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Enhancement effect of ethanol on algal biomass accumulation

Chengchen Wu

Department of Applied Biological Science, Zhejiang University, Hangzhou 310029, P.R. China

Abstract

Microalgae is a suitable alternative to replace conventional fuel resources for biodiesel production for its renewable and environmental-friendly advantages that could meet the global demand for biodiesel production. To reduce production cost and improve feedstock yields of biodiesel production from microalgae, current research on algal biodiesel in our group mainly focus on selection of oil-rich algae species, optimization of algal culture conditions and amelioration of algal lipid extraction and transesterification. The effects of ethanol concentration gradients along with varied cultivation times on lipid and fatty acid accumulation and composition of freshwater microalgae Scenedesmus *sp.* and Chlorella *ellipsoidea* were studied. Different ethanol concentrations showed different effects on the growth of freshwater microalgae, and proper amount of ethanol could markedly improve algal density, lipid productivity, lipid content and fatty acid content, respectively. Lipid productivity and lipid content were increased correspondingly with the increase of ethanol concentrations. However, ethanol at low concentrations could inhibit total lipid accumulation. Positive effect of ethanol on lipid content of *Scenedesmus* sp. should above a threshold value of ethanol concentration and algal light deprivation inhibited ethanol positive effects on algal growth and lipid biomass. Besides, with the increase of ethanol concentrations and cultivation times, the cumulative quantity of C16:0 and C18:0 decreased correspondingly, but unsaturated fatty acids were increased and appeared early in algal cells. The results indicated that adding proper amount of ethanol in algal culture medium was beneficial to biodiesel feedstock production and biodiesel properties.

Biography

Chengchen Wu is a PHD candidate at Zhejiang University in the Department of Applied Biological Science. Her current research interests mainly focus on selection of oil-rich algae species and optimization of algal culture conditions. She has published several journal papers.