

TDB-DST Supports M/s K. N. Biosciences (India) Private Limited, Hyderabad, for Commercialization of Indigenous C-Phycocyanin Production Technology from Spirulina

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Strengthening India's capabilities in biotechnology-based sustainable manufacturing, the Technology Development Board (TDB), under the Department of Science & Technology (DST), Government of India, has extended financial assistance to M/s K. N. Biosciences (India) Private Limited, Hyderabad, for the project titled "Production of C-Phycocyanin using Spirulina sp. as a Cell Factory." The project aims to commercialize an indigenous technology for producing high-value C-phycocyanin, a natural blue pigment with applications across the food, nutraceutical, agriculture, aquaculture, poultry feed, and biostimulant sectors, while reducing India's dependence on imported natural colorants.

The technology has been developed by the Indian Institute of Technology (IIT) Guwahati using an indigenous Spirulina strain (NCIM 5143) and has been transferred to the company through a formal Transfer of Technology (ToT) agreement for commercial production. The initiative reflects the successful translation of publicly funded research into market-ready biotechnology products and aligns with the Government of India's vision of strengthening bioeconomy, sustainable manufacturing, and Aatmanirbhar Bharat.

The project integrates an optimized upstream cultivation process with an environmentally sustainable downstream extraction and purification technology for the production of high-purity C-phycocyanin. Using controlled photoautotrophic cultivation under optimized light and nutrient conditions, the process generates high-density Spirulina biomass rich in phycocyanin. This is followed by a green, solvent-free extraction and single-step purification process, enabling efficient recovery of food-grade and analytical-grade C-phycocyanin with reduced processing complexity and environmental impact.

Unlike conventional extraction methods, the indigenous process minimizes the use of chemicals while delivering high product purity suitable for diverse industrial applications. The final product is obtained as a stable, water-soluble blue powder that has been benchmarked against commercial international standards. With growing global demand for natural food ingredients and clean-label products, the technology offers significant commercial opportunities while supporting sustainable and eco-friendly manufacturing practices.

The project will establish commercial-scale production capabilities for C-phycocyanin in India, creating an indigenous value chain for natural pigments and specialty bioproducts. The initiative is expected to support import substitution, promote value addition to algal biotechnology, strengthen India's bio-manufacturing ecosystem, and enhance the country's competitiveness in global markets for natural ingredients and nutraceuticals.

Speaking on the occasion, **Shri Rajesh Kumar Pathak, Secretary, TDB**, stated, "India's bioeconomy presents immense opportunities to transform indigenous research into globally competitive products. Technologies such as this demonstrate how scientific innovation can create sustainable alternatives to

imported specialty ingredients while promoting green manufacturing and value-added biotechnology. TDB remains committed to supporting commercialization of such indigenous technologies that strengthen India's self-reliance and global leadership in the bio-based economy."

Expressing gratitude for the support, the leadership of M/s K. N. Biosciences (India) Private Limited stated that the assistance from TDB will enable the company to establish commercial-scale production facilities and accelerate the market deployment of high-quality indigenous C-phycocyanin. The company noted that the project will contribute to building a robust domestic ecosystem for natural bio-based products while addressing growing demand across domestic and international markets.



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