

## Sample of Level 3 Editing

The effects of ~~fuel physical and chemical properties~~ of VOME fuels on the ~~DI diesel~~ engine performance, exhaust emissions, and combustion characteristics ~~for of~~ DI diesel engines

### Abstract

Vegetable oil methyl ester (VOME) ~~which is~~ produced through the trans-esterification ~~from of~~ vegetable oil and can be ~~is~~ used as biodiesel in diesel engines ~~for solving the problems of global warming and higher oil price due to its~~ as a renewable, nontoxic, and ~~potentially~~ environmentally friendly ~~fossil fuel alternative in light of growing concerns regarding global warming and increasing oil prices~~ properties. This study used ~~eight kinds of~~ VOME fuel produced from eight different oil bases to conduct a series of engine tests ~~for to~~ investigating the effects of ~~VOME fuel physical and chemical properties~~ on the ~~DI diesel engine performance, exhaust emissions, and combustion characteristics at three different engine speeds and at various gradational engine load conditions~~ offer a ~~commercial~~ diesel engine. The experimental results showed that using VOME in an unmodified DI diesel engine ~~has yielded a~~ higher brake specific fuel consumption (BSFC) due to ~~the its~~ VOME fuel's lower calorific value. The ~~H~~high cetane ~~number-rating~~ of VOME ~~has also imparted a~~ better ignition quality and the high intrinsic ~~high~~ oxygen content ~~advanced~~ the finish time of the ~~heat release rate (HRR) during the in-ignition delay period. The~~ Earlier start of combustion and ~~fast the rapid~~ combustion rate ~~speed~~ lead to a drastic increase in the HRR and the in-cylinder combustion pressure (ICCP) ~~raised rapidly in during the~~ initial premixed combustion phase. ~~And A more greater extent of complete~~

#### Comment [WC1]:

##### TUTOR – convention:

In scientific writing, researchers seldom make outright claims unless they are widely accepted facts. In these situations it is best to precede these claims with terms such as “purported” or “potential”.

**Comment [WC2]: CHECK:** Please define DI and then include it in parentheses.

#### Comment [WC3]:

##### TUTOR – convention:

Always write the term in full the first time you introduce it, then write the acronym in parentheses after. Afterwards you only need use the acronym

Example: ‘... on spark ignition (SI) engine performance. The exhaust emissions for SI engines...’

**Comment [WC4]: CHECK:** Is the engine used commercially available? If so, indicate that it is.

**Comment [WC5]: CHECK:** Is this a conventional variable? I’m familiar with some variables used in engine testing, however I have not heard of this term. Would rate of heat dissipation be better?

combustion ~~process causes~~ resulted in higher peaks of HRR and ICCP as well as near TDC position. ~~Therefore, the~~ Thus, it was found that a diesel engine fueled with VOME ~~can~~ could potentially produce the same engine power as one fuelled with petroleum diesel, but with a reduction ~~on~~ in the exhaust gas temperature (EGT), ~~as well as~~ smoke and THC emissions, albeit with a slight ~~but~~ increase ~~the~~ in nitrogen oxide (NOx) emissions ~~slightly~~. In addition, VOME ~~which has~~ possesses shorter ~~length of~~ carbon chains, more saturated bonds, and a higher oxygen content which also ~~produce~~ yields a lower EGT as well as reduced smoke, THC, and NOx emissions. However, this is obtained at the detriment of an increased ~~except the~~ BSFC ~~is increased among eight kinds of VOME~~.

Keywords: Vegetable oil methyl ester, ~~T~~ transesterification, ~~B~~ biodiesel, ~~F~~uel physical and chemical ~~fuel~~ properties, ~~E~~ngine performance, ~~E~~xhaust emissions, ~~C~~ombustion characteristics

## 1. Introduction

~~Nowadays~~ Currently, the ~~main~~ major source of energy used across the globe ~~supplying still depend on~~ is still obtained from fossil ~~fuels~~ energy, in the forms of ~~such as~~ oil, coal, and natural ~~gas~~ all over the world. However, ~~the reserves of~~ these fossil ~~fuels~~ energy are ~~limited~~ non-renewable, disproportionately distributed in certain regions of the world, and ~~may be~~ are likely to be exhausted in the near future. In recent years, ~~T~~ the demands for energy have grown very ~~fast~~ quickly due to the rapid development of ~~world~~ economies ~~certain growing economies~~ in recent years,

### Comment [WC6]:

#### TUTOR – tense:

Incorrect: ‘causes’

Correct: ‘resulted in’, ‘caused’

Reason: Earlier in the paragraph you used the past tense (‘this study used...’), so the tense should be consistent throughout the paragraph.

### Comment [WC7]: CHECK:

Please define TDC and then include it in parentheses.

### Comment [WC8]: CHECK:

What does ‘near TDC position’ mean and how is it related to the combustion process? Do you mean ‘...HRR and ICCP peaks closer to the TDC position’? Please clarify

### Comment [WC9]: CHECK:

Please define.

### Comment [WC10]: CHECK:

Does this mean the BSFC is increased for all of the eight different kinds of VOME compared to petroleum diesel? Or does the BSFC vary between the different kinds of VOME?

### Comment [WC11]:

#### TUTOR – word choice:

Okay: ‘nowadays’

Better: ‘currently’

Reason: ‘nowadays’ is colloquial, whereas ‘currently’ is more academic.

especially in Asia and the Middle East. The International Energy Agency (IEA) has forewarned of an oil shortage ~~because of~~ due to the imbalance between oil supply and demand. This supply ~~ing crunch~~ deficit will ~~cause a~~ have serious ~~impact~~ implications for ~~on~~ many non-oil producing countries which are ~~mainly~~ dependent on oil imports. ~~On the other hand~~ Furthermore, the extensive use of fossil ~~fuel~~ energy has ~~also~~ increased the production of greenhouse gases, especially ~~in~~ carbon dioxide (CO<sub>2</sub>), thus ~~leading to~~ exacerbating the greenhouse effect. ~~For example, the climate change caused by the greenhouse effect has influenced the development of ecological environment.~~ In order to stem climate change due to the ~~reduce the production of~~ anthropogenic production of greenhouse gases ~~effectively~~, international policies such as the Kyoto Protocol ~~committed the party have been~~ instigated to reduce ~~its~~ the overall global greenhouse gas emissions ~~of greenhouse gases to a minimum of at least~~ 5% below ~~that of levels in 1990 levels~~ in during the commitment period from 2008 to 2012.

~~Many worldwide countries especially in non-oil producing countries actively search for the alternative energy.~~ Much international research, particularly in non-oil producing countries, is being carried out in an effort to find alternative sources of energy. Biomass, solar energy, and hydrogen are the three major types of alternative energy currently being widely researched internationally; ~~as~~ because these energy sources which have ~~ability~~ the potential to both reduce ~~the reliance on~~ fossil fuel ~~reliance~~ energy and the ~~rapid~~ release of CO<sub>2</sub> to the atmosphere ~~at the same time are researched and promoted in the world.~~ Biomass is ~~a renewable energy that~~ not only ~~provides a~~ renewable energy resource but also has clear benefits ~~to the globe for the environmental protection,~~ particularly with regard to emissions. Therefore, at the present time, biomass is the most promising ~~feasible~~ selection ~~candidate as a~~ to

**Comment [WC12]:**  
**TUTOR – Phrase choice:**  
 Incorrect: ‘on the other hand’  
 Correct: ‘furthermore’; ‘in addition’  
 Reason: ‘on the other hand’ suggests that the following sentence has an opposite meaning to the previous statement.  
 Example: ‘I think this could be a good opportunity for your career. *On the other hand* I think it is a bit risky.’

**Comment [WC13]: CHECK:** Does this mean less than or equal to 95% of greenhouse gas levels in 1990? If so, this sentence is correct.

**Comment [WC14]:**  
**TUTOR – word choice:**  
 Okay: ‘ability’  
 Better: ‘potential’  
 Reason: ‘ability’ suggests an active skill which inanimate objects do not have.  
 Example: ‘His *ability* to charm clients is invaluable to our company.’  
 ‘Nuclear fusion has the *potential* to provide us with large amounts of energy whilst not harming the environment.’

**Comment [WC15]:**  
**TUTOR – word choice:**  
 Okay: ‘selection’  
 Better: ‘candidate’  
 Reason: ‘selection’ suggests it has already been chosen, whereas ‘candidate’ suggests that it is an potential option.  
 Example: ‘The eagle is one of the top *candidates* for our new company logo.’

substitute for fossil energy ~~at present~~. Biodiesel is ~~one a form of the~~ biomass. ~~More specifically, it is defined as~~ the mono alkyl esters of long-chain fatty acids derived from renewable lipid feedstocks, such as vegetable oils and animal fats, ~~formulated for use in compression ignition (CI) engines. Biodiesel that has similar fuel properties with to PD~~ can be ~~directly used directly~~ or mixed with PD in diesel engines with a little ~~or to no engine modification on engine structure and parameters~~.

Vegetable oil methyl ester (VOME) which is produced through ~~the~~ trans-esterification ~~from of~~ vegetable oils is commonly used as biodiesel in diesel engines ~~around the~~ worldwide. The use of VOME as a fuel has been widely investigated. A number of researchers have ~~been~~ demonstrated that using VOME ~~fuels~~ in diesel engines can reduce the production of CO<sub>2</sub> ~~when over~~ the whole life-cycle ~~of fuel production and combustion is considered~~. Also, ~~the~~ higher oxygen content (approximately 11 ~~w/w~~ ~~higher~~) and consequent lower energy content of VOME ~~fuels causes results in a the~~ reduction in engine torque and power ~~due to its lower energy content~~. However, some researchers ~~have also~~ reported that VOME can produce the same engine power as PD, because ~~its the~~ better ignition quality and ~~higher~~ intrinsic oxygen content available ~~in for~~ combustion ~~process provide allows more complete a greater degree of combustion~~. The ~~more complete improved~~ combustion also ~~decreases~~ reduces the amount of ~~the~~ smoke and THC emissions ~~efficiently~~. ~~On the contrary~~ ~~Conversely~~, a slight increase ~~on in~~ NOx emission is ~~obtained observed~~ due to a higher combustion temperature. In addition, a lower exhaust gas temperature (EGT) ~~was observed due to the lower energy content and higher combustion efficiency~~.

The ~~worldwide using condition~~ current global use of VOME is related ~~with to~~ the specific climates, agricultural policies, and environmental laws of ~~different each~~

**Comment [WC16]: CHECK:** Does this stand for 'petroleum diesel'? Please define and include the acronym in parentheses.

**Comment [WC17]:**  
**TUTOR – grammar:**  
Incorrect: '... in diesel engine'  
Correct: '... in a diesel engine', or '...in diesel engines'  
Reason: As you are referring to many engines, you must use the plural.  
Example of using singular: '... increases the fuel consumption of a diesel engine.'

**Comment [WC18]:**  
**TUTOR – convention:**  
For scientific papers, chemical concentrations are usually quoted as '%x/x', where 'x' is either weight (w or wt), mass (m) or volume (v).  
Example: 10 %w/v = 10 unit weight per 100 unit percent volume

**Comment [WC19]:**  
**TUTOR – word choice:**  
Okay: 'provide'  
Better: 'allow'  
Reason: 'provide' suggests it imparts something that wasn't previously there, whereas 'allow' refers to a change in the extent.  
Example: 'The conference *provided* the graduates an opportunity to network with their peers.'

**Comment [WC20]: CHECK:** Are you referring to a particular research paper? If so, you should include the reference.

countries. Palm oil, soybean oil, and rapeseed oil are the most commonly used vegetable oils in the world, as can be seen in Table 1. In the United States, VOME made from soybean oil are-is commonly used as biodiesel-in this country. In Europe, rapeseed oil is the most widely-readily available oil used to produce VOME. In the regions of tropical climate, such as Malaysia and Indonesia, palm oil is the most common base oil used in VOME production. Some-In certain regions, other vegetable oils such as peanut oil, sunflower oil, palm kernel oil, and various others types are also used to produce VOME fuel for diesel engines-at certain regions.

As shown in Fig.1, the demand for vegetable oil has raised increased rapidly every year. For example, More specifically, the amount of major vegetable oil consumption is has increased from approximately 100 million metric tons to 125 million metric tons in the period from 2003 to 2007. It is This indicatesd that VOME is becoming more and more increasingly popular in the worldwide due to the environmental benefits, such as reduced emissions, affected by its VOME fuel's particular specific fuel physical and chemical fuel properties (e.g. viscosity, calorific value, density, chemical composition, mixing properties, and octane number). For example, the physical and chemical properties of VOME, such as viscosity, calorific value, density, chemical composition, mixture properties, and cetane number have a direct effect on the exhaust emissions and engine performance through the injection, ignition and combustion processes.

In this studywork, eight kinds of VOME produced from eight different base oils which are used were used as test fuels in an unmodified, commercially available, single cylinder DI diesel engine to conduct a series of engine tests forto investigating the effects of VOME fuel on a DI diesel engine. The eight base oils that were chosen

**Comment [WC21]: CHECK:** Would 'consumption of' be more appropriate?

**Comment [WC22]: CHECK:** You should include the year from which the amount starts increasing.

Example: '...increased rapidly every year since the year 2003'

**Comment [WC23]:**

**TUTOR – word choice:**

Okay: 'more and more'

Better: 'increasingly'

Reason: 'more and more' is somewhat colloquial, whereas 'increasingly' is more academic.

**Comment [WC24]: CHECK:** This

argument is somewhat inadequate because an increase in consumption is not necessarily due to the environmental benefits of the fuel, it might be because it is cheaper. Perhaps replace 'indicate' with 'suggests' or rearrange the sentence.

Example: 'The increasing popularity of VOME may be due to...'

**Comment [WC25]: CHECK:** Octane?

**Comment [WC26]:**

**TUTOR – word choice:**

Okay: 'work'

Better: 'study'

Reason: a piece of academic writing is usually referred to as a 'study' whereas 'work' is usually a more generalized term reserved for a particular researcher's specific line of research.

Example: 'Einstein's pioneering work in the field of colloidal particles helped him...'

for this study are all commonly used worldwide and suitable for domestic development, including The VOME fuels used for testing were as follows: soybean oil methyl ester (SOME), peanut oil methyl ester (PNOME), corn oil methyl ester (COME), sunflower oil methyl ester (SFOME), rapeseed oil methyl ester (ROME), palm oil methyl ester (POME), palm kernel oil methyl ester (PKOME), and waste oil methyl ester (WOME) are used as test fuels fueling in unmodified single cylinder DI diesel engine to conduct a series of engine tests for investigating the effects of the fuel physical and chemical properties of VOME on DI diesel engine. The experimental data results from using for each VOME test fuel are were first compared with PD first, and then compared to each of the make an advanced analysis among other eight kinds of VOME test fuels. Furthermore, we use the combustion characteristics, such as the heat release rate and the in-cylinder combustion pressure were measured to demonstrate gauge the effects of fuel physical and chemical properties of VOME fuel on DI diesel engine performance and exhaust emissions.

**Comment [WC27]: CHECK:** What does this mean? Please clarify and elaborate as to how a fuel is considered “suitable for domestic development”.

**Comment [WC28]:**  
**TUTOR – convention:**  
Scientific writing aims to be purely objective. As such personal pronouns such as ‘we’, ‘I’, ‘they’, are usually not used.  
Example: Incorrect: ‘I used a pipette.’  
Correct: ‘A pipette was used.’