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The isolation and identification of new microalgal strains producing oil and carotenoid simultaneously with biofuel potential

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1 **The isolation and identification of new microalgal strains producing oil and**
2 **carotenoid simultaneously with biofuel potential**

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11
12 **Abstract**

13 Taxonomy and phylogeny of twenty two microalgal isolates were examined using
14 both universal and newly designed molecular primers. Among the isolates, *Scenedesmus*
15 *bijugus*, *Coelastrella* sp., *Auxenochlorella protothecoides*, and *Chlorella* sp. were
16 particularly promising in terms of producing lipids as measured by fatty acid methyl
17 esters (FAME) analysis and significant concentration of carotenoids. A comparative
18 experiment showed that *Scenedesmus bijugus* and *Chlorella* sp. were the most
19 promising candidates ($L^{-1} d^{-1}$, with biomass) 174.77 ± 6.75 , 169.81 ± 5.22 mg, lipids 40.14
20 ± 3.31 , 39.72 ± 3.89 mg, lutein 0.47, 0.36 mg, and astaxanthin 0.27, 0.18 mg respectively.
21 The fatty acids produced by these microalgal isolates were mainly palmitic, stearic,
22 oleic, linoleic, and linolenic acid. The freshwater microalgal isolate *Scenedesmus bijugus*
23 be the most suitable isolate for producing biodiesel and carotenoids, due to high
24 productivity of biomass, lipids, metabolites, and its suitable fatty acid profile.

25 **Keywords:** microalgae; carotenoids; lipids; bioprospecting; biofuel.

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