RENDIMIENTO DE LÍPIDOS CON Y SIN NITRÓGENO LIMITANTE EN LEVADURAS OLEAGINOSAS AISLADAS EN LOS ANDES NORPERUANOS

LIPID YIELD WITH AND WITHOUT LIMITING NITROGEN IN ISOLATED OLEAGINOUS YEASTS IN THE NORTH PERUVIAN ANDES

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RESUMEN

Las Levaduras Oleaginosas (LO) pueden producir un alto contenido de lípidos para obtención de biodiésel o sustancias nutraceúticas. Se aisló, identificó, evaluó la cinética de crecimiento, rendimiento de biomasa (Y_{xs}) y lípidos (Y_{ps}) empleando medios de cultivo con C/N 100:1+xilosa y 2:1+glucosa (MS-1-7 y MS-2-7). Las LO se identificaron mediante el secuenciamiento de las regiones ITS del ADNr y su contenido de lípidos por gravimetría. La cinética de crecimiento fue evaluada empleando el modelo de Gompertz tipo II parametrizado. Se seleccionaron tres cepas con elevado contenido de lípidos *Rhodotorula glutinis*, *R. mucilaginosa* y *R. kratochvilovae*. Determinándose que la relación C/N en el medio de cultivo tiene influencia en la cinética de crecimiento, los rendimientos de Yxs e Yps. Con MS-1-7 se obtuvo una elevada velocidad específica de crecimiento (μmax), alcanzando la fase estacionaria entre 6 a 9 h, así como la mayor acumulación de lípidos entre 23 y 32%. Con el medio MS-2-7 se obtuvo el máximo valor de biomasa en la fase estacionaria entre 37 y 51 h, lo que generó los mayores Yxs al concluir todo el proceso con un Yps de 4.65; 5.59 y 8.80 gL-1 en las cepas mencionadas. *R. kratochvilovae* tiene potencial para ser utilizada en procesos de producción de biodiésel, empleando un medio de cultivo sin limitación de nitrógeno con elevada concentración de carbono durante la operación unitaria de fermentación. Cuyos rendimientos a nivel industrial pueden mejorar utilizando ingeniería genética y de biorreactores, así como empleando una fuente de carbono más eficiente.

PALABRAS CLAVE

Rendimiento de lípidos, Nitrógeno limitante, Levaduras oleaginosas, Andes norperuanos, *Rhodotorula* glutinis, *Rhodotorula mucilaginosa*, *Rhodotorula kratochvilovae*.

ABSTRACT

Oleaginous Yeasts (OY) can produce high lipid content to obtain biodiesel or nutraceutical substances. Growth kinetics, biomass yield (Yxs) and lipids (Yps) were isolated, identified, evaluated using culture media with C/N 100:1+xylose and 2:1+glucose (MS-1-7 and MS-2-7). OY were identified by sequencing the ITS regions of rDNA and their lipid content by gravimetry. The growth kinetics was evaluated using the parameterized Gompertz type II model. Three strains with the highest lipid content Rhodotorula glutinis, R. mucilaginosa and R. kratochvilovae were selected. The C/N ratio in the culture medium was found to influence growth kinetics, Yxs and Yps yields. With MS-1-7, a high specific growth rate (μmax) was obtained, reaching the stationary phase between 6 to 9 h, as well as the highest lipid accumulation between 23 and 32%. With the MS-2-7 medium, the maximum biomass value was obtained in the stationary phase between 37 and 51 h, which generated the highest Yxs at the end of the entire process with a Yps of 4.65; 5.59 and 8.80 gL-1 in the strains mentioned. R. kratochvilovae has the potential to be used in biodiesel production processes, using a culture medium without nitrogen limitation with a high concentration of carbon during the fermentation unit operation. Its yields at an industrial level can be improved using genetic and bioreactor engineering, as well as a more efficient carbon source.

KEYWORDS

Lipid yield, Limiting nitrogen, Oleaginous Yeasts, Peruvian Andes, Rhodotorula glutinis, Rhodotorula mucilaginosa, Rhodotorula kratochvilovae.

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