

Development of anthocyanin-based edible eco-friendly colorant from Red Cabbage

TECHNOLOGY AVAILABLE FOR TRANSFER

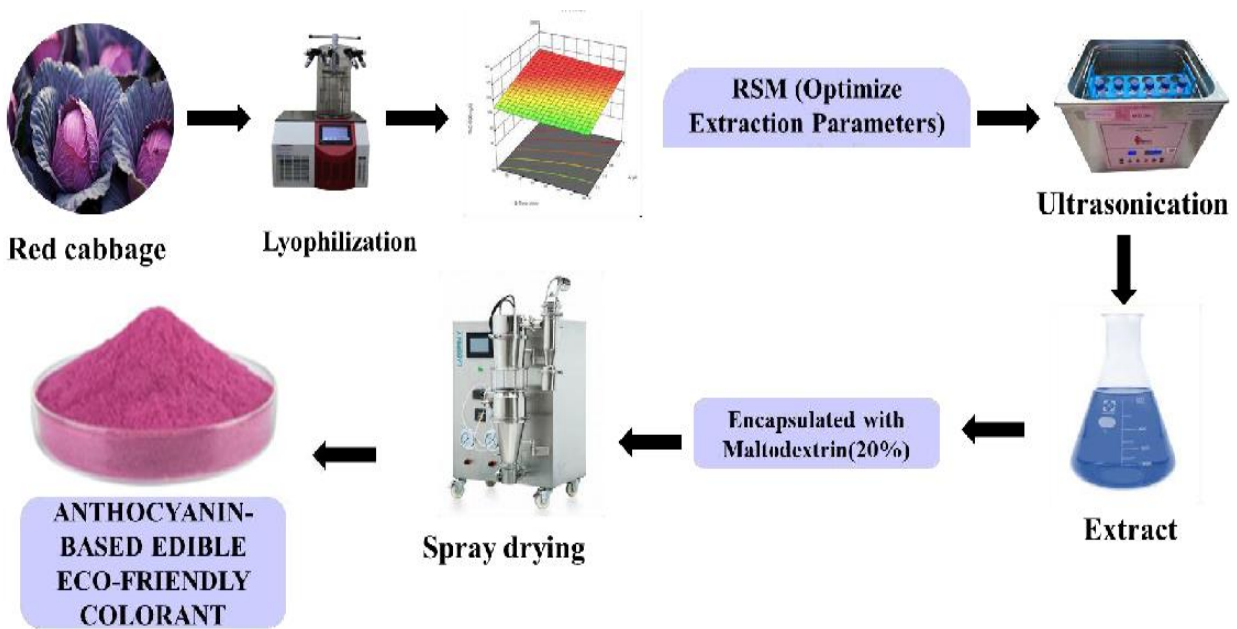
UNMET NEED AND OPPORTUNITY

The food industry is moving toward natural bioactive compounds for their safety and health benefits over synthetic alternatives. While synthetic colorants like Red 40 and Yellow 5 pose health and environmental risks, natural colorants often lack heat and storage stability. Hence, the demand for safe, stable, and health-promoting pigments such as anthocyanins is growing. Traditional anthocyanin extraction methods using solvents like ethanol or methanol are inefficient, toxic, and time-consuming, often degrading heat-sensitive compounds and reducing antioxidant activity, making them unsuitable for food-grade use.

Therefore, there is an urgent need for a solvent-free, sustainable and stable natural colorant for food and nutraceutical products, offering improved anthocyanin stability, bioavailability, and shelf life.

TECHNOLOGY

The technology offers an improved process to produce water-soluble, food-grade anthocyanin powder from red cabbage using ultrasound-assisted extraction (UAE) optimized through response surface methodology (RSM). The extracted dye is stabilized by spray-drying. FTIR and SEM analysis of the structure and surface properties indicates that the natural dye has good thermal stability, bio accessibility and functional properties (antioxidant activity and enzyme inhibition efficiency) making it suitable for food and nutraceutical use.



STAGE OF DEVELOPMENT

The technology is currently placed at TRL-4, has been developed and validated at lab scale using multiple analytical tools. Laboratory scale optimization of extraction and encapsulation parameters have been completed.



Biotech Consortium India Limited

NOVEL CHARACTERISTICS

	Solvent-free process: Uses a completely organic solvent-free UAE method, ensuring food-grade safety and eco-friendly processing.
	High stability: Stable at up to 120°C and has storage stability up to 70 days at 4°C., outperforming conventional anthocyanin formulations.
	Functional benefits: Shows strong antioxidant activity (82%) and enzyme inhibition, making it useful as both a colorant and functional food additive.
	Optimized extraction: Reproducible process optimized for high anthocyanin yield (125.72 mg/L).
	High demand: Vibrant red color which is non-toxic as well as biodegradable—ideal for food, beverage, and nutraceutical products.
	Cost-effective: Red cabbage is a low-cost raw material, making the process economical.
	User-friendly process: Simple to produce, non-toxic, and biocompatible.
	Sustainable: Utilizes red cabbage and its processing waste, supporting sustainable and circular economy practices

APPLICATION

- **Food applications:** Serves as a natural, non-toxic colorant for beverages, confectionery, dairy, and bakery products, replacing synthetic dyes like Red 40 and Yellow 5.
- **Nutraceutical:** Offers antioxidant, anti-diabetic, and *α -amylase/ α -glucosidase* enzyme inhibitory properties, making it suitable for dietary supplements and functional foods.
- **Pharma and cosmetics:** Acts as a biodegradable, bioactive pigment for cosmetic and pharmaceutical products with added antioxidant and anti-inflammatory benefits.

INTELLECTUAL PROPERTY

Indian patent filed

LICENSING OPPORTUNITY

BCIL is looking for suitable Licensee for transfer of this technology.

CONTACT

Dr. Purnima Sharma, Managing Director

BIOTECH CONSORTIUM INDIA LIMITED

V Floor, Anuvrat Bhawan, 210, Deen Dayal Upadhyaya Marg, New

Delhi:110002 Phone: +91-11-23219064-67,

Fax: +91-11-23219063

Email: tto.bcil@biotech.co.in & info.bcil@biotech.co.in Website:

www.biotech.co.in