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Derivative Spectrophotometric Determination of Aluminium Using 2,4-Dihydroxybenzaldehyde Isonicotinoyl Hydrazone as a Complexing Agent

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A simple and sensitive spectrophotometric method for the determination of aluminium in aqueous solutions has been developed. Al(III) forms a soluble yellow coloured complex with 2,4-dihydroxybenzaldehyde isonicotinoyl hydrazone (2,4-DHBINH), which maximally absorbs at the wavelength of 395 nm and at the pH of 5.5. First order derivative spectrum exhibits maximum at 445 nm and crosses the wavelength axis at 394.6 nm. Beer's law is obeyed in the ranges: 0.03–0.40 μg mL^{-1} and 0.013–0.324 μg mL^{-1} of Al(III) form the zero order and first derivative methods, respectively. ε value for the zero order method was 5.1×10^4 L mol^{-1} cm^{-1}. Both methods were applied to the determination of Al(III) in silicate and carbonate minerals.