Biodiesel Is The Future Of Energy
The Production of Sustainable Biofuel From Poultry Fats

By:
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Presentation Outline:

1. Introduction.
2. The Benefits of Biodiesel.
3. Research Methodology.
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Section 1: Introduction
Introduction

- The demand for fossil fuels as an energy source in recent decade has been dramatic.

- Many hydrocarbons reservoirs are depleted every day around the world.

- The utilizing of fossil fuels for instance, natural gas and coal as an energy source are emitted huge quantities of carbon dioxide to our environment & contributed in global warming phenomenon.
The passive environmental consequences of fossil fuels and the bother about fossil fuel supplies have encouraged the investigation for renewable biofuels for example, biogas and biodiesel.

Biodiesel may consider as quite reliable fuel due to several advantages for example, reduces engine wear, reduce the global warming phenomenon, reduces carbon dioxide emissions up to 80% than petroleum diesel. Sustainable energy source and cheaper than petroleum diesel.
- Biodiesel is renewable and clean burning fuel that is made from waste vegetable oils, animal fats, or recycled restaurant grease for use in diesel vehicles.

- Biodiesel produces less toxic pollutants and greenhouse gases than petroleum diesel.

- It can be used in pure form (B100) or can be blended with petro-diesel in the form of B2 (20% biodiesel, 80% petrodiesel), B5 (5% biodiesel, 95% petrodiesel) or B20 (20% biodiesel, 80% petrodiesel).
Biodiesel could be obtained from many biological resources for instance, vegetable oil & alga.

Therefore, this study is aimed to produce a reliable biodiesel from poultry fats for instance, chicken fat.

Moreover, in the present investigation an attempt has been achieved to utilized chicken fat as low cost renewable feedstock to produce biodiesel.
• The produced biodiesel is also subjected into several laboratory tests for example, density, cloud point, pour point and cetane value and the results have been compared well with ASTM standards.
Section 2: The Benefits and Advantages of Biodiesel
Produced from Renewable Resources:

- Biodiesel is a renewable energy source unlike other petroleum products that will vanish in years to come.

- Since it is made from animal and vegetable fat, it can be produced on demand and also causes less pollution than petroleum diesel.
Can be Used in existing Diesel Engines:

One of the main advantages of using biodiesel is that it can be used in existing diesel engines with little or no modifications at all and can replace fossil fuels to become the most preferred primary transport energy source.

Biodiesel can be used in 100% (B100) or in blends with petroleum diesel. For example, B20 is called as 20% blend of biodiesel with 80% diesel fuel. It improves engine lubrication and increases engine life since it is virtually sulphur free.
• Less Greenhouse Gas Emissions (e.g., B20 reduces CO2 by 15%):

• Fossil fuels when burnt release greenhouse gases like carbon dioxide in the atmosphere that raises the temperature and causes global warming.

• To protect the environment from further heating up, many people have adopted the use of biofuels. Experts believe that using biodiesel instead of petroleum diesel can reduce greenhouse gases up to 78%.
Grown, Produced and Distributed Locally:

- Fossil fuels are limited and may not be able to achieve our demand for coal, oil and natural gas after a certain period.

- Biodiesel can work as an alternative form of fuel and can reduce our dependence on foreign suppliers of oil as it is produced from domestic energy crops.

- It is produced in local refineries which reduce the need to import expensive finished product from other countries.
Section 3: RESEARCH METHODOLOGY
The chicken fat has been obtained & collected from a local butcher shop at Koya city in Iraqi Kurdistan region.
Moreover, the fat has been washed and cleaned with deionized water. Moreover, the solid fat has been melted at (65 - 70) °C.
● The melted fat has been filtered to remove any suspended particles and impurities.

● Moreover, the experiment has achieved in a laboratory that considered of 250ml flasks.
• The flasks were kept in an water bath maintained at 60°C. This temperature keeps the methanol below its boiling point temperature.

• Alkali transesterification reaction has been adopted to produce the biodiesel from meted chicken fat. The calculated amount of KOH has been dissolved with the needed amount of methanol.
This liquid has been poured into the melted chicken fat in a specific flask. The reaction has been done at 60°C and for 30 min.

After the reaction was completed for melted chicken fat, the reaction mixture was allowed to be separated into two layers by using a separator funnel.
After a while of time, two materials has been separated from each other.

At the bottom of separator, a red color that content the impurities and glycerol.

The Fuel obtained at the upper layer of the separator funnel. Then, the produced biodiesel has been washed two times by hot water.
Section 4: RESULTS AND DISCUSSION
Transesterification reaction has been achieved by utilizing a fat sample.

Moreover, this process is achieved yield about 80%. Table 1 shows some physical properties of produced biodiesel.
Table 1: physical properties of produced biodiesel.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Produced biodiesel</th>
<th>ASTM Standards for Biodiesel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density kg/m³</td>
<td>883</td>
<td>860-900</td>
</tr>
<tr>
<td>Cetane Number</td>
<td>74</td>
<td>40 min</td>
</tr>
<tr>
<td>Flash point °C</td>
<td>106</td>
<td>54 min</td>
</tr>
</tbody>
</table>
Indeed, the methanol/oil ratio may consider one of the most important parameters that affect the reaction and biodiesel yield.

Therefore, the process optimization for biodiesel production has been achieved by adopting several methanol/oil ratios.

Figure 1 shows the relationship between several methanol/oil ratio and the yield percent of the biodiesel.
Figure 1: The relationship between the ratio of MeOH/oil and biodiesel yield% at 30 min reaction time.
• It seems from figure 1 that the yield percentages increase by increasing the amount of methanol.

• However, the reaction reaches equilibrium at methanol/oil ratio about 7:1. It also seems from figure 1 that the maximum conversation to ester could be achieved at methanol: oil ratio about 7:1.

• As a result, it could be argued that adopting molar ratio of methanol/oil ratio between (6:1 to 7:1) could achieve the optimal molar ratio.
Section 5: Conclusion
• In conclusion, this study is attempted to investigate and produce biodiesel from chicken fat.

• It could be argued that it quite possible to produce biodiesel from chicken fat by adopting transesterification reaction method.

• Therefore, it quite recommended that utilizing waste chicken fats at slaughterhouse as a promised feedstock for biodiesel production.

• Moreover, the process optimization is also achieved for some process parameters for example, amount of methanol.
• It could be argued that adopting methanol/oil ratio about 7:1 could achieve good biodiesel yield about 80%.

• Furthermore, the biodiesel production could be incomplete if the methanol amount is less than the optimal value.

• However, it quite recommended that to achieve more studies and process optimization before installing any biodiesel plant for commercial production.
References


Thanks ...