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**Dual-wavelength  $\beta$ -correction spectrophotometric determination of trace concentrations of cyanide ions based on the nucleophilic addition of cyanide to imine group of the new reagent 4-hydroxy-3-(2-oxoindolin-3-ylideneamino)-2-thioxo-2H-1,3-thiazin-6(3H)-one**

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**Abstract**

A simple, fast, low cost and sensitive direct  $\beta$ -correction spectrophotometric assay of cyanide ions based on its reaction with the reagent 4-hydroxy-3-(2-oxoindolin-3-ylideneamino)-2-thioxo-2H-1,3-thiazin-6(3H)-one, abbreviated as HOTT in aqueous media of pH 7-10 is described. The electronic spectrum of the produced brown-red colored species showed well defined and sharp peak at  $\lambda_{\text{max}} = 466 \text{ nm}$ . The effective molar absorptivity for the produced cyano compound was  $2.5 \times 10^4 \text{ L mol}^{-1} \text{ cm}^{-1}$ . Beer's law and Ringbom's plots were obeyed in the concentration range 0.05-2.0 and 0.30-1.5  $\mu\text{g mL}^{-1}$  cyanide ions, respectively. The proposed method offers 16.0 and 50.3  $\mu\text{g L}^{-1}$  lower limits of detection (LOD) and quantification (LOQ) of the cyanide ion, respectively. The analytical utility of the method for the analysis of cyanide ions in tap and drinking water samples was demonstrated and the results were compared successfully with the conventional cyanide ion selective electrode. The short time response and the detection by the naked eye make the method available for the detection and quantitative determination of cyanide in a variety of samples e.g. fresh and drinking water. Moreover, the structure of the produced colored species was determined with the aid of spectroscopic measurements (UV-Vis, IR,  $^1\text{H}$  and  $^{13}\text{C}$  NMR) and elemental analysis. © 2009 Elsevier B.V. All rights reserved.

**Author Keywords**

$\beta$ -Correction spectrophotometry; Cyanide ions; Determination; Industrial wastewater; Nucleophilic addition

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