

Effects of different chemical additives on biodiesel fuel properties and engine performance. A comparison review

Obed Majeed Ali^{1,a}, Rizalman Mamat¹, Nik R. Abdullah², Abdul Adam Abdullah¹, Fitri Khoerunnisa³, Ratnaningsih Eko Sardjono³

¹Faculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600, Pekan, Pahang, Malaysia

²Faculty of Mechanical Engineering, Faculty of Mechanical Engineering, Universiti Teknologi MARA (UiTM) 40450 Shah Alam, Selangor, Malaysia

³Department of Chemistry, Indonesia University of Education, Bandung 40154, Indonesia

Abstract. Biodiesel fuel can be used as an alternative to mineral diesel, its blend up to 20% used as a commercial fuel for the existing diesel engine in many countries. However, at high blending ratio, the fuel properties are worsening. The feasibility of pure biodiesel and blended fuel at high blending ratio using different chemical additives has been reviewed in this study. The results obtained by different researchers were analysed to evaluate the fuel properties trend and engine performance and emissions with different chemical additives. It found that, variety of chemical additives can be utilised with biodiesel fuel to improve the fuel properties. Furthermore, the chemical additives usage in biodiesel is inseparable both for improving the cold flow properties and for better engine performance and emission control. Therefore, research is needed to develop biodiesel specific additives that can be adopted to improve the fuel properties and achieve the best engine performance at lower exhaust emission effects.

^a Corresponding author: obedmajeed@ump.edu.my