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Citrus' wastes: Another way to eradicate deforestation

Abstract

Brazil is one of the main bioethanol producers using its sugarcane supplies, but it needs more space for its sugarcane fields because the quantity of Ethanol sugarcane production is starting to be insufficient, as a result, this is conducting to the deforestation in The Amazon. If Brazil wants to keep producing bioethanol, it will have to look up for a way that requires less space in order to be environmentally responsible.

Introduction

The generation of energy taking advantage of natural products or organic wastes (biomass) is one of tomorrow's industries. The petroleum's high price and other factors such as pollution and global warming have increased the demand for bioenergy, which means that the demand for new fertile and accessible land is growing. Biofuels are collectively known as fuel sources made from biomass that is organic matter (plant material or animal waste). The most commercially spread biofuels are ethanol and biodiesel. These are the main alternatives to fossil fuels, and they have been in an industrial development phase for the last 20 years.

We have to develop renewable energy sources, capable of insuring prosperity without damaging the environment. The potential benefits of increasing our dependence on renewable energy sources such as biofuels are many, like polluting less the environment, thus being more environmentally responsible.

During the mid-1980's, before any other country had even thought of the idea, Brazil succeeded in mass-biofuel production for motor vehicles, using alcohol derived from its plentiful sugarcane supplies to fulfill vehicles fuel demand. Years later, the program that had put the country so far ahead was nearly consigned to history when oil prices slid back from the high prices seen in the 1970's. It was not before four years ago when Brazil's production picked up in a big way. Now Brazilians are flocking to buy cars that give them the chance to mix and match alcohol with regular fuel - and conventional motor vehicles that run purely on petrol are looking old-fashioned once again.

Brazil's Bioethanol

Brazil's bioethanol is often held up as a model of sustainable biofuel production, a report released in October 2006 by the "International Energy Agency's Bioenergy Task 40" confirms it by analyzing the international bioenergy and biofuels trade. This report concluded that the production of sugarcane-based ethanol practiced in Brazil is environmentally sustainable. Biofuels are rated in terms of energy balance, the units of biofuel energy produced per unit of input energy and carbon saving, the percentage of greenhouse gas emissions prevented by producing and using the biofuel instead of producing and using the same amount of fossil fuel energy. Sugarcane ethanol is estimated to have an energy balance of a staggering 8.3 on average, but could be 10.2 in the best case; far outstrips the energy balance of any other biofuel, especially those produced in temperate regions. The carbon saving is between 85 and 90 percent bigger by a long way from any other biofuel.

But, is it really as sustainable as claimed by the report? The report used a set of sustainability criteria, drafted by a parliamentary Commission in The Netherlands, that are preliminary in nature, with many uncertainties due to disagreements among the stakeholders. The criteria included a carbon saving of 30 percent or more in 2007, increasing to 50 percent or greater in 2011; provisions for protecting biodiversity in sensitive areas, rather weak; setting a limit of no more than 5 percent

conversion of forest to plantations within 5 years; no negative economic impacts on the region or nation; compliance with welfare standards such as labor rights, basic human rights, property and use rights, and anti-bribery laws; compliance with environmental laws in waste disposal and management, and the use of transgenics (genetically modified organisms).

Among the main concerns are ecological and social impacts, including food security. It is yet unclear how additional land used for sugarcane will impact on biodiversity, or compete for land needed for food growing. The report did not deal at all with social welfare, and that, in a country where human rights and land rights is still problematic.

Sugarcane encroaches on the Amazon, but far more so on the Atlantic forest and the Cerrado, a very bio-diverse and unique savannah-type ecosystem. Two-thirds of the Cerrado have been destroyed or degraded. If sugarcane cultivation expands, the outlook for the world's natural biodiversity would be grim.

A World Wildlife Foundation (WWF) report to the International Energy Agency in 2005 suggested that Brazil's bioethanol program reduced transport emissions by 9 Mt a year, but 80 percent of the country's greenhouse gas emissions came from deforestation. A study found that while an hectare of land in Brazil grows enough sugarcane to make ethanol to save 13 t CO₂ a year, natural forests would absorb 20 t of CO₂ every year if they were allowed to regenerate on the same hectare of land.

The Amazon is one of the largest terrestrial carbon sinks, and losing that would greatly increase carbon emissions and contribute to warming the planet by perhaps a further 0.6 °C to 1.5 °C over and above the warming already predicted by the Intergovernmental Panel on Climate Change (IPCC) on this century, This should concern everybody, the reason is that much of the rainfall that sustains the forest is recycled; water is absorbed by the trees and returned to the atmosphere by evapo-transpiration. An estimated 7 trillion tones of water are recycled, which helps to cool the atmosphere immediately above the forests. The water cycle (which supports agriculture in the region and elsewhere) could break down, and that could affect the US grain belt. Permanent drought over the Amazon basin may seriously reduce the already diminishing global food supply, and at the same time send ever larger amounts of carbon emissions into the atmosphere in a catastrophic upward spiral of global warming that would take most species on earth to extinction.

For all the mentioned situations, it is clear that we have to develop a different biofuel in Brazil. Brazil can keep producing bioethanol but we will have to look for a way that requires less space, so we don't have to deforest the Amazon and cut down so many trees stealing the home of animals and plants increasing the Earth's temperature.

Fill your tank with citrus liquid fuel from orange...

In 1992, Karel Grohmann started investigating the possibility of converting citrus' peels into ethanol and in 2004, Bill Widmer continued Grohmann's work supported by Renewable Spirits LLC from Delray Beach, Florida.

Karl Grohmann's research was eventually discontinued because enzymes were needed as part of the process but they were expensive, and gas, at the time, was relatively cheap. Last decade an economic flip-flop occurred and thanks to a rise in gas prices, the enzyme production started to be cheaper, so it made this project became a reality. Now a days a pilot installation able to produce 10, 000 gallons is under construction, and it is thought that it would be possible to produce up to 80 million of ethanol gallons per year from the organic wastes that are not used in Florida.

It would be useful to continue with this technology in Brazil because of all the problems that Brazil is facing now a days. Using citrus' peel will be very favorable, this will be better because the sugarcane will start being produced only for growing food, and Brazil won't need so much space because it will stop being produced for biofuel, and, as a result, The Amazon wouldn't be deforested.

Using that kind of organic wastes will help between other things the environment, because we are going to be able to use the wastes for issues that can benefit us and produce biofuels with them.

Citrus' peels are rich in pectine, cellulose and polysaccharide hemi cellulose which can be hydrolyzed to sugars and then, with a little help from the leaven it can be fermented and transformed to a type of alcohol called ethanol.

Where could the citrus' peels be taken in Brazil?

The world-wide production of citrus juice is considered in 2.6 million tons and Brazil is the one that controls the market with 50% of the total elaborated volume. The citrus juice processing industries and other food industries produce millions of pounds of citrus' wastes every year, and they are mispending the wastes. In the best cases, enterprises could donate all the leftovers produced because of the juices, this will actually help them not just in the economical sense (enterprises will get money from their leftovers) but in the social part, society will look the enterprises with other eyes, it would be great that enterprises could say that the organic wastes produced in their industry are being used for ethanol production, which means between other things that the Amazon is being saved, but there's also the possibility that enterprises wouldn't want to donate them, the price would be from 3 to 5 cents (USD) per pound of citrus peel waste.

Advantages of citrus' peels- based bioethanol

Besides the optimization of citrus, the main advantage of bioethanol over petroleum based fuels is its renewability and its supposed carbon neutrality, another benefit over fossil fuels is the greenhouse gas emissions, the road transport network accounts for 22% (www.foodfen.org.uk) of all greenhouse gas emissions and through the use of bioethanol, some of these emissions will be reduced as the fuel crops absorb the CO₂ they emit through growing. wastes' separation into two categories, organics and inorganics, this contributes to diminish the quantity of inorganic wastes in the environment, this project will also help to diminish the air pollution caused by the automobiles, trucks and buses, this is because the ethanol adds oxygen to the fuels like the gasoline that are done with petroleum, and that aids to neutralize the carbon monoxide, in addition, by using bioethanol in older engines can help reduce the amount of carbon monoxide produced by the vehicle thus improving air quality, also ethanol has been touted as an extremely beneficial fuel due to its higher octane rating of 113 compared to that is between 83 and 95 octanes.

Another advantage of bioethanol is the ease with which it can be easily integrated into the existing road transport fuel system. Ethanol does not pollute ground water, because of its chemical structure, ethanol phase separates when it comes into contact with water. This makes it very safe for the environment because ethanol is biodegradable. It also means that ethanol will not pollute ground water like many other potential fuel sources could. Elaborating biofuel based on the citrus' peels is another alternative to fossil fuels without risking food security como happened with the corn, as it is the peel and not the whole fruit, it will not increase its cost because it is an organic useless waste.

Conclusion

We have to keep thinking in alternatives ways to save our planet, maybe for now are biofuels but we have to keep looking for new ways to make our planet last a little bit longer. We have many environmental problems, one of them is deforestation.

Citrus' peels- based ethanol as an alternative fuel and as another way to eradicate deforestation is very attractive because Brazil will stop growing sugarcane fields in places that are not environmentally for that, it can also be considered a tomorrow's fuel. If we change our natural resources for sugarcane fields will be terrible because sugarcane does not provide home for birds. We really have to worry about deforestation because it not only that we are cutting trees, but all the implications that this human activity means, reduce the already diminishing global food supply, send

larger amounts of carbon emissions into the atmosphere which will increase global warming and take most species on Earth to extinction, including ours.

Ethanol currently stands as the leader of the pack in alternative fuels alongside bio-diesel. As a substitute for petrol it is the obvious choice in its blending ability with petrol, from which it can easily become the fuel of choice. There is much research ongoing into bioethanol, improving our technology and understanding year on year. This can only enhance the standing of bioethanol as a viable and cheap alternative fuel. If we could develop the citrus' peel- based ethanol, the efficiency of this fuel looks set to continue improving.

Most people think that hydrogen will be the fuel of choice for our long-term future. This gives bioethanol a short-term life as a major fuel. However, it will be many years before hydrogen fuel is safe and economic enough for its mass use. Until that time there will be a high demand for bioethanol as an alternative fuel. Even then, hydrogen may not be the fuel of choice for all applications, with bioethanol still taking a role in powering our society.

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