

The Optimal Absorption of Bilirubin Using an Optical Fibre Sensor.

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ABSTRACT: This paper describes an optical fiber sensor for the monitoring of bilirubin concentration and commonly called jaundice an open path optical technique is used to analyze the absorption lines of bilirubin within the Ultra Violet/ Visible region. By using a wavelength corresponding to a bilirubin absorption peak, the Beer-Lambert Law can be used to relate the concentration of bilirubin surrounding the sensing portion to the amount of absorbed light. In the initial experiment, the absorption cross section for MAS bilirubin a product from Thermo Scientific was investigated and compare with theoretical data. Initially, an empty cuvette was used to measure incident intensity when the light passes through the empty cuvette. Then a cuvette was filled with bilirubin sample before measured the transmitted intensity. The theoretical absorbance of bilirubin shows maximum absorption in the range of 400 nm to 600 nm. The experimental result shows the absorption line for measured MAS bilirubin is in similar pattern but the maximum absorbance shows in range 600 nm to 700 nm. This is due to the type of sample used in the experiment and high attenuation of the optical fiber used at the lower wavelength of UV light. Future work would be carried out to study the cross sensitivity of bilirubin absorption spectrum with other human blood molecules like hemoglobin (Hb), oxygen (O₂) and carbon dioxide (CO₂) to yield the best wavelength for the absorption.

Keywords: fibre optic sensor, bilirubin, absorption.