

Influences of Iron Oxide Nanomaterial and Hydrogen Addition Into Sunflower Biodiesel/Diesel Powered Diesel Engine Performance and Emissions

M. Ozcanli^{1,*}, E. Tosun², A. Calik³,

¹University of Çukurova, Department of Automotive Engineering, 01330, Adana, Turkey,
ozcanli@cu.edu.tr

²University of Çukurova, Department of Automotive Engineering, 01330, Adana, Turkey,
etosun@cu.edu.tr

³University Mersin University, Vocational School of Technical Sciences, 33110, Mersin, Turkey,
ac@mersin.edu.tr

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Abstract.

In this study, effects of iron oxide (Fe₃O₄) and hydrogen (H₂) additions into 20% sunflower biodiesel + 80% diesel (B20) operated compression ignition engine performance and emissions were evaluated. Diesel fuel (D) was selected as a reference fuel for comparison purpose. Reduced performance level with B20 can be recovered with use of nanoparticle and hydrogen due to their superior combustion characteristics. In comparison to diesel, B20 mixture have caused to reduction on power by 6,44% while addition of nanoparticle and hydrogen (H_B20_Fe) have increased power by 5,76%. B20 mixture led to decrease carbon monoxide (CO) emission by 7,92% whereas nanoparticle and hydrogen addition have caused further decrement by 12,35% compared to diesel. Diesel showed best nitrogen oxides (NO_x) emission characteristics of all. Increment levels were 7,24% and 12,94 for B20 and H_B20_Fe, correspondingly (This study was supported by Cukurova University Scientific Research Project Coordination FBA-2020-12687 project.).