

N°444 / OC

TOPIC(s) : Alternative solvents / Alternative technologies

Extraction and characterization of bioactive lipids from microalgae using Supercritical CO₂ and its commercial applications

AUTHORS

NIDHI HANS / IIT DELHI, BLOCK III, 390 CRDT DEPARTMENT, NEW DELHI

Anushree MALIK / IIT DELHI, BLOCK III, 390, CRDT DEPARTMENT, NEW DELHI

Corresponding author : Satyanarayan NAIK / naiksn@gmail.com

PURPOSE OF THE ABSTRACT

Extraction of bioactive compounds using organic solvents has become a concern for health and environment. The high cost of organic solvents and demanding environment regulations has increased the need of new, clean and green technology. Supercritical Carbon dioxide has gained attention in recent years for extraction of bioactive compounds from microalgae as it offers various advantages and is environment friendly. Currently, there is much interest in biologically active compounds derived from marine algae. Microalgae are rich in fatty acids, proteins, phenolic compounds, sterols, polysaccharides, oligosaccharides, photosynthetic pigments, vitamins and minerals. Microalgae consist of 40-80% lipids. Lipids from microalgae are extracted using Supercritical CO₂ at optimum temperature, pressure and time. Fatty acids present in extracted lipids are converted into fatty acids methyl esters (FAME) and are detected using gas chromatography-mass spectroscopy (GC-MS). Microalgae contain polyunsaturated fatty acids (PUFAs) including ω -3, ω -6 which has positive role in human health as it prevent and modulate certain diseases that are common in many populations. Extraction and optimization of lipids from different strains of microalgae such as *Chorella vulgaris*, *Dunaliella salina*, *Spirulina*, and *Hematococcus* and algae consortia (mixture of *Chorella pyrenoidosa* and *Phormidium*) is performed and its characterization is done using gas chromatography mass spectroscopy. Results shows that consortium algae contain Oleic acid, stearic acid, Palmitic acid, Palmitoleic acid and linoleic acid. Physiochemical characterization of microalgae has been performed which allow determining different application and purposes of extracted bioactive compounds from selected microalgae.

FIGURES

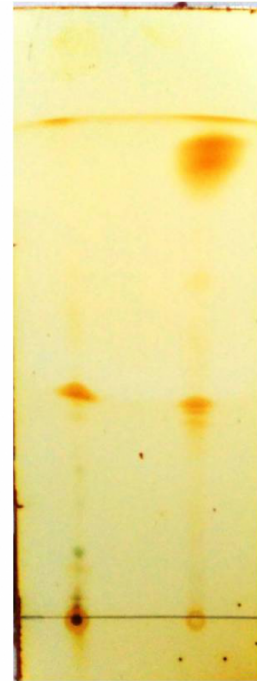
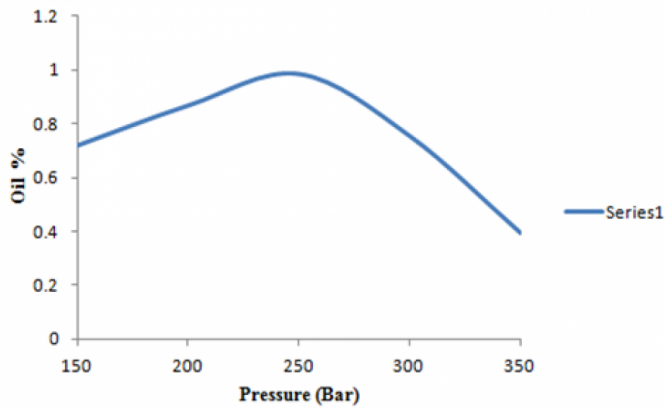


FIGURE 1

Supercritical CO₂ extraction of lipids

X-axis- pressure (bar)

Y-axis- Oil percentage

FIGURE 2

Thin layer chromatography

Formation of FAME in lane 2

KEYWORDS

Microalgae | Supercritical carbon dioxide | FAME | GC-MS

BIBLIOGRAPHY

Mendes, Rui L., et al., Supercritical carbon dioxide extraction of compounds with pharmaceutical importance from microalgae. *Inorganica Chimica Acta* 356 , 2003, 328-334.

Sahena, Ferdosh, et al., Application of supercritical CO₂ in lipid extraction—A review. *Journal of Food Engineering* 95.2 ,2009, 240-253.

Mendes, Rui L., et al., Supercritical carbon dioxide extraction of compounds with pharmaceutical importance from microalgae. *Inorganica Chimica Acta* 356, 2003, 328-334.