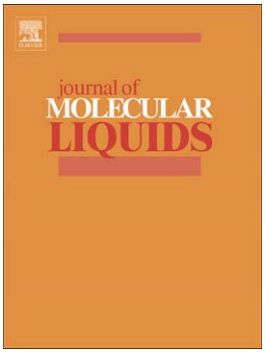

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Aslan M. Aliev, Ilmutdin M. Abdulagatov

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The study of microalgae *Nannochloropsis salina* fatty acid compositions extraction using different techniques. SCF vs conventional extraction.

Aslan M. Aliev[a,b], Ilmutdin M. Abdulagatov[c]

[a]*Institute of Physics DSC RAS, Yaragskogo Street, 94, Makhachkala 367003, Russia*
[b]*Mountain Botanical Garden DSC RAS, Yaragskogo Street, 75, Makhachkala 367030, Russia*
[c]*Dagestan State University, Physical Chemistry Department, Gadzhieva Str., 43a, Makhachkala 367000, Russia*

Abstract

The extraction of lipids and other valuable components from microalgae (*Nannochloropsis salina*) has been performed using various conditions: pure SC-CO_2; SC- CO_2+acetone (at 32 MPa and 40 °C); Soxhlet apparatus with *n*-hexane; and Soxhlet apparatus with chloroform. Small amounts of co-solvents (3.2 wt. % of acetone) were added to modify the polarity and solvent strength of the supercritical CO_2 to increase the solute solubility and to minimize operating costs of the extraction process. The extractions of lipids from algae were performed using a laboratory scale SCF extraction experimental apparatus. High pressure supercritical reactor with volume of 993 cm^3, which made from stainless steel, was used. The flow rate of SCF was maintained constant (1.5 ± 0.05 kg/h). The extraction time was within 1.5 h. Four extracted lipid fractions were collected separately for each extraction conditions (for pure CO_2 and CO_2+ co-solvents) and analyzed using GC-MS. The experimental results showed that extraction technique is negligible small affecting on total extract yields and fatty acids content.

***Keywords*:** acetone; carbon dioxide; chloroform; fatty acids; microalgae; *Nannochloropsis Salina*; supercritical extraction; supercritical fluid

1. Introduction

The population of many developing countries suffers from unbalanced nutrition and run short of food. A fatty acids deficiency in daily food raises the risk of cardio-vascular and autoimmune diseases, cancer, asthma, arthritis, depression, schizophrenia, and various pathologies in a child development [1-17]. For example, palmitoleic, frachidonic, timnodonic acids are used for treatment and prevention of diseases such as cardio-vascular, diabetes, and eye disorders, arthritis, contribute to the Alzheimer disease remission, facilitate to control the cholesterol and a blood pressure, and arthronosos, *etc*. Also, polyunsaturated fatty acids maintain the brain