

The feasibility of ripe aratiles (muntingia calabura) as a source of bioethanol



These days, the air pollution is very common. And one factor for this problem is the carbon emissions from the vehicles. Vehicles that use petrol or gas are a liquid mixture created from crude oil. It is true that using petrol, you can travel a hundred kilometer with a full tank, but it greatly affects the environment as it produce carbon when burned. The bioethanol is a high octane fuel and can be an alternative for the lead in the petrol (or gas) used by the vehicles.

The combustion of bioethanol results in a clean emission because it produces far less carbon dioxide as the fuel crop absorbs the carbon dioxide, thus results to a good air quality. It's also environmentally friendly for it uses a biodegradable source to make this kind of product. Unlike the petrol, it can harm the soil and might lead to damage with the food chain. The use of bioethanol can be an alternative for the petrol. This study aims to make a better bioethanol from the *Muntingia calabura* fruit (*muntingia calabura*) as an alternative for petrol.

Three setups were prepare with different amount of *Muntingia calabura* fruit and fermented. After the fermentation, each setup was then distilled and then the ethanol was collected. Each setup was repeated three times. During the experimentation, there was no ethanol produced by each distillation process. Thus, the experimentation can't proceed to the comparing of the ethanol produced to the commercial gas. It is concluded that the amount of ripe *Muntingia calabura* fruits used does not affects the quality of the bioethanol produced and there is ano significant difference on the theoretical and the change in the length of time to burn, color, and odor of the bioethanol produced.

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Introduction

Background of the study These days, the air pollution is very common. And one factor for this problem is the carbon emissions from the vehicles.

Vehicles that use petrol or gas are a liquid mixture created from crude oil. It is true that using petrol, you can travel a hundred kilometer with a full tank, but it greatly affects the environment as it produce carbon when burned.

When a vehicle is running, there are so many different types of gasses and particles emitted. These things can have detrimental effects on the environment. Of particular concern to the environment is carbon dioxide, a greenhouse gas that causes the climate change that were experiencing right now.

The ozone layer helps to protect life on earth from ultraviolet rays, but human have accelerated the depletion of this protective shield. Other emissions that affect human health and create smog include ozone and carbon monoxide. Some air pollutants and particulate matter from cars can be deposited on soil and surface waters where they enter the food chain. This substance can affect the reproductive, respiratory, immune and neurological systems of animals. Another problem is the nitrogen oxides coming from the cars. They are major contributors to acid rain which can harm the organisms. Bioethanol is a high octane fuel and can be an alternative for the lead in the petrol (or gas) used by the vehicles. The combustion of bioethanol results in a clean emission because it produces far less carbon dioxide as the fuel crop absorbs the carbon dioxide, thus results to a good air quality.

It's also environmentally friendly for it uses a biodegradable source to make this kind of product. Unlike the petrol, it can harm the soil and might lead to a damage with the food chain. Muntingia calabura, a native fruit that grows in this country, is not always been given much attention from people. This fruit is not being sold in the market, so it really is a good source for it is free and convenient to gather. Some of the fruits were not eaten and let them fall from the tree. Instead of letting this happen, it can be useful in making them as a source of bio ethanol. The aim of this study is to make these Muntingia calabura to be a better bioethanol which have a better quality

Significance of the study

This study aims to make an alternative bioethanol for gas. It can help to reduce the air pollution in the community. The bioethanol can lead to the growth of the economy of the community. The demand for the bio ethanol is also the demand for more Muntingia calabura to be cultivated, thus a good thing for the people who grows a Muntingia calabura tree. Scope and

Delimitation

This study covers the use of aratiles fruit as a source for bioethanol. Yeast was then used for the fermentation process of the aratiles fruit. This study used denatured alcohol for the distillation process. Distillation is used to collect the ethanol produced. Statement of the problem

This study aims to determine the feasibility of Muntingia calabura fruit as an alternative for ethanol. This study aims to answer some questions: 1. Does the amount of ripe Muntingia calabura produce a good ratio for the

bioethanol produced? 2. Does the amount of ripe Muntingia calabura affect <https://assignbuster.com/the-feasibility-of-ripe-aratiles-muntingia-calabura-as-a-source-of-bioethanol/>

the color produced, the flame quality, and the length of burning time of the bioethanol? Hypothesis

The amount of *Muntingia calabura* affects the quality of the bioethanol produced and when changed, then there is a change in the quality, length of time to burn, color, and odor of the bioethanol produced.

Definition of terms Aratiles (*Muntingia calabura*) is a sweet fruit and is widely planted in the country. *Muntingia calabura* fruit was used in this research to make an alternative bioethanol. Bioethanol is a petrol substitute for road transport vehicles. It is mainly produced by fermentation process, though it can also be manufactured by chemical process of reacting ethylene with steam. It is a high octane fuel and has replaced lead as an octane enhancer in petrol.

Review of Related Literature and Studies

Bioethanol is a fuel that serves as a petrol substitute for road transport vehicles. It is mainly produced by the fermentation process of sugar which mainly comes from energy crops. There is said that there is an ongoing research and development on the production of ethanol fuel by the use of municipal solid waste. Ethanol or ethyl alcohol is a clear odourless, biodegradable, low in toxicity and causes little environmental pollution when it split. Because when it burns, it produces carbon dioxide and water. By blending the ethanol with gasoline, it can oxygenate the mixture so it burns more completely and polluting gases are reduced. Bioethanol has a number of advantages like in the field of greenhouse gas emissions. It is said that greenhouse gas being emitted in the road transport is about 22%. But by the <https://assignbuster.com/the-feasibility-of-ripe-aratiles-muntingia-calabura-as-a-source-of-bioethanol/>

use of bioethanol, some emissions will be reduced as the fuel crops absorb CO₂, they emit through growing. Thus, air quality will be improved with the use of bioethanol.

Another advantage is in the boost of economy from growing. Bioethanol is biodegradable, meaning it is far less toxic than that of fossil fuels. According to the study of ProSim, there are two types of ethanol being produced: synthetic; and fermentation ethanol. Fermentation ethanol or bioethanol can be produced from materials containing sugars, starches or cellulose. Fermentation steps are required to all of these production processes to convert the sugar into ethanol, as well as a more or less advanced distillation step to separate the alcohol from the water. Ethanol is a widely used biofuel. In addition to being renewable, it has a major advantage that ethanol can be easily blended.

When small amounts of ethanol are added to gasoline, there are many advantages, in particular the reduction of carbon dioxide and other toxic pollution from exhaust gases of vehicles. Ethanol helps reduce greenhouse gas emissions; because it is made from crops and crops absorb CO₂ and give off oxygen. Due to all these reasons, the focus on designing and building-up new plants by many engineer is firm and rapid as possible to satisfy a growing demand. According to Scribd. com, bioethanol can be used to substitute petrol such as premium, super and lead replaced petrol. It has many favourable conditions. Ethanol can be produced with feedstock that has enough amount of sugar or can be transformed into sugar like starch.

There are many sources that can be used to produce ethanol. Some sources that can be used are sugar beets and sugar cane. Both of the mentioned sources for ethanol production contain high amount of sugar. Sugar can be easily fermented. According to About. com, Ethanol is good for the environment like the blends of E85. E85 is 85% ethanol and 15% gasoline has fewer volatile components than gasoline which means fewer emissions from evaporation. Another one is the E10 which has 10% ethanol and 90% gasoline. This blend reduces carbon monoxide emissions from the gasoline and improves fuel octane. Vehicles that use these fuels produce lower carbon monoxide and carbon emission, and the same or lower levels of hydrocarbon and oxides of nitrogen emissions. Ethanol is easy to use for drivers. Though flexible fuel vehicles have the advantage if being able to use E85, they may even choose to use the combination of the E85 and the gasoline itself.

The use of ethanol also helps the economy through its supports like the way it supports the farmers and creating domestic products. And because ethanol is produced domestically, it can solve the problem of a certain country to export oil and increase its own dependency. According to a study, Ethanol is one of the best tools we have to fight air pollution. And there is no fuel available at scale that matches ethanol's ability to improve overall environmental quality compared to gasoline. Ethanol contains 35% oxygen. Adding oxygen to fuel will lead to complete fuel combustion, reducing harmful emissions in tailpipe. Ethanol also displaces the use of toxic gasoline components such as benzene, a carcinogen. Ethanol is non-toxic, water soluble and quickly biodegradable. Ethanol is a renewable fuel produced

from plants, unlike petroleum-based fossil fuels that have a limited supply and are the major contributor of CO₂ emissions.

The use of gasoline in place of gasoline helps reduce carbon dioxide because the CO₂ released is recycled. Independent analyses compare ethanol and the gasoline of today's technology shows that ethanol reduces greenhouse gas (GHG) emissions from 30-50%. A study by Yale University's Journal of Industrial Ecology found that GHG emissions from ethanol are "... equivalent to a 48 percent to 59 percent reduction compared to gasoline, a twofold to threefold greater reduction than reported in previous studies." It is also published in the study of Yale Journal of Industrial Ecology that they conclude ethanol production reduces GHG emissions compared to gasoline between 48-59%. In 2012, the 13.2 billion gallons of ethanol produced the greenhouse emissions of the vehicles by 33.4 million tons. That is equivalent to the removing of 5.2 million cars and pickups from the road for a year.

A study conducted for the Governors' Ethanol Coalition, "The Fate and Transport of Ethanol-Blended Gasoline in the Environment," concluded that ethanol poses no threat to surface and ground water. According to the study, ethanol is a natural occurring substance and is expected to biodegrade fast enough essential to the environment. A study conducted by the MTBE industry suggested that in the event of a gasoline spill or leak, since ethanol breaks first, it's a fact that benzene would persist in the environment longer. But this ignores the fact that ethanol-blended fuels contain less benzene, and the real threat to the environment is from the presence of benzene in gasoline, not the ethanol.

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