Bioresource Technology 125 (2012) 340–343

Contents lists available at SciVerse ScienceDirect

Bioresource Technology

journal homepage: www.elsevier.com/locate/biortech

Short Communication

A new Arctic *Chlorella* species for biodiesel production

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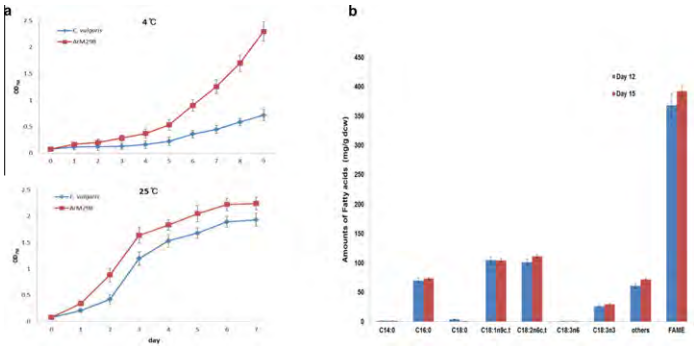
HIGHLIGHTS

- We provide specific characters of Arctic *Chlorella* ArM0029B as a biodiesel source.
- ArM0029B displayed fast growth at a wide temperature range of 4–32 °C.
- ArM0029B accumulated high levels of total fatty acids, reaching 39% of dry weight.
- In ArM0029B, 54% of total fatty acids was oleic acid (18:1) and linoleic acid (18:2).
- These results suggest that ArM0029B may be a suitable source for biodiesel.

GRAPHICAL ABSTRACT



(A) Growth rate of ArM0029B at various temperatures. *Chlorella vulgaris* served as a control. Data are expressed as ± SD (n = 3). (B) Analysis of fatty acid composition in ArM0029B. The amounts of each fatty acid and total fatty acids were presented as mg/dry cell weight.

ARTICLE INFO

Article history:
Received 28 June 2012
Received in revised form 7 September 2012
Accepted 9 September 2012
Available online 16 September 2012

Keywords:
Biodiesel
Chlorella
Fatty acid
Oleic acid (18:1)
Linoleic (18:2)

ABSTRACT

Microalgae are a potential resource for biodiesel production. A green alga, *Chlorella* sp., was isolated from Arctic sea ice, which was named ArM0029B. These algae displayed faster growth at a wide temperature range of 4–32 °C compared to *Chlorella vulgaris*. ArM0029B also accumulated high levels of total fatty acids under nitrogen starvation conditions, reaching 39% of dry cell weight, with the proportion of oleic acid (18:1) and linoleic acid (18:2) reaching 54% of total fatty acids. Taken together, these results indicate that the newly identified *Chlorella* species, ArM0029B, is a promising candidate for biodiesel production.

1. Introduction

Biodiesels are derived from biomass, a renewable energy source because the energy contained comes from the sun. Biodiesel is mostly derived from crop oils, animal fats, and waste cooking oils (Chisti, 2007; Taufiqurrahmi et al., 2011; Zhang et al., 2003). Microalgae are considered an attractive source for producing biodiesel due to their potential for high oil content (Chisti, 2007; Ugwu et al., 2008). Biodiesel production using microalgae provides several advantages over oil crops (Li et al., 2008); it requires less water than crop plants and does not compete for agricultural land use.

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0960-8524/$ - see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.biortech.2012.09.026