ANALYSIS OF THE EFFECT OF USING PERTAMAX AND ESSENTIAL OIL FUEL MIXTURE VARIATIONS ON TORQUE, POWER, AND AIR FUEL RATIO (AFR) IN A 150 CC GASOLINE ENGINE

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ABSTRACK

The demand for efficient and environmentally friendly fuel has become a primary concern in the current automotive industry. Essential oil, as a natural bioadditive, holds the potential to enhance combustion quality and engine performance when blended with high-octane fuel such as Pertamax (RON 92). This study aims to analyze the effect of using variations of Pertamax and essential oil mixtures on engine performance, specifically torque, power, and Air Fuel Ratio (AFR), on a 150 cc gasoline motorcycle equipped with an Engine Control Unit (ECU) ignition system. The research method employed was an experimental study conducted in a laboratory using a dynamometer to measure torque and power, and an oxygen sensor to measure AFR. The tested fuel variations consisted of pure Pertamax and Pertamax mixed with essential oil at concentrations of 5%, 10%, and 15%. Testing was performed at various engine speeds to obtain comprehensive performance data. The results indicated that the addition of essential oil significantly influenced engine performance. The highest maximum power was produced by the mixture of Pertamax with 5% essential oil, reaching 14.2 HP, which showed a significant increase compared to pure Pertamax at 11.75 HP. Meanwhile, the best maximum torque among the mixture variations was achieved at a 15% essential oil concentration, recording 13.47 Nm, approaching the torque value of pure Pertamax at 13.5 Nm. The AFR values for the 5% and 15% mixtures were 12.99 and 12.94, respectively, indicating a rich mixture condition optimal for engine performance. In conclusion, the addition of 5% essential oil is recommended to optimally increase engine power.

***Keywords**: Pertamax, Essential Oil, Torque, Power, Air Fuel Ratio (AFR), 150 cc Gasoline Engine.*