ABSTRAK

ANALISIS PENGARUH PENGGUNAAN FILTER UDARA BERBAHAN DASAR ARANG TEMPURUNG KELAPA TERHADAP PRESTASI MESIN BENSIN 4 LANGKAH TD200

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Bertambahnya jumlah kendaraan bermotor berbanding lurus dengan banyaknya konsumsi bahan bakar minyak dan emisi. Filter udara dibuat dari arang tempurung kelapa yang diaktivasi secara fisik menggunakan microwave dengan daya 60% selama 6 menit, kemudian dibentuk menjadi pelet dengan beberapa variasi kerapatan, yaitu tanpa filter, kerapatan tengah kosong, rapat tengah, dan renggang. Pengujian dilakukan pada variasi putaran mesin 2000 rpm, 2500 rpm, dan 3000 rpm. Data torsi, daya, dan bsfc diperoleh menggunakan sistem akuisisi data VDAS. Hasil penelitian menunjukkan bahwa penggunaan filter udara arang tempurung kelapa mampu meningkatkan torsi dan daya mesin serta menurunkan nilai bsfc dibandingkan dengan kondisi tanpa filter. Variasi filter dengan kerapatan tengah kosong memberikan peningkatan performa paling optimal, dengan kenaikan torsi sebesar 8,19% dan daya sebesar 7,21% yang signifikan serta penurunan konsumsi bahan bakar spesifik engkol sebesar 9,09% pada putaran mesin 2000 rpm. Dengan demikian, arang tempurung kelapa berpotensi dimanfaatkan sebagai bahan alternatif filter udara untuk meningkatkan prestasi mesin bensin 4 langkah.

Kata Kunci : Arang tempurung kelapa, bsfc daya, filter udara, mesin bensin 4 langkah, torsi.

ABSTRACT

Analysis of the Effect of Coconut Shell Charcoal–Based Air Filter Usage on the Performance of a TD200 Four-Stroke Gasoline Engine

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The increase in the number of motor vehicles is directly proportional to the growth of fuel consumption and exhaust emissions. Air filters made from coconut shell charcoal were developed to improve engine performance and efficiency. The coconut shell charcoal was physically activated using a microwave at 60% power for 6 minutes and then formed into pellets with several density variations, namely without filter, hollow-center density, solid-center density, and loose density.The experiments were conducted at engine speeds of 2000 rpm, 2500 rpm, and 3000 rpm. Torque, power, and brake specific fuel consumption (BSFC) data were obtained using the Vehicle Data Acquisition System (VDAS). The results show that the use of coconut shell charcoal air filters increases engine torque and power while reducing BSFC compared to the condition without a filter. The hollow-center density filter variation provides the most optimal performance, showing significant increases in torque and power as well as a reduction in specific fuel consumption at all engine speed variations. Therefore, coconut shell charcoal has potential to be utilized as an alternative air filter material to improve the performance of four-stroke gasoline engines.

Keywords : air filter, bsfc, coconut shell charcoal, four stroke engine, power, torque.