Abstract

The crude oil graduate depletion, as well as aspects related to environmental pollution and global warming instigated many researches concerning alternative fuels. Natural gas (NG) is one of the most attractive available fuels. A promising technique for its use in internal combustion engines is the dual fuel concept. One of the main problems with this technique is that, at low loads, the engine efficiency decreases compared to conventional diesel. The unburned hydrocarbons and carbon monoxide emissions are also higher in dual fuel mode. An effective method to compensate the demerits of limited lean-burn ability and slow burning velocity of NG is to mix it with a fuel that possesses wide flammability limit and fast burning velocity. Hydrogen (H_2) is thought to be the best gaseous candidate for natural gas.In the present work, NG enrichment with various H_2 blends is investigated as a technique for improving dual fuel mode, especially at low loads. Impact on engine performance and emissions is experimentally examined. Total BSFC is considerably reduced. An important benefit in terms of BTE, reaching to increase a 12% with the 10%H_2 blend compared to the pure NG case, is also achieved. THC and CO emissions are in general reduced as a result of the improvement of gaseous fuel utilization. CO_2 emissions are also in general reduced. Even though a slight increase is in overall observed for NO_x emissions, it's almost insignificant