

POTENTIAL ALTERNATIVE GROWTH MEDIA FOR YEAST WITH FOOD APPLICATION: A STUDY WITH *Wickerhamomyces anomalus*

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Abstract

Yeast species have been applied for different purposes, such as the production of food and beverages, the biosynthesis of metabolites, and the biotransformations in vivo, characterizing them as potential for active packaging applications. In this context, alternative culture media that use industrial waste or cheaper products have attracted researcher's attention, considering that culture media represent one of the main costs and limit the growth of microorganisms. This study aimed to evaluate the yeast with food applications, *Wickerhamomyces anomalus*, growing in culture media that use spirulina, isolated soy protein and brewer's residual yeast. These components are nutritional sources that can be applied in products for human consumption and could replace the traditional composition of the standard medium for yeasts, YEPG (Yeast Extract 0.5%, Peptone 1%, Glucose 1%). Two growth media were developed: LSpG (Brewer's Yeast 0.5%, Spiruline 1%, and Glucose 1%) and LSoG (Brewer's Yeast 0.5%, Isolated soy protein 1% and Glucose 1%). Fermentations were performed with 200mL of each media (YEPG, LSpG, and LSoG) on a shaking table with 200rpm and 30±1°C for 96h. At 24h and 96h, pH, glucose concentration, cell concentration, and cell viability were determined. The results show that the cell viability was higher than 90% after 24h and 96h. The pH was similar for the three media after 24h and 96h. Cell concentration after 24h was higher in LSpG (8.3log(cell/mL)) and in LSoG (8.5log(cell/mL)) than in YEPG (8.2log(cell/mL)). After 96h, the cell concentration in the media remained close to 8log(cell/mL). Concerning the sugar consumption, after 24h more than 40% of the initial sugar was consumed, with higher consumption in LSoG medium (61%). After 96h, the glucose consumption in YEPG reached 90%, in LSoG, 82%, and in LSpG, 85%. These results show similarities comparing the evaluated media and are in accordance with studies of the growth of *W. anomalus* in laboratory and winemaking conditions. It is emphasized that it is possible to optimize the fermentative conditions for a better activity. Furthermore, it was noticed that this fermentative test performed showed similarities between the microorganism growing in the tested synthetic and alternative media. Thus, the use of the tested alternative media corresponds reduction of up to 93% of the culture medium cost. This work shows the potential use of spirulina, isolated soy protein, and dried brewer's yeast, replacing conventional nutritional sources, as alternatives in the composition of culture media, reducing the cost of the process while allows food and biotechnological applications for yeasts, like *W. anomalus*.

Keywords: Alternative growth media; Biotechnology; Fermentation; Non-conventional yeasts.

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