**THE EFFECT OF PERTAMAX AND BUTANOL BLENDS ON ENGINE PERFORMANCE AND EXHAUST EMISSIONS OF A 4-STROKE MOTORCYCLE**

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# ABSTRACT

The increasing consumption of fossil fuels and vehicle exhaust emissions has driven the need for alternative, environmentally friendly fuels. This study aims to investigate the effect of mixing Pertamax fuel with butanol on engine performance and exhaust emissions of a 2019 Honda Vario 125cc motorcycle. The research employed an experimental method with a quantitative approach, testing engine performance (power and torque) and exhaust emissions (HC, CO, $CO_2$, and $O_2$) across several Pertamax-butanol fuel blend variations (P99B1, P98B2, P97B3, and P96B4). The results showed that adding butanol significantly increased engine power and torque, particularly with the P98B2 and P97B3 blends. Furthermore, the levels of harmful emissions such as CO and HC decreased as the proportion of butanol increased, indicating a more complete combustion process. Therefore, blending butanol with Pertamax has been proven to enhance engine performance while reducing harmful exhaust emissions, making it a promising and eco-friendly fuel alternative.

***Keywords :*** *Butanol, Engine Performance, Exhaust gas emissions, Motorcycle, Pertamax*