

Review Report Of

**PERFORMANCE AND EMISSION CHARECTERISTICS OF
BIO DIESEL WITH HYDROGEN ON FOUR STROKE DIESEL
ENGINE**

A thesis submitted in the partial fulfillment of the requirement for the *award for the degree of*

BACHELOR OF TECHNOLOGY

IN

MECHANICAL ENGINEERING

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CERTIFICATE

This is to certify that project report is entitled "**PERFORMANCE AND EMISSION CHARECTERISTICS OF BIO DIESEL WITH HYDROGEN ON FOUR STROKE DIESEL ENGINE**" was carried out by **T. SATISH (18815A0365), T. DURGA PRASAD (18815A0364), CH. MANI KANTA (18815A0387), V. PAVAN SAI (18815A0367)**, in partial fulfilment of requirements for the award of the Degree of Bachelor of technology in "**MECHANICAL ENGINEERING**" by Jawaharlal Nehru Technological University, Kakinada During the years 2018-2021.


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ABSTRACT

The foremost difficulties related to the use of biodiesel in CI engine are lower BTE and insignificant smoke emissions. These difficulties related to using biodiesel can be resolved by inducing gaseous fuels simultaneously along with primary fuel in CI engine. This paper confers the effect of the compression ratio on the engine on the performance, combustion, and emission characteristics of Niger seed (*Guizotia abyssinica*) oil methyl ester blend (B20) with simultaneous injection of hydrogen (gaseous fuel) at different flow rates. The studies were carried out on a variable-compression-ratio single-cylinder 4-stroke CI engine at 1500 rpm with three different compression ratios of 16, 17.5, and 18.5 and at three different hydrogen flow rates of 5 lpm, 10 lpm, and 15 lpm. The injection of hydrogen notably increased the brake thermal efficiency (BTE) with a significant reduction in brake-specific fuel consumption (BSFC). The combustion characteristics cylinder pressure (CP), net heat release rate (NHRR), and rate of pressure rise (RoPR) also increased drastically. Also, the emission of CO, UHC, and smoke opacity were reduced significantly with spike in NO_x emissions. The comparable trends were followed at all the three compression ratios, and the CR 18.5 has shown improved results at a flow rate of 15 lpm. At 15 lpm and CR 18.5, the BTE, CP, NHRR, RoPR, and NO_x values were increased by 7.3%, 7.68%, 12.36%, 21.08%, and 56.8%, respectively. Further, the BSFC, CO, UHC, and smoke opacity were reduced by 9.15%, 84.95%, 69.9%, and 59.78 % respectively.