

# Experimental Studies of Engine Single Cylinder run on DieselBiodiesel-Butanol blends

Izuan Izzudin 1 , Ahmad Fitri Yusop 1, Syazwana Sapee 1, MA Hamidi 1, I.M. Yusri 1  
, R. Mamat 1, , Erdiwansyah 1,2

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

2 Fakultas Teknik, Universitas Serambi Mekkah, Aceh, Indonesia  
Email: [izuan.ump@gmail.com](mailto:izuan.ump@gmail.com)

## **Abstract:**

Biodiesel and butanol are excellent additive fuels, especially for diesel fuel. Many studies in the literature report that biodiesel-butanol with various ratios is applied to diesel engines. In this experiment, diesel engines operated using biodiesel-butanol blend in low proportions 5-5%, 5-10% 10-5%, 10-10%, 15-5% and 15-10% mixed with pure diesel, and the blend is characterized. This blend of fuels can be represented as B5Bu5, B5Bu10, B10B5, B10Bu10, B15Bu5 and B15B10 with a numeric number in the fuel blends. This fuel blend is used as test fuel which is operated on a single cylinder diesel engine, four steps, direct injection (DI) at a constant speed of 1200 rpm and engine load of 25% and 50%. The combustion characteristics, performance and engine emissions are analyzed and evaluated by comparing each load and the speed of the engine being operated. Furthermore, fuel additives with pure diesel are needed to check emissions from the engine when the engine is run with a blend of diesel-biodiesel-butanol fuel. Among the six fuel blends samples examined in this experiment, better performance was shown in the B5B10 blend and produced fewer emissions. The results of the whole experiment are presented in full in this paper.

**Keywords:** Cylinder Diesel Engine; Four Steps; Direct Injection (DI); Biodiesel-Butanol

## **ACKNOWLEDGMENT**

The authors would like to express their deepest gratitude to the University Malaysia Pahang (RDU190355 and RDU172204) for their financial assistance for this project.