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DIC Corporation

DIC, Debut Biotech Team Up to Develop and Bio-manufacture Natural Pigments for More Sustainable Food Colorants and Cosmetics

TOKYO - DIC Corporation (DIC) announced a joint research development agreement with California-based biotech startup Debut Biotechnology, Inc. (Debut Biotech), further enhancing DIC efforts to develop natural pigments for food colorants and cosmetics.

In recent years, increasingly urgent climate concerns have increased global consumer demand for biodegradable, naturally derived colorants—notably in foods and cosmetics—to replace synthetic petroleum-derived colorants. This rapidly increasing consumer demand has motivated major global brands to seek out more sustainable materials for their products.

Unfortunately, the increasing efforts to extract useful pigments from natural materials, including flowers or plants, continue to face significant commercialization challenges, including unacceptably low yields, excessive post-extraction waste generation, and environmental burdens, such as land and water use. Moreover, problems specific to agriculture, such as increasingly unstable weather as well as qualitative and quantitative fluctuations remain as barriers to efficient production.

While more organizations are now researching ways to efficiently culture bacteria, yeast, or algae, etc., using biological reactions within cells to produce needed materials, the by-products generated by these reactions continue to foil attempts to conduct reaction processes under optimum conditions.

Debut Biotech's proprietary next-generation continuous cell-free biomanufacturing technology overcomes these traditional biomanufacturing barriers—retaining enzymes and other useful parts of cells, while discarding limiting parts. By working with vital cell enzymes and such under optimum conditions, Debut Biotech engineers optimize reactions, synthesizing stable targets with high purity to efficiently and continuously manufacture biomaterials and other active ingredients previously overlooked due to low material yields.

Debut Biotech, CEO Joshua Britton said, “With our advanced cell-free biomanufacturing platform, we're able to produce color ingredients that are simply not possible with traditional fermentation-based biomanufacturing. Our colors are naturally-derived with a fraction of the inputs—less waste and energy—and without the use of petrochemicals. With this approach, we're able to take on a level of complexity that creates whole new possibilities for the color

ingredient landscape across industries. We're thrilled to be working with DIC as they're established leaders in the color ingredients industry."

DIC Managing Executive Officer and New Business Development Headquarters General Manager Kiyofumi Takano said, "DIC hopes to combine Debut Biotech's advanced knowledge of enzyme reactions and process design with DIC's scale-up technology, quality control, and product development capabilities to develop and commercialize new sustainable, high value-added bio-based colorants, pigments, and healthy foods for global markets."

"As a leading global provider of printing inks and organic pigments, DIC is constantly striving to develop safer and more sustainable products. And through this joint development agreement with Debut Biotech, DIC expects to continue delivering on the DIC Color and Comfort by Chemistry vision to improve the human condition by safely bringing color and comfort into people's lives with even safer and more environmentally friendly products."

About DIC Corporation

DIC Corporation is one of the world's leading fine chemicals companies, with top shares of the global printing inks, organic pigments and polyphenylene sulfide (PPS) compounds markets. Established in 1908 as a manufacturer of printing inks, DIC has capitalized on its capabilities in organic pigments and synthetic resins to build a broad portfolio of products for diverse industries, including automobiles, electronics, food and housing. DIC is also the core of the DIC Group, a multinational organization with operations in more than 60 countries and territories worldwide.

Website: <https://www.dic-global.com/en/>

About Debut Biotech

Debut Biotech is dedicated to unlocking natural products through sustainable biomanufacturing. Their unique biomanufacturing platform harnesses natural cell-free enzymes to overcome the limitations of cell-based manufacturing and provides access to previously unobtainable products. Debut Biotech truly believes that biomanufacturing will be how materials and ingredients are created in the future and are committed to leading the revolution. To learn more about Debut Biotech, and their cell-free approach to biomanufacturing, visit www.debutbiotech.com.