

There are increasing evidences of an irreversible and fast-proceeding transition in energy and chemical technologies [1,2,3], characterized from the progressive substitution of fossil fuels and the introduction of renewable energy sources (RES) and alternative carbon feeds [4,5,6,7,8]. While still several scientists argue if and when this transition may occur, new ...

Additionally, it will examine the challenges and opportunities as well as the future perspectives on the integration of biotechnology with other renewable energy sources. 14.2. Historical overview of biotechnology applications in bioenergy. ... Potential applications of renewable energy sources, biomass combustion problems in boiler power ...

The rise in coal and oil consumption leads to increased CO₂ emissions, which has led to the greenhouse effect and a decrease in natural resources of non-renewable energy (Koreti et al. 2022; Maurya et al. 2023). Major oil resources are plant oils and animal fats in the oleochemical sector. Still, the limited oil production and their sustainability hinder the ...

Global energy demand has been rapidly increasing over the past few decades, driven by population growth, urbanization, and industrialization [1]. The rise in energy consumption has had detrimental environmental consequences, such as the emission of greenhouse gases and the onset of climate change [2] consequently, there is an increasing imperative to ...

The future applications of synthetic biology in the biotechnology industry to address issues of human medicine, robust food supplies, fine chemicals, and renewable energy will undoubtedly accelerate in the coming years. The biotechnology industry has over three decades of experience in serving the public good responsibly.

Energy biotechnology is now more timely than ever, given its importance in exploiting bio-based research and reducing the carbon footprint for energy production. This collection of articles includes bioenergy-related topics such as lignocellulosic utilization, cell-free biocatalytic systems, and energy storage. Critically, articles are included in research topics ...

Renewable energies are becoming increasingly significant all around the world as a means of reducing our environmental footprint and combating climate change. Solar, wind, hydropower, geothermal, marine, and other forms of energy should be the primary clean energy sources for eco-friendly processes. However, developing new technologies and intensifying ...

Consequently, the exploration of renewable energy sources, such as biofuels, emerges as a prudent solution to mitigate the energy crisis. ... This comprehensive review aims to evaluate the potential of biotechnological applications in the development of advantageous bioenergy crops, spanning from feedstock enhancement to

sustainable biofuel ...

Biofuel is potentially thought as one of the greatest sources of renewable energy in use currently unlike fossil fuels such as natural gas, coal, and petroleum. Therefore, this chapter describes an overview of biofuel production from marine algal sources by applying biotechnological approaches meta.

bio-fuels grown sustain ably), hydropower etc., are some of the examples of renewable energy sources A renewable energy system converts the energy found in sunlight, wind, falling-water, sea-waves, geothermal heat, or biomass into a form, we can use such as heat or electricity. Most of the renewable energy comes either directly or indirectly ...

As more countries, companies and individuals seek energy sources beyond fossil fuels, interest in renewable energy continues to rise.. In fact, world-wide capacity for energy from solar, wind and other renewable sources increased by 50% in 2023 (link resides outside ibm). More than 110 countries at the United Nations" COP28 climate change conference ...

The efficient biotechnology process of two-stage anaerobic digestion (AD) can generate biohythane in two-stages, dark fermentation, and methanogenic phases, for H₂ and CH₄ synthesis respectively. ... Demirbas A. Potential applications of renewable energy sources, biomass combustion problems in boiler power systems and combustion related ...

Biotechnology has wide application in medical, agriculture, bioremediation, non-renewable energy production, and food production. Nowadays, environment friendly biotechnological approaches are also popular in petroleum industry. Conventional approaches are ...

This review critically synthesizes research works on the microalgae and bacteria nexus applied in the advancements of renewable energy generation, with a special focus on biohydrogen, reclamation of wastewater and desalination processes. ... Biotechnological applications of microalgae-bacteria interactions involve multiple disciplines, focusing ...

Therefore, when predicting the impact of biotechnology to the energy industry in the future it is a certainty that the production of biofuels from biomass resources will increasingly contribute to the global energy supply, and that the development of renewable energy will increasingly be promoted by those countries that lack fossil fuel resources.

1 Department of Biotechnology, ITS Paramedical College, Ghaziabad, ... The use of versatile microorganisms to generate renewable energy fuels from the biomass and biological wastes can diminish this menacing concern to a large extent. ... However, the energy outputs from MFCs and MECs are insufficient for real-world applications, and, currently ...

Biotechnology, the use of biology to solve problems and make useful products. The most prominent area of biotechnology is the production of therapeutic proteins and other drugs through genetic engineering. Learn more about the development and applications of biotechnology in this article.

Cellulosic biomass--the fibrous, non-edible part of plants--is an abundant domestic resource that can potentially provide a renewable feedstock for advanced biofuels. A key component to producing market-competitive cellulosic biofuels lies in developing more efficient and cost-effective ways to convert biomass into fuel.

However, developing new technologies and intensifying current processes is essential to aid in the transition to renewable energy. Biotechnology is a wide-ranging field that uses biological systems, living organisms, or derivatives to develop or produce new products or processes for various applications. ... An important application field of ...

The CRISPR-Cas9 genome editing technology now enables writing the genome at will, which will allow biotechnology to become an "information science." This review covers recent advances in using CRISPR-Cas9 to engineer the genomes of a wide variety of organisms that could be use in the industrial production of biofuels and renewable chemicals.

Microbial biotechnology is an important strategy for sustainable bioprocesses in which microorganisms and their enzymes are used for the conversion of carbohydrates, ...

Algae have gained substantial importance as the most promising potential green fuel source across the globe and is on growing demand due to their antioxidant, anticancer, antiviral, antihypertensive, cholesterol reducing and thickening properties. Therefore, it has vast range of application in medicines, pharmaceutical, cosmetics, paper and nutraceutical ...

The replacement of fossil fuels with more carbon-neutral and renewable sources has become a key necessity of the time. The proposition that energy can be obtained from biomass with a decisively positive energy balance and at a scale sufficiently large to have a substantial impact on sustainability and security objectives is both supported by several recent studies.

The application of biotechnology in bioenergy synthesis has contributed to the availability of renewable energy sources. However, issues still need to be resolved at the ...

However, the future contributions of biotechnology to the energy industry are not only influenced by technical advances in biotechnology, but also by the price of fossil fuels, the ...

Furthermore, lignocellulosic biomass is an abundant renewable energy source, with the potential to displace a large portion of conventional energy resources such as fossil fuels and natural gas for the future production of



Application of biotechnology in renewable energy

liquid biofuels with improved environmental benefits. ... 3 Biotech will publish a special issue of articles that focus on ...

Biotechnology has emerged as a pivotal tool in developing sustainable solutions for a renewable energy future, focusing primarily on the advancement of biofuels. Utilization of ...

Biofuels are increasingly being used in transportation, heat, and power development requiring the need for renewable sources of energy. This review highlights the use of dreck organic matters from aquatic environment and soil supplies for renewable energy production for human requirements, sustaining a clean and healthy environment.

These clean sources can be used instead of conventional fossil fuels and nuclear energy. Nowadays, there is a huge interest in this subject since it is expected to provide 50% of the world's primary energy by 2040. Moreover, renewable energy can be play a crucial role to reduce gas emissions to the environment by about 70% during 2050.

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