

**Title:** UTILIZATION OF GLYCERIN FROM BIODIESEL TO DIHYDROXYACETONE PRODUCTION BY *GLUCONOBACTER OXYDANS*

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Glycerin is the main by-product of the biodiesel industry. It contains glycerol as the major component and impurities like methanol and soap. The world production of biodiesel has increased the availability of glycerol and today there are concerns related to the economy and environmental impact of the excess of glycerin from biodiesel. One of the promising uses of this glycerin is as a carbon and energy source in bioconversion processes to produce value-added products. Dihydroxyacetone (DHA) is used in the cosmetic industry as the active ingredient of sunless tanning lotions, in chemical synthesis of pharmaceuticals and fine chemicals, in food industries and as an auxiliary in the treatment of some skin diseases. DHA is industrially produced from glycerol using *Gluconobacter oxydans*. The process is performed in fed-batch operation mode to avoid the inhibitory effect of substrate and product upon cell growth. The aim of this work is to use glycerin from biodiesel as raw material without purification to obtain DHA using *Gluconobacter oxydans* DSM 2343. The bacterium was grown in appropriate medium containing glycerol or glycerin according to the experiment. The inoculum was grown in 25g/L glycerol culture medium for 24-48 hours. The first set of experiments was carried out in 250 mL Erlenmeyers flasks containing 50 mL of medium. Fed-batch fermentation was performed with 1 L medium in 3 L bioreactor with additions at 25 and 50 hours of cultivation. Initially the air rate and agitation speed were 150 rpm and 1 vvm and after 30 hours of cultivation they were increased to 180 rpm and 2 vvm. The temperature in all the experiments was 30 °C. DHA yield was 99% after 50 hours in Erlenmeyers flasks in a medium containing 25 g/L glycerol. The same yield was gotten in a medium containing 25 g/L glycerin. However, the DHA yield was only 12% in medium containing 45 g/L glycerin. Fed-batch operation in bioreactor using 25 g/l glycerin medium and two additions of 10g glycerin (45g/L total) result in 73% yield after 50 hours and 90% yield after 72 hours. The results showed it was possible to produce DHA using glycerin from biodiesel. Good production was achieved in Erlenmeyers flasks at a concentration of 25 g/L glycerin but not at 45 g/L. However, using a fed-batch strategy in bioreactor it was possible to increase the production and get good yields even at 45 g/L glycerin.

**Key words:** Biodiesel, Dihydroxyacetone, *Gluconobacter oxydans*, Glycerin

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