Extraction-spectrophotometric determination of iron as the ternary tris(1,10-phenanthroline)-iron(II)-picrate complex

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A highly sensitive extraction-spectrophotometric method has been developed for the determination of iron based on the formation of a ternary complex with 1,10-phenanthroline as a primary ligand and picrate as a counter ion. The slightly soluble red-orange complex obtained in the pH range 2-9 is easily and completely extracted into 1,2-dichloroethane. The absorbance is measured directly in the organic phase at 510 nm against a reagent blank. Beer?s law is obeyed over the concentration range 0.1-3.6 ?g ml^{?1}, corresponding to 0.01?0.36 ?g ml^{?1} of iron in the aqueous solution. The apparent molar absorptivity and Sandell?s sensitivity were 1.3 × 10⁵ mol^{?1} cm^{?1} and 0.43 ng cm^{?2}, respectively. The interference of various ions was examined and the serious interferences arising from common metal ions, which are sometimes unavoidable in other methods, were not observed in the proposed method.