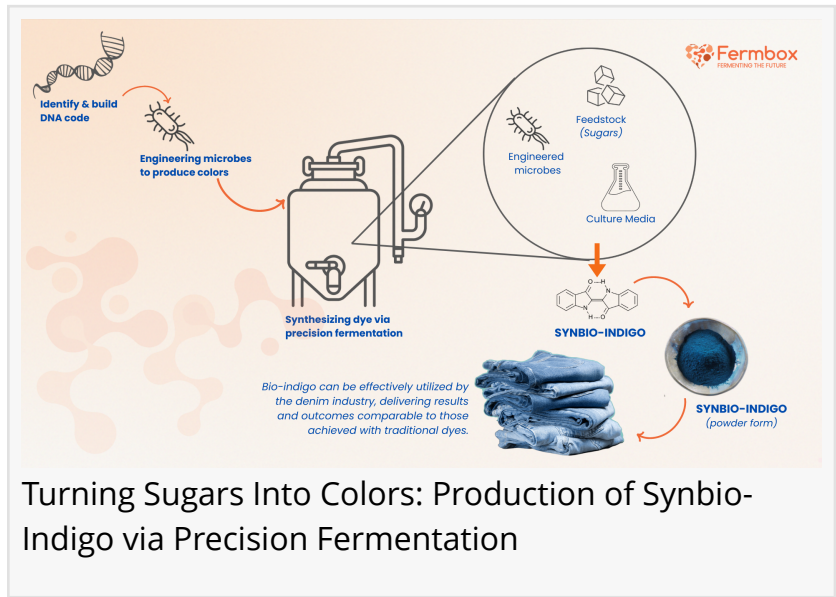


Greener Blues: Introducing Fermbox Bio's Sustainable Synbio-Indigo

Fermbox Bio introduces Synbio-Indigo, a fermentation-based indigo dye, providing a sustainable alternative to traditional indigo production.

BENGALURU, KARNATAKA, INDIA, July 30, 2024 /EINPresswire.com/ -- [Fermbox Bio](#), a synthetic biology research and manufacturing company, has successfully developed a sustainable, fermentation-based, [Synbio-Indigo](#) dye. Leveraging their advanced Synbio Product Development Platform, Fermbox Bio produces high-quality Synbio-Indigo through microbial fermentation, ensuring a minimal environmental footprint.



Fermbox Bio Founder [Mr. Subramani Ramachandrappa](#) comments, "Synbio-Indigo showcases the potential of synthetic biology to deliver sustainable solutions. With precision fermentation, we produce an indigo dye that matches traditional indigo, with the added benefits of better sustainability, traceability and quality."

The Urgent Need for Sustainable Indigo Production:

The blue denim gets its iconic color from indigo dye, but unfortunately, this dye is notoriously harmful to the environment. Today Indigo is primarily manufactured via chemical synthesis using harmful chemicals like benzene, formaldehyde, aniline, cyanide, and sodamide, and they are also associated with emissions linked to petrochemical use.

"Chemical production of indigo dye depends on non-renewable petrochemicals, leading to high energy use and releasing toxic by-products that lead to water pollution and disruption of aquatic ecosystem," explains Preeti Dharmagoudar, Co-founder of Fermbox Bio. "While natural extraction from the Indigofera plant avoids most of these chemicals, it requires large amounts of land and water, disrupting habitats and impacting biodiversity. Agro-based indigo also has lower

purity, which contributes to an inconsistent dyeing quality. Indigo production from Indigofera farming often involves exploitative labor practices and exposes workers, including children, to hazardous conditions."

Whether it's produced chemically or extracted naturally from the Indigofera plant, there are serious environmental and ethical concerns. Both methods consume vast resources, exacerbating environmental damage and climate change.

Preeti emphasizes that the textile and denim industries must adopt more sustainable and ethical production methods to address these challenges. With the global denim industry consuming nearly 70,000 tons of indigo dye annually, it is crucial to transform how we produce this dye. Fermbox Bio's Synbio-Indigo offers a promising alternative by reducing reliance on non-renewable resources and minimizing harmful pollutants.


Fermbox Synbio Product Platform for Synbio-Indigo Production:

Mr. Subramani, provides further insight into their proprietary Fermbox Synbio Product Platform, a cutting-edge integration of strain and enzyme engineering. This platform optimizes metabolic pathways in microorganisms to produce various sustainable synbio products leveraging a range of advanced tools and technologies, including rDNA technology, CRISPR genome editing, molecular biology, computational biology, pathway mapping, machine learning, and high-throughput screening. This comprehensive suite of tools, combined with the flexibility to work with various host microorganisms, broadens the platform's potential applications, resulting in a diverse product portfolio. One of the applications of this platform is the production of sustainable Synbio-Indigo.

"We're teaming up with microbes to produce Synbio-Indigo," says Subramani. "Our Synbio

	CHEMICALLY SYNTHESIZED INDIGO	PLANT-BASED INDIGO	Fermbox FERMENTING THE FUTURE SYNBIO-INDIGO
Source	Chemically synthesized	Agro-based extracted from Indigofera leaves	Precision fermentation based
Environment & Sustainability	<ul style="list-style-type: none"> Toxic chemicals Water pollution High carbon footprint 	<ul style="list-style-type: none"> Biodiversity loss Land degradation High carbon footprint 	<ul style="list-style-type: none"> Eco-friendly Low carbon footprint
Scalability	Highly scalable	Low scalability	Highly scalable
Supply chain	Established & stable	Variable & unreliable	Potential for stable & robust integration
Purity	High purity	Variable, may contain impurities	High, due to controlled microbial production
Consistency & Quality	High consistency & quality	Variable consistency & quality	High consistency & quality

Comparison of Chemically Synthesized Indigo, Plant-Based Indigo, and Synbio-Indigo in terms of source, environmental sustainability, scalability, supply chain, purity, and consistency, highlighting Synbio-Indigo's advantages in sustainability



Product Platform uses microbes to create indigo dye by mimicking natural processes. Instead of relying on chemicals, these microbes transform sugars into colors using synthetic biology tools and precision fermentation."

The technology employs re-engineered microbial enzymes to drive this biotransformation. By embedding these engineered enzyme genes into bacteria, Fermbox Bio turns them into bio-factories that convert sugars into blue dye pigments. These microbial bio-factories multiply rapidly, resulting in high yields of blue pigment—like brewing beer but for colors!

"Our biotransformation process provides a sustainable source of indigo," Subramani explains. "By utilizing advanced genetic engineering, we're able to increase both yield and efficiency. We're also focused on improving the functionality of Synbio-Indigo, aiming to make the dyeing process itself more sustainable."

Synbio-Indigo: The Shift to Sustainable Indigo Production:

As environmental regulations tighten on chemical pollutants and non-renewable resources, industries are being pushed to find sustainable alternatives. Consumers, increasingly opting for eco-friendly products, are driving the demand for sustainable practices from their favorite brands.

Synbio-Indigo meets this demand by utilizing renewable feedstocks, significantly reducing the reliance on synthetic chemicals and non-renewable resources. This also enhances safety for both the environment and workers. Produced in a controlled environment, Synbio-Indigo ensures high purity and consistency, providing a stable and reliable supply chain.

About Fermbox Bio:

Fermbox Bio specializes in Synthetic Biology Research and Manufacturing, with operations in India, Thailand, and the USA. The company develops sustainable synbio products and solutions, leveraging microbial fermentation and synthetic biology. Fermbox Bio's collaborative model supports partners from concept to commercialization, addressing the unique challenges of scaling up in biomanufacturing.

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