

MT4-244

() ()
ExByDz
ECE R-96
(RPM) (RPM)
HC PM CO₂ CO
NO_x

Effect of Ethanol, Biodiesel and Diesel Blend Fuel on Performance and Pollutants Parameters of Diesel Engine

B.Najafi; R.Ebrahimzadeh; A.Hajir

ABSTRACT

In this research, for correction the combustion properties of biodiesel fuel, ethanol was added. Therefore, effect of using ethanol, biodiesel and diesel blend fuel on MT4-244 diesel engine performance pollutants emission parameters and emission were investigated. The biodiesel in this research produced from waste cooking oil that at (5, 10, 15, 20, 25 and 30% on volumetric basis) blended with Ethanol (2, 4 and 6%), and diesel fuel. So far, 18 samples including variable percent of three fuels were prepared which showed as BED forms. Engine testes were performed on ECE-R96 standard on full load and two engine rotations maximum torque (1300 RPM) and maximum power (2000 RPM). It was found increasing of biodiesel, decreased the pollutant emissions of CO, CO₂, PM and HC in comparison to diesel fuel but BSFC and NO_x emission increased. It also, Using biodiesel did not change the engine power and torque.

KEYWORDS : Alternative Fuels, Biodiesel, Ethanol, Performance Parameters, Pollutants Emission, Diesel Engine.

// :
// :

Najafib@uma.ac.ir :

i
ii
iii

[[[]] NO_x HC CO
[] [] [] [] []

[.]

[.]

B_xE_yD_z
z y x

:(.)

[.]

C ₁₆ H ₃₄	C ₂ H ₅ OH	C ₂₀ H ₃₉ O ₂	-	
/		/	-	
/	/	/	MJ/kg	
/	/	/	Cst	°C
/	/	/	g/cm ³	°C
		/	%W	

[] [] [] []

MT4-244

[.]

(.)



/ / / /

(rpm)

(rpm)

rpm

:()

mm		
mm		
Lit	/	
-	/	
hp		(rpm)
N-m) (rpm
rpm		

ECE R-96

:()

%	%	%	%	(rpm)	
	%	%	%	(rpm)	

()

(rpm rpm

()

()

:()

% %

rpm rpm

/ /

% %

rpm rpm

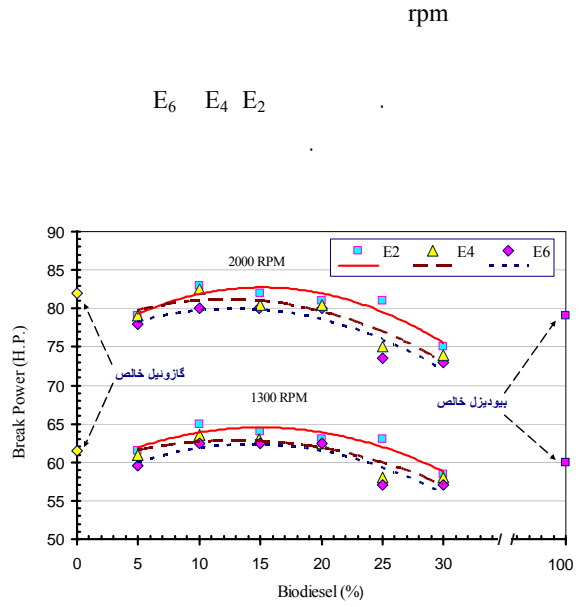
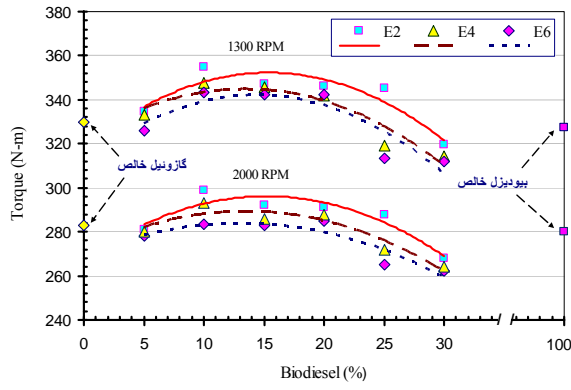
/

rpm

(/) /

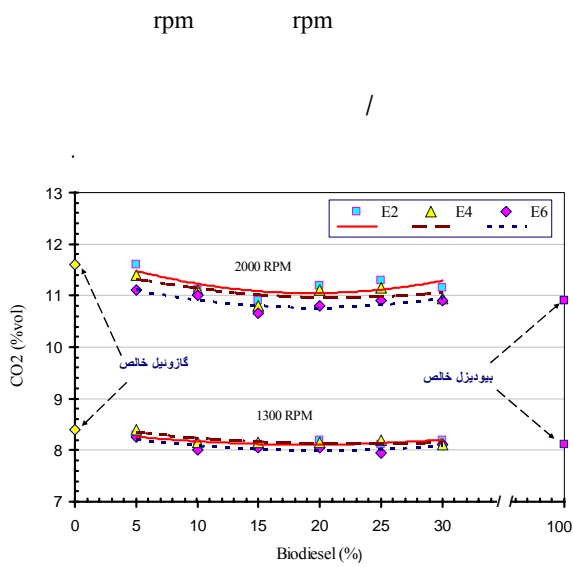
PMID CO	E400	
AVL Dicom Ditest Gbhm	A-8020	

/ / / /

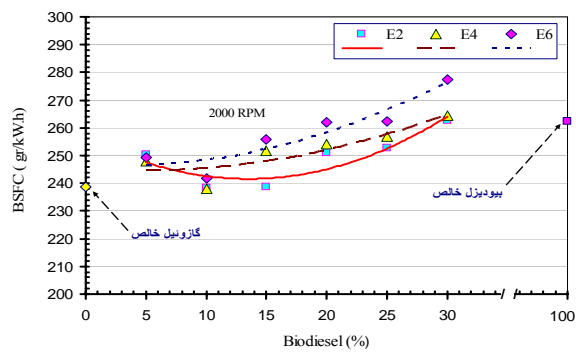


Archive of SID



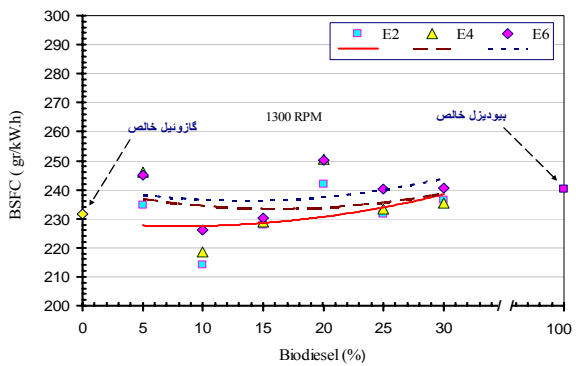


CO₂ (:)



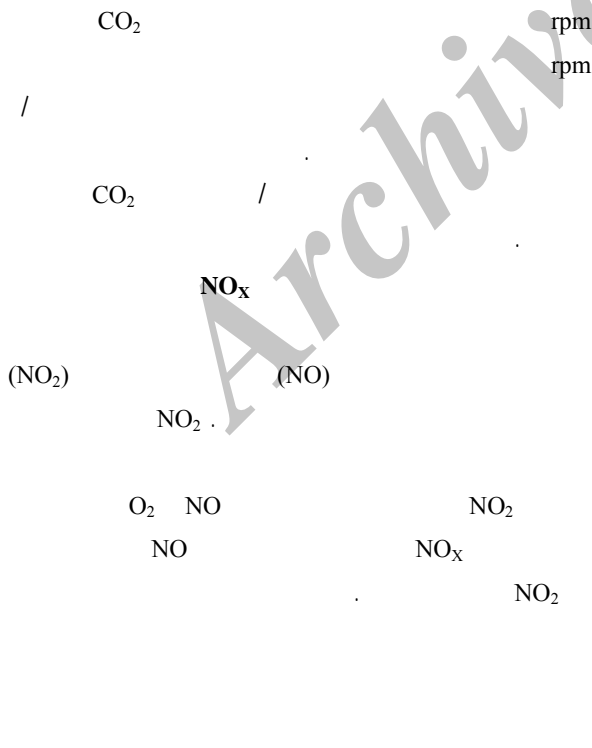
(rpm)

(:)



(rpm)

(:)



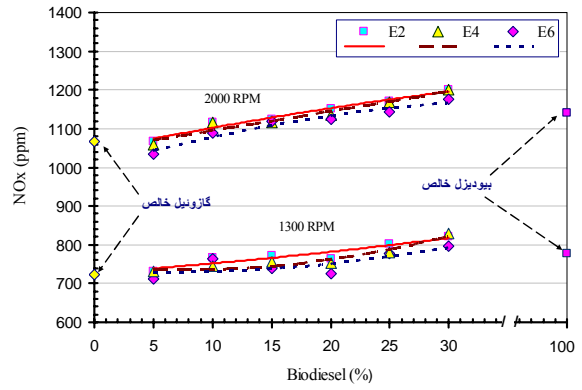
CO

(:)

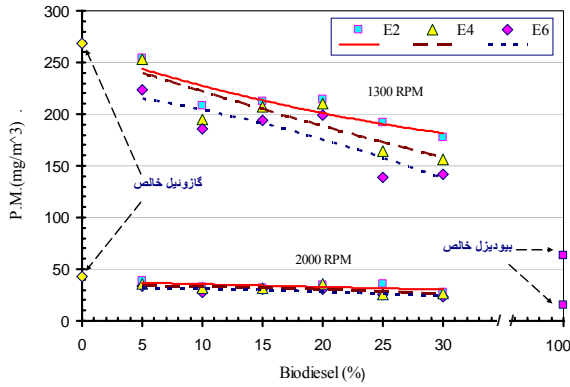
NO₂

NO

NO₂



[]



(NO_x)

(:)

NO_x

NO_x

NO_x

rpm

%

rpm

NO_x

rpm

rpm

PM

(:)

(PM)

PM

rpm

PM

rpm

PM

PM

/

PM



/ / / /

% % :

PM CO₂ CO
NO_x

B ₁₀ E ₂ D ₈₈			
	/	rpm	
		rpm	
		rpm	
		rpm	
		rpm	
/	/	rpm	(CO)
/	/	rpm	
/	/	rpm	(CO _v)
/	/	rpm	
	/	rpm	(NO _x)
		rpm	
/	/	rpm	(PM)
/	/	rpm	

Hamelinck C.; Faaij A.; "Outlook for Advanced Biofuels. Energy policy", vol.34, p.p.3268-3283, 2006.

Haran S.; Mathai I.; "Transesterification Reactions", Journal of Scientific and industrial Research, vol.33, p.p.178-187, 1974.

Lapuerta M.; Armas O.; GarciaContreras R.; "Stability of Diesel- Bioethanol Blends for Use in Diesel Engines", Biomass & Bioenergy, p.p.208-212, 2007.

Malca M.; Freire F.; "Renewability and Life-cycle Energy Efficiency of Bioethanol and Bio-Ethyl Tertiary Butyl Ether", Assessing the implications of allocation, vol.31, p.p.3362-3380, 2006.

Najafi B.; Piruzpanah V.; Ghobadian B.; "Experimental Investigation of Performance and Emission Parameters of a Small Diesel Engine Using CNG Biodiesel", JSAE, Paper No: 20076575 & SAE Paper No. 2007-32-0075.

Nye J.; Southwell P.; "Conversion of Rapeseed Oil to Esters for Use as Diesel Fuel", Elsevier Applied Science Publishers, p.p. 487- 490, 1987.

Rosenberg A.; Kaul H.; Senn T.; Aufhammer w.; "Costs of Ethanol Production from Winter Cereals:the Effect of Growing Conditions and Crop Production Intensity Levels", Mechanical Engineering, vol.15, p.p.91-102, 2002.

[]

[]

[]

[]

[]

[]

[]

Abdul M.; John H.; Garpen V.; "The Effect of Biodiesel Oxidation on Engine Performance and Emissions", Biomass & Bioenergy, p.p. 324-330, 2001.

Cormick M.; MichaelS R.; Tersal G.; Andrew A.; Herring M.; "Impact of Biodiesel Source Material and Chemical Structure on Emission of Criteria Pollutants from a Heavy-duty Engine", Environmental Science and Technology, vol.35, p.p. 1742-1747, 2001.

Engler C.; Johnson L.; Jegasophy H.; Reddy M.; Yarbrough C.; "Partial Intersterification of Plant Oils", Agricultural Reviews and Manaals, Agricultural Reserch Service, the U.S. Department of Agri culture, Arm-Nc-28, 71, 1983.

Fernando S.; Hanna M.; "Development of an Ovel Biofuel Blend Using Ethanol-Biodiesel-Diesel Microemulsions:EB-Diesel", Energy and Fuels, vol.18, p.p.1695-1703, 2004.

Gerdes K.; Suppes G.; "Miscibility of Ethanol in Diesel Fuels", Industrial and Engineering Chemistry Research, vol.40, p.p. 949-956, 2001.

[]

[]

[]

[]

[]

[]

¹ Full Load