



## RESEARCH ARTICLE

EFFECTS OF 532 NM AND 671 NM LASERS IRRADIATION ON ABSORPTION COEFFICIENTS OF  
NORMAL AND ANEMIC HUMAN BLOOD SAMPLESImad Al - Deen Hussein Ali Al - Saidi<sup>1</sup>, Majdi Faisal Majeed<sup>2</sup> and Ikram Kamal Jasim<sup>1</sup>

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## Abstract

The effects of laser irradiation on the absorption coefficients of the normal and anemic human blood samples were investigated. Two continuous wave (CW) diode - pumped solid - state lasers (DPSSL's) of different wavelengths, 532 nm and 671 nm, were used. The output power of these lasers can be adjusted over the range 0 - 100 mW. In the present study, the output power of both lasers was fixed at 20 mW. The blood samples were irradiated at different irradiation times, 5, 15, and 30 min. The absorption coefficients of the normal and anemic human blood samples were determined from the measurements of the absorbance spectra of the unirradiated and irradiated samples. The absorbance spectra were measured using UV - Visible double - beam spectrophotometer operating over the wavelength range 190-1100 nm. Significant changes in the absorption coefficients of the irradiated blood samples were observed compared to the unirradiated blood samples. The results obtained in the present investigation showed that there are significant effects of laser irradiation on the optical properties of the human blood samples. These effects can result in noticeable changes in their absorption coefficients. The results suggested that the technique used in the present investigation has great potential to be a useful tool for the clinical diagnostics and the medical applications.

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## Introduction:-

Laser irradiation of blood and biological tissues has been increasingly used in many biological and medical applications [1 - 7]. For these applications, the knowledge of the optical properties of tissues is of great importance for the interpretation and quantification of the diagnostic data for the prediction of light distribution and absorbed energy for therapeutic use. Exposure of blood and biological tissues to the laser radiation can produce significant changes in the optical properties and the structures of these biological materials [3, 8, 9]. The effects of laser irradiation on the biological materials depend on the experimental conditions such as, the type of the biological material irradiated, the wavelength and the intensity of the laser radiation beam, and the irradiation time. The changes in the optical properties of the blood and the biological tissues can be determined from the measurements of the changes in optical parameters of the blood and the biological tissues such as, absorbance (A), transmittance (T), reflectance (R), refractive index (n), and absorption coefficient ( $\alpha$ ). For a better understanding of the responses of these parameters to the laser beam irradiation, further studies are needed to investigate the biological effects of interaction of laser radiation with biological materials. There are several techniques can be used for measuring the

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