

Abstract

Effects of organic carbon sources on cell growth and alpha-tocopherol productivity in wild and chloroplast-deficient W14ZUL strains of *Euglena gracilis* under photoheterotrophic culture were investigated. In both strains, the increase in cell growth was particularly high when glucose was added as the sole organic carbon source. On the other hand, alpha-tocopherol production per dry cell weight was enhanced by adding ethanol. Ethanol addition also increased the chlorophyll concentration in wild strain and mitochondria activity in W14ZUL strain. For effective alpha-tocopherol production, the effects of mixture of glucose and ethanol were investigated. The results showed that, when a mixture of glucose (6 g/l) and ethanol (4 g/l) was used, alpha-tocopherol productivity per culture broth was $3.89 \times 10^{-2} \text{ mg l}^{-1} \text{ h}^{-1}$, which was higher than the value obtained without addition of organic carbon source ($0.92 \times 10^{-2} \text{ mg l}^{-1} \text{ h}^{-1}$). In addition, under fed-batch cultivation using an internally illuminated photobioreactor, the alpha-tocopherol production per culture broth was 23.43 mg/l, giving a productivity of $16.27 \times 10^{-2} \text{ mg l}^{-1} \text{ h}^{-1}$.

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