BCIL

Biotech Consortium India Limited

New algal strain for Astaxanthin: *Dysmorphococcus globosus*-HI

TECHNOLOGY AVAILABLE FOR TRANSFER

UNMET NEED AND OPPORTUNITY

Astaxanthin (ASX) is an antioxidant carotenoid which protects cells from damage against UV-induced photo-oxidation. It is used for anti-tumor therapies; preventive treatment of age-related neural damage like in Alzheimer and Parkinson diseases. Although the production cost of synthetic ASX is lower than natural ASX but the use of chemical ASX raises severe concern related to toxicity and not suitable for human consumption. In 2022, the Global Natural ASX Market was valued at USD 116.2 Million which is expected to reach USD 248.3 Million by 2032. This market is estimated to achieve a compound annual growth rate of 8.1%.

Thus, there is a huge market demand for natural ASX and also a highly productive microbial strain for the production of natural ASX with low production cost.

TECHNOLOGY

The present invention provides a novel solution by introducing an algal strain which provides high yield of natural ASX. A new algal strain of *Dysmorphococcus globosus* is isolated from the Himalayan region of Northern India. Its growth conditions were optimized in the laboratory to achieve maximum growth and production of ASX. This novel algal strain of *D. globosus* showed promising results by accumulating significantly higher ASX as compared to other commercially available algal varieties for the production of natural ASX. Till now, natural ASX is mainly produced from freshwater algae *Haematococcus pluvialis* which shows ASX accumulation of 7.72-174.70 mg/L in culture condition with the doubling time of approximate 25 hours. However, presently isolated algal strain of *D. globosus* shows high carotenoid accumulation of ASX (391 mg/L) and doubling time 8-12 hours only, as compare to the other available algal species for commercialization. Thus, a major breakthrough can be achieved in the carotenoid market by utilizing algal strain of *D. globosus* for commercial production of natural ASX.

UNIQUE SELLING PROPOSITIONS

- **Quality** – Natural ASX represents finest quality with the highest antioxidant potential as compare to synthetic ASX which is a mixture of stereo-isomers and less stable under technological conditions with poor bioavailability.

- **Enhanced efficacy** – Highest yield of ASX has been observed with the novel algal strain of *D. globosus,* at rate of 391 mg/L, as compare any other potential algal sources. The richest source of natural ASX is *H. pluvialis*, a microalga which is widely used for commercial production of natural ASX. The below mentioned comparative table shows the significant advantage of the novel algal strain of *D. globosus* over *H. pluvialis*:

Property	*H. pluvialis* (Commercial strain)	*D. globosus* - HI (ICGEB Strain)
Cell biomass	9.00 g/L (30 days)	**0.756 g/L (25 days)**
ASX percentage (CDW basis)	1-5% CDW	**51.01% CDW**

- **Cost effective** – The present algal strain of *D. globosus* produces natural ASX multifold, as compare to other commercially available microalgae, hence it is very cost effective.
- **Toxicity**- High grade natural ASX, suitable for human consumption.

CHARACTERISTICS OF NOVEL ALGAL STRAIN OF *D. globosus*

The purified novel algal culture was maintained in the liquid medium, incubated at 25 ± 2^0C, with continuous illumination of light and was kept under constant shaking on an orbital shaker. The growth characteristics of novel strain of *D. globosus* has been optimized in different types of media to find higher biomass production like 1.14 g/L and maximum ASX percentage at 51.01% (CDW basis).

ANALYSIS OF NATURAL ASX

The isolated natural ASX has been analyzed by thin-layer chromatography (TLC analysis).

APPLICATION

Nutraceutical, food, cosmetics and pharmaceuticals.

INTELLECTUAL PROPERTY

Patent application has not been filed.

LICENSING OPPORTUNITY

BCIL is looking for suitable industrial partner for scaling up and commercialization of this technology comprising novel algal strain of *Dysmorphococcus globosus*-HI.

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