

Integrating precision Agri-biomanufacturing capabilities to address complexities at Agri-Food Biotechnology

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The industrial transformation of agricultural raw materials into processed products for commercialization necessitates the application of synthetic biology during industrial production. Molecular rewriting will be an important component of plant synthetic biology. In addition to engineering microbes to have new abilities, synthetic biology enables agronomists to harness biological power to solve farming and agriculture concerns. By harnessing microorganisms as large-scale production platforms, synthetic biology can also reduce the demand for chemical fertilizers by optimizing nitrogen and phosphorous utilization as well as improve crop nutritional value. By allowing targeted DNA modifications within living plants or single cells, CRISPR tools can enable synthetic biology to reach its full potential. In addition to enabling precision agriculture, the synthetic

biology industry has significant potential in processing Agri-food components, substances, and additives; however, infrastructure and production issues remain for mass production.

In order to overcome the challenges associated with synthetic biology, Tidetron Bioworks Technology Co., Ltd. has developed a system from research and development to mass production and is among the first synthetic bio-manufacturing platforms in the world to achieve mass production of various substances.

As a pioneer in the Agri-Food biotechnology sector, China's Guangzhou city headquartered Tidetron Bioworks Technology has contributed substantially with its remarkable growth trajectory and innovative approaches in the synthetic biology sector. Tidetron is poised to play a crucial role in shaping the industry's evolution to improve the global food system thereby. The acclaimed Tidetron Altra platform-based strain library and component library is a significant resource for Asia's Agri-Food biotech industry. Zhang Zhiqian, Founder and CEO of Tidetron Bioworks elaborates further on the precision Agri-bio manufacturing sector for tackling complex challenges through innovation.

How can the precision Agri-biomanufacturing sector address complex challenges through innovation?

Innovation is not a one-time fix but a continuous process of developing and improving technologies, practices, and approaches. While addressing complex challenges is also a long-term task. In contrast to conventional production methods, synthetic biology presents a new approach to manufacturing, yielding a low-carbon food source and mitigating the environmental impact associated with traditional methods. We found out that the exciting thing is that the innovation of synthetic biology has emerged as a game-changer in biomanufacturing, which offers a robust set of tools and technologies that enable us to engineer biological systems to produce a wide range of valuable products. And what is more exciting is that it may speed up the process from the lab through the super-factory from the experience of Tidetron Bioworks- the "CELL Factories" we built have the remarkable ability to generate a diverse range of substances. These advancements have the potential to enhance our quality of life substantially.

What is the significance of synthetic biology in biomanufacturing as demonstrated by Tidetron Bioworks' groundbreaking biomanufacturing platform?

As demonstrated by Tidetron Bioworks, the significance of synthetic biology in biomanufacturing is its ability to revolutionize the production of various substances. Tidetron Bioworkshas pioneered synthetic biology to achieve mass production in the biomanufacturing industry.

The core competency lies in our proprietary technology platform-Tidetron Altra, which enables us to synthesize numerous substances that can only be produced in trace amounts or are limited by the characteristics of the native organisms or metabolic pathways. As a result, we can scale up the production of those challenging substances to synthesize in large quantities. Our technology has demonstrated strong versatility and has been validated on dozens of substances and platforms. In addition, we have forged strategic partnerships with esteemed research institutions, academic organizations, and industry experts. This collaborative approach empowers us to tap into cutting-edge research, leverage invaluable expertise, and access critical resources, alongside the significant increase of substances and synthesis yielding the research need.

With tools like CRISPR-Cas and other gene-editing techniques, Tidetron Bioworks leverages microfluidics and directional evolution, which enables us to achieve significant mass production and synthesize a wide range of target substances.

And by utilizing the innovative Tidetron Altra platform-based strain library and component library, Tidetron Bioworks has overcome challenges associated with transforming and applying scientific research achievements in an industrial setting. The comprehensive approach covers the entire chain from research and development to production, ensuring efficient and effective implementation.

The SUPER-Factory established by Tidetron Bioworks further demonstrates our commitment to maximizing production capacity. With annual production exceeding 10,000 tons, we are focusing on the growing demands of industries while maintaining high-quality standards and meeting environmentally friendly needs. This scalability showcases the significance of synthetic biology in biomanufacturing, enabling large-scale production of valuable substances.

We strive to provide integrated solutions for various industries, align with the global shift towards eco-friendly practices, and ensure biomanufacturing processes have a lower environmental impact.

Could you share more about the honor of establishing the fastest-growing Agri Food Biotech company in China?

A culture of innovation and collaboration lies at the heart of Tidetron Bioworks. By harnessing the immense power of synthetic biology, we have developed groundbreaking solutions that effectively tackle the complex challenges present in several

industries in China. This strategic move has allowed us to stand out in the market. Also, through fruitful collaborations with renowned beverage and seasoning companies, we have made great strides in bolstering nutrition and championing public health.

The cutting-edge Tidetron Altra— an exclusive platform boasting a vast strain variant library and comprehensive component repository- has empowered us to curate a strain variant library of unparalleled magnitude with millions of possibilities. In addition, guided by iterative improvements, we've proudly secured a portfolio of unique production strains exclusively owned by Tidetron Bioworks.

Moreover, Tidetron Bioworks has attracted investment and secured funding from renowned venture capital firms and strategic partners alongside our successful business operations. This financial support has given us the necessary resources to scale operations, intensify research and development efforts, and expand production capabilities. It has also allowed us to attract top-tier talent, assembling a formidable team of exceptional scientists, engineers, and industry professionals.

The unwavering commitment to sustainability has been pivotal in our success story. With the increasing global demand for eco-friendly and sustainable solutions, Tidetron Bioworks' emphasis on green mass production and environmentally conscious practices has deeply resonated with customers and industry stakeholders. This intense dedication to sustainability has fueled business growth and positioned us as a responsible and socially aware organization.

What are the company's strategies for maximizing production efficiency and capacity over the long term?

The first strategy is focused on New Services for R&D and Mass Production Integration. By integrating production and research systems, Tidetron is leveraging the Tidetron Altra platform-based strain library to facilitate collaboration and resource sharing. It enables us to reserve valuable data and resources and offer customized solutions across various stages, from material engineering to mass production applications. Additionally, Tidetron actively supports joint patent applications with different sectors, fostering innovation and breakthroughs in the application of synthetic biotechnology through collaborative research and development efforts.

The second strategy centers around Intelligent Fermentation, which enables Green Mass Production. Tidetron Bioworks has perfected materials using a customized intelligent fermentation system to ferment and mass-produce the optimal strains rapidly. After meticulous separation and purification, the company achieves high-purity, highly active, and stable quality target materials. It is worth noting that Tidetron's factory boasts an annual production capacity exceeding 10,000 tons while with a low cost of energy consumption, pollution, and carbon emissions.