

## MEASUREMENTS OF THIRD-ORDER SUSCEPTIBILITY OF 3-[[(4-METHYL-1-PIPERAZINYL) IMINO]-METHYL]- RIFAMYCIN VS USING Z-SCAN TECHNIQUE

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## ABSTRACT

The nonlinear optical properties of 3-[[(4-methyl-1-piperazinyl) imino]-methyl]rifamycin VS in Dimethyl sulfoxide (DMSO) solvent with different concentrations were studied using single beam Z-scan technique with a continuous-wave radiation at 532 nm of an output power of 3.34 mW. The Z-scan measurements indicated that the samples exhibited large nonlinear optical properties. The optical response was characterized by measuring the concentration dependent refractive index  $n_2$  of the medium using the Z-scan technique. The sample showed negative and large nonlinear refractive index values of the order of  $10^{-7}$ cm<sup>2</sup>/W and reverse saturable absorption with high values of the nonlinear absorption coefficient of the order of  $10^{-3}$  cm/W. The origin of optical nonlinearity in the samples may be attributed due to laser-heating induced nonlinear effect. These results indicate that the sample is a promising candidate for applications in the nonlinear optic field.

KEY WORDS-Nonlinear optics, Nonlinear refractive index, Z-scan, self-defocusing.

## **INTRODUCTION**

Materials with third-order optical nonlinearities have been investigated extensively for their applications in optical switching, optical phase conjugation, optical limiting devices, etc. It has been observed from the reported literatures and some theories that organic compounds have large third-order NLO susceptibility  $\chi^{(3)}$  value and fast response, [1-14] and are promising candidates for these nonlinear optical applications [15,16]. The nonlinear sample acts as a focusing lens when its nonlinear refractive index  $n_2$  is positive, but it

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