A Computer-Based Approach to Increasing the Efficiency of Biofuels

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Abstract

The world's most popular energy source is petroleum. But as you are surely aware, petroleum is a fossil fuel that is not only non-renewable but also incredibly bad for the environment. Fuels made from plant material are known as biofuels. Because they are cleaner than fossil fuels, biofuels are seen as a superior alternative energy source. However, the cost of producing biofuels is high. Therefore, scientists are working on a variety of ways to lower the cost of producing biofuel, including utilising computers to find new biotechnological products or enhance current ones so that they can generate more biofuel for less money. We will explain how computers may be utilised to enhance the production of biofuels in this post.

Keywords: Biotechnological •Saccharification • Enzymes • Programming language

Introduction

We frequently utilise petroleum-based goods to power our automobiles, heat our houses, produce energy, and create plastics. Petroleum and other fossil fuels are buried deep within the Earth. They develop over a period of millions of years and are dependent on high-pressure conditions and extinct creatures such as plants, algae, bacteria, and mammals (including dinosaurs). Carbon dioxide is released during combustion of fossil fuels. Because of this, burning more petroleum results in more carbon dioxide being emitted into the atmosphere, which causes global warming. A better energy source may be biofuels. Plants like corn, sugarcane, and soy may be used to make biofuels. Biofuels are regarded as renewable and sustainable since they originate from plants that we can keep growing, allowing us to create this form of energy continually. However, making biofuel is costly. To turn plant biomass into biofuels, several intricate procedures are required. Therefore, a lot of people continue to choose petroleum because they think it's cheaper, but they are omitting the long-term environmental problems.

Scientists have been trying to increase the output of biofuels for years. For instance, sugar is taken from cane juice and utilised to create bioethanol (a form of fuel), through a process known as fermentation, to create biofuel from sugarcane. But after the extraction procedure, a lot of leftover waste biomass and sugar are produced. According to a recent study conducted in Brazil, the output of biofuel might be increased by double if the residual sugar was removed. Second-generation biofuel is defined as biofuel derived from sugarcane biomass.

The manufacturing of second-generation biofuel includes several processes. Saccharification is an important stage: The remaining sugarcane biomass is broken down using eczymes. Enzymes are proteins and, like other proteins, they are constructed from chains of building blocks known as amino acids (that are made by atoms). Enzymes accelerate chemical processes that break down other compounds. In a sizable tank, enzymes are combined with the waste from sugarcane, where the waste is broken down by the enzymes to produce sugar. The ability of various enzymes to extract sugar from discarded sugarcane varies. It may be possible to enhance this phase of biofuel synthesis by improving the less effective enzymes. The most crucial traits of effective enzymes may be found using computers, and these traits can subsequently be used by scientists to create enzymes that are more effective.

Conclusion

Numerous researches have been conducted in the recent years to enhance enzymes for the generation of biofuels. Laboratory testing, however, are costly and time-consuming. We can quickly conduct millions of tests using computer simulations. Computer findings can assist scientists in determining which laboratory tests are most likely to yield good results, however they are not as precise as laboratory tests themselves. If you have a solid understanding of the biological problem and are familiar with a programming language, designing algorithms for biological applications is not a particularly difficult task.

The development of enzymes for the production of biofuels has been the subject of extensive research in recent years. But laboratory tests are pricey and time-consuming. Computer simulations allow us to swiftly run millions of tests. Although computer discoveries can help scientists choose the lab tests that are most likely to produce useful results, they are not as accurate as the actual lab tests. It's not especially challenging to create algorithms for biological applications provided you have a firm grasp of the biological problem and are familiar with a programming language.

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