Jurnal Teknovasi
Volume 08, Number 02, 2021, 59 – 64
ISSN : 2540-8389

ANALYSIS OF THE EFFECT OF ADDING ECO RACING ON PERTAMAX FUEL ON THE PERFORMANCE OF 2 STOCK MOTOR ENGINES

Dwi Hermawan[1]*, Amirsyam Nasution[2], Indra Hermawan[3]

University of Medan Area[1,2,3]
*E-mail:hermawandwi098@gmail.com

Submited : 15 Augustus 2020
Revision : 17 September 2020
Accepted : 01 October 2020

ABSTRACT

The technology of saving and reducing air pollution on motorized vehicles with fuel originating from petroleum continues to be researched. Fuel savings occur due to the depletion of petroleum supplies so that humans find technology to streamline engine performance, research is also carried out to find alternatives or add additives to motor vehicles. Materials that were not previously considered as additional fuel were tested and assessed for their feasibility as saving substances and reducing air pollution in vehicle exhaust emissions. Eco racing is one of the appropriate fuels to be used as an additive to vehicle fuel. The purpose of this study is to determine the changes in power and torque on the engine after using. Pertamax and Eco Racing. Specific fuel consumption produced by fuel. Pertamax and Eco Racing blends Pertamax and eco racing fuels. Based on the results of the tests that have been carried out, it can be concluded that. The phenomenon obtained from this test is that the power and torque produced are greater using pure Pertamax fuel, namely at 4000 rpm to 4200 rpm rotation, producing 8.6 kW of power, after 4200 rpm the power generated decreases at 4400 rpm. with the resulting power of 8.3 kW, then in the next round, namely at 5400 to 5600 rpm the power generated increases by 9 kW.

Keywords: Eco Racing, Pertamax, Composition and Power

INTRODUCTION

With the rapid development of the automotive world today, we as Indonesians are required to be more productive, both in terms of quality and quantity. The development of the automotive world in quality can be seen from the increasingly sophisticated automotive machines, especially motor vehicle engines. Meanwhile, in terms of quantity, it can be seen from the emergence of various types and types of new vehicles that are now starting to penetrate the Indonesian market, besides that, we can note this from the increasing density of motorized vehicles on the highway. The positive impact of the increasingly sophisticated and large number of motorized vehicles is the smooth flow of transportation and shortening travel time. While the negative impact is the problem of environmental pollution caused by exhaust gases from motor vehicles.

The combustion engine is one of the main driving elements of the combustion engine for vehicle engines, ranging from small to large vehicles. Therefore, the energy required varies greatly. The power

Jurnal Teknovasi
Volume 08, Number 02, 2021, 59 – 64
ISSN : 2540-8389

generated by the bakak motor comes from the combustion system. Some combustion systems use ignition and some use a high compression system (example 2 stroke engine). Combustion with the ignition system there are two cycle systems that we are familiar with, namely the 2 stroke and 4 stroke system. All existing systems aim for maximum power. In engines with a 2-stroke cycle system, 2T oil is used for the combustion process, besides being used to assist the combustion process, 2T oil is also used to assist the lubrication and cooling process. The use of 2T oil is only on engines with a 2 stroke cycle system, how, why and what happens, if biopremium is mixed with side oil used in the Kawasaki Ninja SS 150 engine (Suriansyah, 2010).

Pertamax is one of PT Pertamina's mainstay fuel types. Pertamax is highly recommended for use in vehicles that have a compression ratio of 10:1 to 11:1. It can also be gasoline-fueled vehicles that use technology equivalent to Electronic Fuel Injection (EFI). With ecosave technology, Pertamax is able to clean the inside of the machine.

METHOD

Torque

Torque is a measure of the engine's ability to do work, namely moving or moving a car or motorcycle from rest to running. For this reason, torque is related to acceleration and under engine rotation.Torque is a measure of an engine's ability to do work, so torque is an energy. The amount of torque is a derived quantity commonly used to calculate the energy produced by an object rotating on its axis. The formulation of the torque is as follows.

$$T = Fb$$

with:
T = torque of rotating object (Nm)
F = the circumferential force of the rotating object (N) b = the distance of the object to the center of rotation (m)

Power

Engine power is the relationship between the engine's ability to produce maximum torque at certain rounds. Power describes the amount of machine work output related to time, or the average work produced. Generated powerof the combustion process in the cylinder and is usually called the power indicator. The power is applied to the piston working back and forth in the engine cylinder. So in the engine cylinder, energy changes from the chemical energy of the fuel by the combustion process to mechanical energy in the piston.

Specific Fuel Consumption

*Specific fuel consumption*or Sfc states the amount of fuel consumed by the motor to produce 1 HP of power for 1 hour. The lower the Sfc value, the lower the fuel consumption used. The following is the result of measuring specific fuel consumption.

The motorcycle used in this study is the Kawasaki Ninja 150SS with the following specifications:
W x L xQ: 1,975 x 719 x 1,090
cylinder volume: 150 cc
TorqueMaximum: 21.6 Nm / 9,000 Rpm
Maximum power: 30.1 SI/10.500 Rpm

Data collection in the form of power and torque produced is measured using a dynamometer or

Jurnal Teknovasi
Volume 08, Number 02, 2021, 59 – 64
ISSN : 2540-8389

dynotest.

RESULTS AND DISCUSSION

A. Results and discussion using Pertamax mixed fuel with Eco Racing

The results and discussion below are the value of mixing Pertamax and Eco Racing fuel mixtures from the Dynotes testing tool which obtained the rpm, power, torque, specific fuel consumption values as shown in table 1.

Table 1. Data From The Results Of The Pertamax Mixed Fuel Dynotest Test With Eco Racing

e/g rpm	Power (KW)	e/g power (Kw)	Torque Nm	e/g torque Nm
4000	3.6	5	8.5	11.7
4200	3.8	5.2	8.5	11.6
4400	3.9	5.4	8.3	11.4
4600	4.2	5.7	8.5	11.6
4800	4.3	6	8.5	11.6
5000	4.5	6.2	8.5	11.7
5200	4.8	6.6	8.7	11.9
5400	5.1	6.9	8.8	12
5600	5.4	7.3	9	12.2
5800	5.5	7.4	8.9	12

1. Power relationship with rotation

It can be seen in graph 1. the line on the graph of pure Pertamax fuel is at 4000 rpm to 4200 rpm, producing 8.6 kW of power, after 4200 rpm the power produced decreases at 4400 rpm with a power generated of 8.3 kW, then in the next round, namely at 5400 to 5600 rpm the power generated increased by 9 kW. In the mixing of Pertamax with Eco Racing, the lowest power produced at 4000 rpm rotation is 5 kW, then increases to 5600 rpm with a power generated of 7.3 kW. It can be seen in the graph that the power generated is greater using pure pertamax compared to mixing pertamax with eco racing.

2. Torque relationship with rotation

In graph 2. the line on the graph is pure pertamax fuel with a rotation of 4000 rpm the torque produced is 14.0 Nm then the torque decreases to 4400 rpm with a torque of 13.7 Nm, after that it increases to 5800 rpm with a torque of 13.7 Nm. Generated 14.4 Nm. In the graphic line, the mixture of Pertamax and Eco racing at 4000 rpm, the torque produced is 11.7 Nm, and then at 4400 rpm the torque produced decreases to 11.4 Nm. After the rotation, the torque produced increases to 5600 rpm with a torque of 12.2 Nm, and then decreases again at 5800 rpm with a torque of 12 Nm. Compared to mixing pertamax with eco racing, pure pertamax produces much greater torque.

Jurnal Teknovasi
Volume 08, Number 02, 2021, 59 – 64
ISSN : 2540-8389

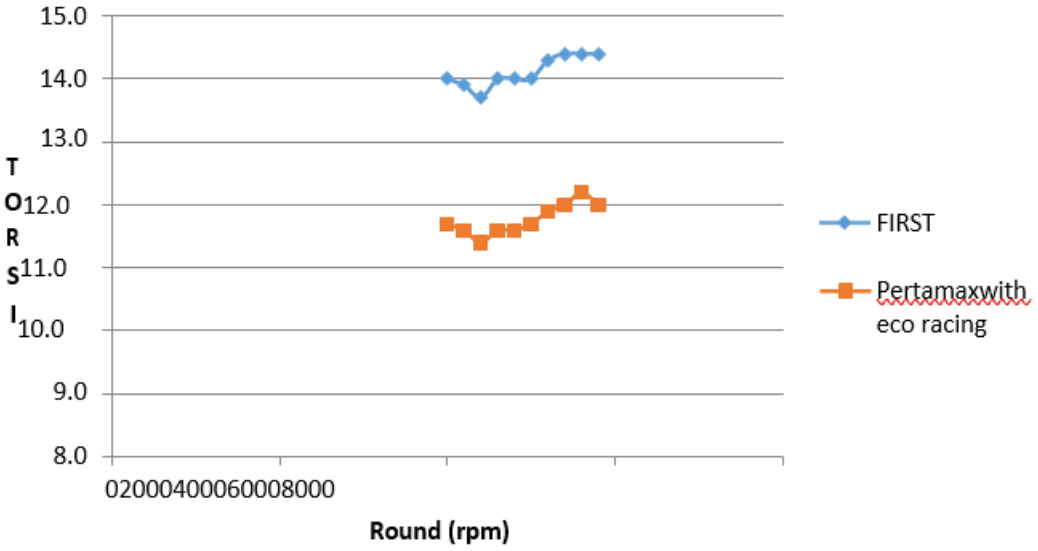

Figure 1. Torque Comparison To Engine Speed

3. Specific Fuel Consumption Relationship With Speed

This test also needs to know the efficiency of the value of fuel consumption in mixing Pertamax with Eco Racing with the aim of knowing how much the value of fuel consumption used in this study is as described below using the specific fuel consumption formula (Sfc) in order to get a value that can be calculated. accountable based on the formula used, and can be explained to the community so that the community understands and understands this exam.

The calculation steps are as follows:

Fuel consumption is one of the benchmarks in this study as shown in Table 3. below.

Table 3 Value of Pertamax fuel consumption with eco racing

e/g rpm	Power (kW)	e/g power (kW)	Torque Nm	e/g torque Nm	m_f	sfc
4000	3.6	5	8.5	11.7	0.000667333	0.000133467
4200	3.8	5.2	8.5	11.6	0.000667333	0000128333
4400	3.9	5.4	8.3	11.4	0.000667333	0.00012358
4600	4.2	5.7	8.5	11.6	0.000667333	0.000117076
4800	4.3	6	8.5	11.6	0.000667333	0000111222
5000	4.5	6.2	8.5	11.7	0.000667333	0.000107634
5200	4.8	6.6	8.7	11.9	0.000667333	0.000101111
5400	5.1	6.9	8.8	12	0.000667333	9.67149E-05
5600	5.4	7.3	9.0	12.2	0.000667333	9.14155E-05
5800	5.5	7.4	8.9	12	0.000667333	9.01801E-05

Graph 3. shows that the decrease in fuel consumption continues to occur in the mixing of pertamax with eco racing occurs at 4000 rpm rotation with a value of 0.000133467 kg/kW.s, to 5800 rpm with a value of 9.01801 kg/kW.s. Then in pure pertamax slightly increased from 4000 rpm rotation where the specific fuel consumption with a value of 0.00011307 kg/kW.s increased to 4400 rpm rotation with a value of 0.00011716 kg/kW.s. after that it increased to 5800 Rpm round with a value of 0.00010804 kg/kW.s.

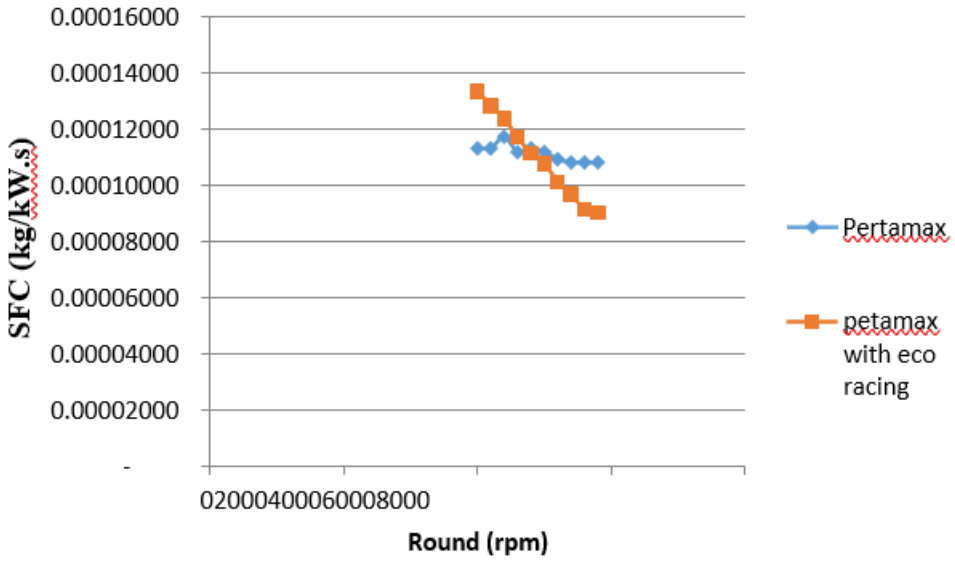

Figure 2. comparison of fuel consumption to rotation

CONCLUSION

The mixture of Pertamax and Eco Racing has the lowest power produced at 4000 rpm, which is 5 kW, then increases to 5600 rpm with a power output of 7.3 kW. The power generated is greater using pure pertamax compared to mixing pertamax with eco racing. The mixture of Pertamax and Eco Racing at 4000 rpm produces 11.7 Nm of torque, and then at 4400 rpm the torque produced decreases to 11.4 Nm. After the rotation, the torque produced increases to 5600 rpm with a torque of 12.2 Nm, and then decreases again at 5800 rpm with a torque of 12 Nm. Compared to mixing pertamax with eco racing, pure pertamax produces much greater torque. Specific fuel consumption of Pertamax and eco racing mixtures at 4000 rpm with a value of 0.000133467 kg/kW.s, up to 5800 rpm with a value of 9.01801 kg/kW.s. Then in pure pertamax slightly increased from 4000 rpm rotation where the specific fuel consumption with a value of 0.00011307 kg/kW.s increased to 4400 rpm rotation with a value of 0.00011716 kg/kW.s. after that it increased to 5800 Rpm round with a value of 0.00010804 kg/kW.s.

REFERENCE

[1.] Iswanto. (2012). Analysis of Pressure Variations in Injectors on Performance (Torque and Power) on Diesel Motors. Technical Journal.
[2.] K, R.a. (2008). Energy Conversion Engine. Semarang: UNNES.
[3.] P, N. (2013). Effect of Type of Gasoline Fuel and Variation of Compression Ratio on Torque and Power on Suzuki FL 125 SP Motorcycle in 2007. Journal of FKIP UNS, 1-11.
[4.] R, A. a. (2016). Structure and Morphology of Lanthanium Silicate Apatite Electrolyte Based on Rice Husk Silica. Materials and Energy Indonesia, 1-6.
[5.] Senior high school. (2013). Analysis of Ignition Degree Variations on Engine Performance. 58-64.

[6.] Suriansyah. (2010). Effect of Combination of Biopremium Fuel and Side Oil on Exhaust Emissions in 2 Stroke Motorcycles Vespa 81. PROTON, 28-34.
[7.] Suyatno, A. (2010). Effect of Heating Fuel with Radiator as an Effort to Improve Gasoline Engine Performance. PROTON, 23-27.
[8.] Utami, L. (2009). Making Ethanol from Noni Fruit. Journal of Chemical Engineering.