# An overview of potential applications for industrial biotechnology in sustainable chemicals.

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## Abstract

**Biotechnology is shown its potential as a tool for sustainable industrial growth. The OECD has gathered and examined case studies demonstrating the use of biotechnology in a variety of industries, including mining, plastics, food processing, textiles, pulp and paper, chemicals, and energy. Making industry more environmentally friendly can help protect or enhance the environment while producing goods and services that can alleviate poverty, create jobs, and enhance the standard of living for a rising global population. The transition to a bio-based economy will hasten the depletion of renewable resources and worsen the environment without scientific and technological advancements.**

**Keywords**: Industrial biotechnology, Industrial Sustainability, Bioproducts, Biomass, Eco efficiency.

## Introduction

The need for better natural resource management and utilisation is becoming more widely recognised. Unsustainable patterns of production and consumption must be diminished and, if at all possible, eliminated in order to achieve this. As a result, industrial sustainability is receiving more attention as it is thought to be a major strategy for achieving such a decrease. For a growing global population, economic expansion creates jobs, revenue, goods, and opportunity to raise living standards. Environmental protection acknowledges the inherent worth of the natural world and all living things [1]. It also acknowledges the capacity of ecosystem-dwelling species to offer knowledge and a way to create industrial processes, products, and production systems that are sustainable. A variety of sectors can move toward more sustainable production thanks to the eco efficiency of industrial bio-products and bioprocesses. These applications, however, are taking place "as a thousand points of light," that is, without a central idea or a clear strategic direction. Such a strategic focus is required to prevent devoting resources to small-scale, perhaps unsustainable advances in the cleanliness of industrial production systems [2, 3]. Such an integrating concept is provided by moving toward an economy that is more heavily dependent on renewable raw materials, or a bio-based economy. As a result of developments in science and biotechnology, it is now both feasible economically and environmentally to "travel back to the future" and start replacing petroleum with biomass, a renewable feedstock primarily sourced from plants. It will be difficult to get there; we need efficient methods to evaluate technology, processes, and goods for sustainability as well as laws that support sustainable production and consumption. As a result of developments in science and biotechnology, it is now both feasible economically and environmentally to "travel back to the future" and start replacing petroleum with biomass, a renewable feedstock primarily sourced from plants. It will be difficult to get there; we need efficient methods to evaluate technology, processes, and goods for sustainability as well as laws that support sustainable production and consumption. Numerous new bio-based initiatives have emerged as a result of the chemical industry's increased focus on sustainable industrial processes [4, 5]. A case study on fuel ethanol that uses agricultural waste and is based on a genetically modified microbe offers a chance to lower the cost of producing fuel ethanol. The Life Cycle Analysis (LCA) for bioproducts can be challenging, particularly when the supply chain's feedstock development phase is taken into account. Water use is becoming more and more important as water scarcity becomes a significant concern. Land use and land-use change are also crucial for the production of biofuels and bioproducts. Resources that are biorenewable have a distinctive economic impact. Globally, biorenewables support a wide spectrum of employment prospects, and the biotech sector is experiencing a significant expansion of employment opportunities. Many of these jobs are in rural areas, which help the area's problems with job creation. Industrial biotech is thus not only a rapidly expanding sector but also a source of well-paying jobs in a variety of locations, including rural ones [6].

## Conclusion

As an enabling technology, biotechnology provides one significant path to the development of clean goods and procedures. It can compete with chemical and physical

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techniques for lowering energy and material use, waste production, and emission levels. Clean processing doesn't always require a radical overhaul of the manufacturing process or a new set of infrastructure.

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