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Spectrophotometric And Thermodynamic Determination Study of Manganese (II) By Using The Reagent 7-(6-Bromo-2-Benzothiazolylazo)-8-Hydroxyquinoline

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ABSTRACT

A thiazolylazo reagent, 7-(6-bromo-2-benzothiazolylazo)-8-hydroxyquinoline (7-(6-BrBTA8HQ)), was synthesized by di azo coupling of (2-amino-6-bromobenzothiazol derivative) with 8-hydroxy quinolone, and used for the spectrophotometric determination of Mn (II). This method was simple, rapid, sensitive, and selective for reaction between manganese and 7-(6-BrBTA8HQ) to form a pink complex with a molar ratio (1:2).The molar absorptivity of the complex was ($1.3695*10^3 L.\ mol^{-1}.cm^{-1}$) at λ max 562 nm. Beer's law obeyed in the range of (1-14) ppm of manganese, and the stability constant was equal to ($3.688*10^{10} L.\ mol^{-1}$).The relative standard deviation, recovery, and relative error were equal to (0.626%, 98.34%, 1.66%) respectively. The effect of temperature also studied and the thermodynamic parameters (ΔG, ΔH and ΔS) calculated and discussed. The ions (Cr^{2+} ,V^{5+} , Cu^{2+} ,Cd^{2+} ,Fe^{2+} ,Ni^{2+} ,Co^{2+} ,Hg^{2+}) were interferences when the reagent react with manganese ,and can be eliminated approximately using suitable masking agent.

Keywords: 8-hydroxyquinoline, manganese (II), azo coupling, thermodynamic parameters.