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The Future of Napier Grass as a Biofuel

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Introduction

The genus Pennisetum contains about 140 species, including species of important cultivated crops such as Napier grass and millet. Most species of Pennisetum are found mainly in tropical and sub-tropical regions of the world.

About 16 species of Pennisetum have been recorded in India, some of which have been introduced from outside the country, with the most important forage species in the genus Pennisetum being Pennisetum purpuram (L.). Where is Pennisetum purpuram also known as elephant grass because in the forests of Africa their length is equal to the length of elephants and they can eat it very easily, making it their favorite food.

Origin and Distribution

The botanical name of Napier grass is Pennisetum purpureum. Its origin is believed to be South America. It is named after Colonel Napier. Who in 1901 drew the attention of the Rhodesia government to the importance of its fodder. This grass was brought to the United States in the year 1913, its cultivation in India was started in the year 1912. In India, this grass is grown in irrigated places in the states of Uttar Pradesh, Haryana, Punjab, Bihar, Madhya Pradesh, Gujarat, Andhra Pradesh etc.

Miscanthus, commonly known as elephant grass, is a promising biofuel for its high biomass yield and low input requirements, meaning it can be adapted to a wide range of climatic zones and land types.

Importance of napier grass

Napier grass has been valued for its high biomass, perennial and pest resistance. Napier grass helps in soil conservation and improvement due to its perennial nature. In

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moderate climates, it can be harvested up to four times per year.

In addition to use as animal feed, Napier grass also has industrial uses, establishing Napier grass as the energy crop of the future because the grass is photo-emissions from the extraction of organic fuels such as alcohols, methane and pyrolytic oils. Napier grass is specifically stored for the production of biofuels and bio-based products, primarily due to its high cellulose content (34.2–40%), high yields per unit area, drought tolerance and Forms a complete crop due to a good water use efficiency.

Significance of Napier Grass as Biofuel

As of the twenty-first century, the world is in the grip of an energy crisis, and recent forecasts predict that global energy demands are likely to increase by 53% – from 533 quintal joules (EJ) in 2008 to 2035 There is a possibility of reaching 812 EJ.

The world's gross inland energy consumption (about 82%) is still derived from petroleum (32%), coal (28%) and natural gas (22%). Despite projected growth in energy consumption over the next two decades, the transportation sector remains largely dependent on non-renewable resources, namely petroleum.

Establishing an uninterrupted supply of transportation fuel has become an important priority to sustain international trade and protect our national security. We therefore need economical alternative sources of energy that will reduce the share of fossil fuels used in the transportation sector and productive industry, reducing environmental concerns caused by widespread use of these resources (eg, climate change and global warming) and the energy source will increase, besides the safety, and power supply will also be improved.

Nowadays, biomass is responsible for 10% of primary energy consumption worldwide and can be used as a promising feedstock for biofuel production. Napier grass is a neglected crop that is abundant in the forest and is not difficult to cultivate, making it a particularly attractive feedstock for biogas and bioethanol production.

Scientists studied the potential of Napier grass for biogas production and found that at 5% total solids, the highest kinetics for biogas production could be achieved and concluded that it could be grown as a feedstock for this purpose.Some scientists also investigated the biome thane potential of Napier grass. To this end, the scientist applied combined alkaline and biological pre-treatment methods as a strategy to increase the yield of biome thane from Napier grass. The results showed that the alkaline pretreatment

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method increased anaerobic digestibility from 49% (untreated grass) to 77% and increased biome thane yield by about 34%.

Benefits of Napier grass

By cultivating Napier grass, green fodder is available to the animals throughout the year, its fodder is rich in nutrients. The average protein content in it is found to be 7 to 12 percent. In the initial stage, about 12 to 14 percent pure matter is found in the fodder. 9.30 percent protein is found in its leaves and 4.40 percent in the stem.

Why Biofuels Are Bad for the Rainforest

Recently, fossil fuels such as petrol and diesel are being used more as plant fuels, which is contributing to the increase of greenhouse gases in the atmosphere, thereby warming our planet. These plant-based fuels, called biofuels, are usually produced from agricultural crops. There are two main types of biofuels: ethanol and biodiesel. Ethanol Usually made from corn and sugarcane, while biodiesel is made from the fruits of the palm tree (mainly oil), soybeans (mainly soy), and canola (also known as rapeseed).

However, compared to conventional fossil fuels, biofuels produced from agricultural crops result in less pollution and emissions of greenhouse gases. In practice, scientists have found that some are causing environmental problems. Biofuels are harming even the poor. This is because they are economically useful.Now that traditional food crops are being used to produce energy, the demand for such crops has increased, so have their prices. Although higher prices may be better for some farmers, who get a higher price for their crop, the consumer has to pay a higher price for the food. In poor countries, where people have little money, this leads to starvation. In 2007 and 2008 there were protests and riots in many countries by people who could not pay the high prices for food.

The high prices of crops are also the cause of other problems. To take advantage of the higher prices, farmers around the world are converting land into agricultural land. To take advantage of the higher prices, farmers around the world are converting land into agricultural land. Most of the land in North America and Europe has already been converted to agricultural land, with agricultural land expanding in tropical locations, especially Brazil and Indonesia, where there are still large areas suitable for new agricultural land. The problem is that some of this land is currently replaced by tropical rainforest. When farmers cut rainforest for farms and ranches, dead trees release carbon dioxide and other greenhouse

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gases into the atmosphere (similar to what happens when burning fossil fuels). In addition, the destruction of rainforests removes native people and kills wildlife. Therefore, biofuels have a significant impact on the environment. Some biofuels are less bad than others. When crops are grown on abandoned agricultural land and areas that do not have natural ecosystems, they have less environmental impact with no excessive use of fertilizers and pesticides. In the future, new types of biofuels will produce fewer greenhouse gas emissions and may actually be helpful for the environment. For example, the use of native grasses for biofuel production in the United States could lead to increased production of biofuels, and would generate less pollution than corn-based ethanol. Plus, these grasses can help increase soil fertility and maintain groundwater levels.

Conclusion

Although bioethanol production from lignocellulosic materials has been extensively studied, there are still environmental, economic and energetic constraints to its production. From an environmental point of view, the lateral stream generated after the distillation stage has a high pollutant potential and the best handling options still need to be studied. Economically, the energy cost required in the pre-treatment phase is still high, making biofuel production less competitive than fossil fuels. As the Indian biofuel sector is in a developing stage, thus evaluating the available germplasm of Napier grass for bioethanol and biogas production and its credibility as an alternative source of energy to Napier grass for the transport sector in India and other countries. It is very important to check.