

## **ABSTRAK**

### **ANALISIS PENGARUH PENGGUNAAN FILTER UDARA BERBAHAN DASAR ARANG BAMBU TERHADAP PRESTASI MESIN BENSIN 4-LANGKAH TD200**

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Peningkatan jumlah kendaraan bermotor berdampak pada tingginya konsumsi bahan bakar dan emisi gas buang. Penelitian ini bertujuan untuk menganalisis pengaruh penggunaan filter udara berbahan dasar arang bambu teraktivasi fisik menggunakan *microwave* terhadap prestasi mesin bensin 4-langkah. Filter udara arang bambu dibuat dalam bentuk pelet dan diaktivasi secara fisik menggunakan *microwave* pada daya 60% selama 7 menit, dengan variasi susunan filter yaitu rapat tengah, tengah kosong, dan renggang. Parameter prestasi mesin yang dianalisis meliputi torsi, daya engkol, dan konsumsi bahan bakar spesifik (bsfc). Hasil pengujian menunjukkan bahwa penggunaan filter udara arang bambu teraktivasi fisik mampu meningkatkan nilai torsi dan daya engkol mesin serta dapat mengoptimalkan nilai bsfc dibandingkan kondisi tanpa menggunakan filter. Variasi filter dengan susunan rapat tengah memberikan peningkatan performa paling optimal, dengan kenaikan torsi sebesar 9,84% dan daya engkol sebesar 7,66% serta penurunan konsumsi bahan bakar spesifik engkol sebesar 7%. Dengan demikian, filter udara arang bambu berpotensi menjadi alternatif untuk meningkatkan efisiensi dan prestasi mesin bensin 4-langkah.

Kata kunci: arang bambu, bsfc, daya engkol, filter udara, mesin bensin 4-langkah, torsi.

## **ABSTRACT**

### ***Analysis of the Effect of Using Bamboo Charcoal–Based Air Filters on the Performance of a Four-Stroke Gasoline Engine TD200***

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*The increasing number of motor vehicles has resulted in higher fuel consumption and exhaust gas emissions. This study aims to analyze the effect of using an air filter made from physically activated bamboo charcoal using microwave irradiation on the performance of a four-stroke gasoline engine. The bamboo charcoal air filter was produced in pellet form and physically activated using a microwave at 60% power for 7 minutes. The filter arrangement was varied into three configurations: dense-center, hollow-center, and loose arrangement. The engine performance parameters analyzed include torque, brake power, and brake specific fuel consumption (bsfc). The test results indicate that the use of physically activated bamboo charcoal air filters can increase engine torque and brake power while optimizing bsfc compared to the condition without using the filter. The dense-center filter configuration provides the most optimal performance improvement, with an increase in torque of 9.84% and brake power of 7.66%, as well as a reduction in brake specific fuel consumption by 7%. Therefore, bamboo charcoal air filters have the potential to be an alternative solution to improve the efficiency and performance of four-stroke gasoline engines.*

**Keywords:** *air filter, bamboo charcoal, bsfc, four-stroke gasoline engine, power, torque.*