

P6.14 - LIPID PRODUCTION FROM NON-DETOXIFIED LIGNOCELLULOSIC BIOMASS HYDROLYSATE BY *ASHBYA GOSSYPII* PRECISION FERMENTATION

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ABSTRACT

Single-cell oil production from renewable and abundant feedstocks offers a sustainable and eco-friendly alternative to fossil-fuels consumption, an issue that has gained more attention throughout the years and needs to be addressed in the following ones. Xylose-utilizing oleaginous *A. gossypii* strains have the ability to accumulate lipids using detoxified industrial wastes as feedstock. Their performance using non-detoxified Eucalyptus bark hydrolysate (EBH) as a substrate was evaluated in this work. *A. gossypii* strains were cultivated in synthetic medium mimicking the composition of non-detoxified EBH (SM) supplemented with 10 g/L yeast extract (YE). All strains exhibited similar growth in SM-10YE up to 48 hours but later exhibited autolysis, which influenced their growth dynamics. Despite this, more than 90% of glucose in the culture was consumed within 120 hours. Notably, strain A877 reached superior lipid accumulation, especially as oleic acid. Lipid production optimization was then performed by testing different nitrogen and micronutrient sources and quantities. At this stage, oxygen availability was also investigated as a potential cause for autolysis onset, and it became clear that a balance between biomass production, lipid accumulation and autolysis was needed to achieve maximum lipid yield. Corn steep liquor (CSL), a low-cost sustainable supplementation for EBH, showcased the best balance between all factors. In bioreactor fermentations using non-detoxified EBH and CSL, a lipid titer of 1.42 g/L was achieved at 78 hours, suggesting potential for high lipid production using low-cost and renewable substrates [1].

References:

[1] Francisco, M. et al. Single-cell oil production by engineered *Ashbya gossypii* from non- detoxified lignocellulosic biomass hydrolysate, *Fermentation*, 9(9), p. 791. (2023).

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