind-Zn) can affect shelf life, long term stability of the resultant formulation was assessed. In order to isolate the cause of 1,2-indanedione performance variability, moisture content of the paper substrates on which the prints had been deposited was measured and a correlation found with percentage ambient relative humidity. Determination of visible color and fluorescence as it corresponded to percentage moisture content allowed for defining critical threshold levels necessary for achieving optimal results. Correlating these values with percentage relative humidity then allowed for the development of standard operating procedures for best possible print development.

Through this work, it was determined that a 7.41% v/v formulation of Ind-Zn having PE as a carrier solvent yielded the most optimal results when processing methods optimized for %RH in the laboratory were utilized. Both initial color development and fluorescence were superior to that of DFO; prints developed with Ind-Zn were a minimum of 6.5 units dE* darker and more red than with DFO for all substrates tested. Processing with Ind-Zn on the majority of the substrates tested yielded fluorescence intensity values approximately four times greater than with DFO.

**1,2-Indanedione, DFO, Moisture Content**

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