OPPORTUNITIES AND PRIORITIES TOWARD DEEP SEA SYNTHETIC BIOMANUFACTURING AND BIOPRODUCTS INDUSTRY

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Abstract

Biomanufacturing is driving the global industrial revolution, with the potential to produce approximately 70% of future products with an estimated value of US$30 trillion. By 2030, it is projected to account for 35% of the global industrial production value. The EU Industrial Biotechnology Vision Plan and the USA's executive order in 2022 highlight the strategic importance of biomanufacturing, aiming to meet at least 30% of the chemical demand within 20 years. China's government report also identifies biomanufacturing as a new growth engine for the bioeconomy.

This presentation delves into the unique advantages of deep-sea bioresources, which have evolved in extreme marine environments such as high pressure, low or high temperature, high salt, and low or high oxygen. These resources offer novel genes, proteins, metabolites, and biosynthetic pathways that can lead to the discovery and development of next-generation bioproducts like pharmaceuticals, health products, biomaterials, enzymes, and biochemicals. However, challenges in implementing marine biomanufacturing strategies must be addressed, including difficulties in obtaining resources, supply and cost issues of bioproducts production, unknown biosynthetic pathways, biosafety concerns, intellectual property, and ethical considerations.

Finally, the presentation will discuss the priorities for deep-sea synthetic biomanufacturing, which include advancing basic deep-sea biology research, developing synthetic biotechnology tools, and optimising biomanufacturing processes to enhance productivity, profitability, and sustainability.

Keywords: Biomanufacturing, Deep Sea, marine bioproducts, synethic biology, synthetic biotechnology

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