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Chapter 42

Effect of Nitromethane-*n*-Butanol-Diesel Blends on Diesel Engine Emissions



Naveen Kumar Sain, Ashish Nayyar, Chandan Kumar, K. B. Rana
and B. Tripathi

Abstract Toxic emissions from diesel engines are great contributors to localized urban and global pollution. Researchers have used different methods to reduce emissions in which the use of alternative fuels and additives seems to be potential solution in current scenario. The present study depicts the effects of nitromethane-butanol-diesel blends on the emissions of diesel engine. *N*-butanol (B) and nitromethane (NM) were selected as additives for diesel fuel due to their exceptional physico-chemical properties, availability in market, and cost. In the first phase, experiments were performed to optimize *n*-butanol-diesel blend on diesel engine, and in the second phase, nitromethane was blended in optimum *n*-butanol-diesel blend (B20) to evaluate the emission characteristics. A single-cylinder four-stroke, water-cooled VCR diesel engine was used for experimentation, and the results of emissions for NM-*n*-butanol-diesel blends were drawn and analyzed. Maximum reduction in smoke and NO_x was achieved up to 82.8% and 13.85%, respectively as compared to pure diesel.

Keywords Emission · Butanol · Nitromethane · NO_x · Smoke

42.1 Introduction

At present, diesel engines are major contributors in transportation and automobile sectors worldwide, and their toxic emissions are highly objectionable in natural environment [1]. NO_x and smoke are the two major emissions which put limit on power output from diesel engine and also have many adverse effects on environment as well as human health [2]. In current scenario, the immediate elimination of diesel

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