**Impact of butanol-acetone mixture as an oxygenated fuel additive to diesel fuel on diesel engine performance and emissions.**

**Abstract**

Butanol-acetone (BA) is considered a “green” energy resource because it releases less emissions than other fuels such as biodiesel and is produced from biomass (agricultural waste and residues) that is non-edible such as lignocelluloses. Researchers produce acetone, butanol and ethanol (ABE) after the fermentation with a ratio (3:6:1). One study produce a mixture of butanol and acetone (2.9:1) with no ethanol from the fermentation process. This BA blend has 75% butanol (longer chain alcohol fuels C4H9OH than other bio alcohol such as ethanol) with high burning velocities that enhances the combustion process. In addition, acetone has some properties that can improve the blend properties. BA blend (2.9:1) can be utilized to decrease the cost of butanol separation and decrease diesel engine fuel emissions. The present work investigates the effect of BA-diesel blend on exhaust gases emissions and engine performance. The test was performed under different ratios of BA and variable engine speed using variable compression single cylinder diesel engine. This investigation has shown a slightly increased in brake power when BA 10% of the blend The brake specific fuel consumption (BSFC) have a slightly increased at all BA blend due to the lower heating value of BA compared with conventional fuel. The brake thermal efficiency (BTE) was clearly increased at all BA blend. CO emissions have decreased at all BA blend when compared with diesel at the same operating condition. CO2 emissions level has noticeably increased in speed 2000 and 2600 due to complete combustion consequently of high oxygen content of BA compared with conventional fuel. NO*x* has dramatically increased at all BA ratios due to increased burning velocity. However, the exhaust temperature has been clearly decreased at all BA blend.