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Supercritical CO₂ extraction of Carotenoids from microalgae and characterize using High performance liquid chromatography

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PURPOSE OF THE ABSTRACT

Carotenoids are natural pigments that are polymerized enzymatically to form highly conjugated 40-carbon structures which are derived from five-carbon isoprene units. Due to increase in demand of natural products, production and extraction of carotenoid has become challenging. It is widely used as nutraceutical, cosmeceutical, pharmaceutical and feed supplement in aquaculture sector. Microalgae are a great source of Carotenoids which comprises of β -carotene, astaxanthin, zeaxanthin, lycopene, lutein and fucoxanthin. Extraction of carotenoids using organic solvents is not suitable due to its toxicity therefore sustainable green extraction process is employed. Supercritical carbon dioxide (SC-CO₂) is used to extract carotenoids from microalgae at critical temperature and pressure. This method is non toxic, environment friendly and prevents degradation of thermolabile compounds. Microalgae strains used to extract Carotenoids are mixture of *Chlorella pyrenoidosa* and *Phormidium*, *Chlorella vulgaris*, *Dunaliella salina* and *Spirulina* at optimized temperature, pressure and time. Carotenoids present are analyzed using UV- spectrophotometer and Reversed phase-High performance liquid chromatography (HPLC). Antioxidant activity of extract obtained by microalgae using SC-CO₂ is also determined using DPPH assay. Benefits of Carotenoids to human health have been reported in literature based on positive impact of antioxidant bioactivity in immune response. Further research studies have to be done in order to develop the beneficial uses of algal carotenoids.

FIGURES

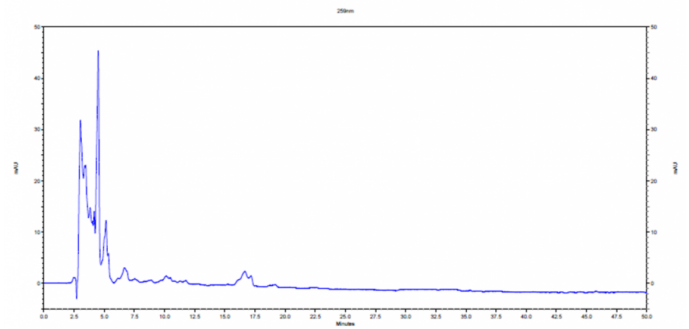
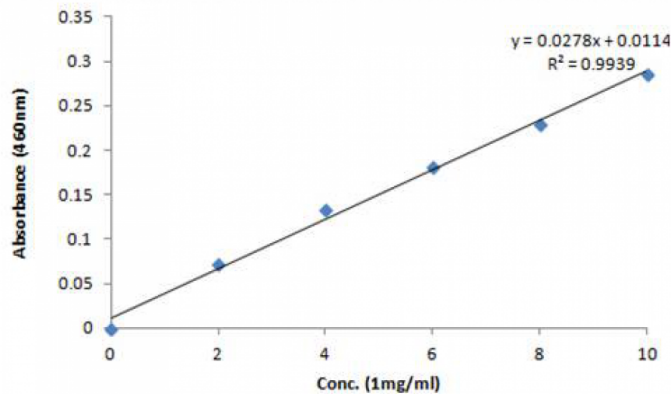


FIGURE 1

UV visible spectrophotometer of carotenoids
X-axis- Concentration of Beta carotene
Y-axis- Absorbance

FIGURE 2

HPLC of carotenoid extracted from algae
Carotenoid extracted using SC-CO₂

KEYWORDS

Carotenoids | Microalgae | SC-CO₂ | HPLC

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