

ABSTRACT

**OPTICAL FIBER SENSOR QUASI GAUSSIAN BEAM FOR DETERMINING
CHOLESTEROL CONCENTRATION**

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The research of optical fiber sensor with Quasi Gaussian beam has been done to analyze the profile of the intensity of external light beam, sensor performance, sensor sensitivity to determine cholesterol concentration. Fiber optic sensor determines cholesterol concentration with laser propagation principle guided by fiber optic bundle in terms of solution intensity profile with cholesterol concentration varying from 0 to 300 ppm. The cholesterol concentration detection mechanism is the propagation of a He-Ne laser beam with a wavelength of 632.5 nm through an optical fiber bundle to a cholesterol solution, then reflected using a flat mirror or a concave mirror. Reflective waves enter fiber optic through receiving fiber. This signal is captured by a silicon detector (SL-818, Newport) in the form of an electric voltage. The results show that the power profile increases with the distance of the object shift from the optical fiber, after reaching the peak of the output power will decrease exponentially with increasing distance. The performance of the Gaussian Quasi optical fiber shift sensor to determine cholesterol concentration achieves high sensitivity, linearity and accuracy with a sensitivity value of 0.08 mV / ppm, linearity over 97%, linear range 0 - 300 ppm, resolution of 1.76 ppm and standard deviation of 0.14 mV. Sensitivity of sensors through mathematical analysis using the Quasi Gaussian beam approach is higher than the sensitivity in Gaussian beam. Based on the external power profile, sensor performance, sensitivity through the field of reflected flat mirror and concave mirror, Numerical Aperture (NA) value and sensor stability, it can be concluded that optical fiber sensor using Gaussian Quasi file can determine cholesterol concentration.

*Keywords : optical fiber sensor, Quasi Gaussian beam, sensor performance,
cholesterol concentration*