

YEASTS AS BIOCATALYSTS IN THE STEREOSELECTIVE REDUCTION OF ACETOPHENONE

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The asymmetric reduction of prochiral ketones represents a pivotal transformation for the production of chiral alcohols. Several of them are considered as key starting materials in obtaining of pharmaceuticals. Nowadays, bio-reductions are an important component of organic synthesis for the production of drugs. In this sense, microorganisms are considered an outstanding tool for the obtaining of these chiral building blocks.

Objectives: Determine the efficiency of yeasts isolated from fruits, vegetables or food, as biocatalysts for the production of enantiomerically pure molecules using acetophenone as a model substrate.

Methods:

1) Isolation of yeasts: Samples of 3 varieties of grapes, carrots, grapefruit, as well as ready-made products such as Camembert and 3 varieties of craft beer were taken. Swab samples were performed in peptone 0.1 p/v% with 0.05% of tween 80 and then insulation in 3 medium: GPYA, PDA and SDA.

2) Identification of the strains: coloration with lactophenol for the colonies that presented corresponding to yeast morphology is prepared, and identifying them with the key of Pitt and Hocking (1997).

3) Reaction with the acetophenone: 15 selected strains were tested. They were obtained after 3 days of growth at 30 ° C in GPY broth, and the mycelia was separated from the culture broth by filtration. Wet mycelia (≈ 2 g) was put in a 125 ml conical flask sterile container containing 80 ml of 0.1M KH_2PO_4 buffer (pH 7.0). The substrate (50 mg) was added dissolved in 1 ml of dimethyl sulfoxide, and the incubation was made on an orbital shaker at 100 rpm at 30 ° C for 7 days. Samples were analyzed by chiral GC-FID and GC-MS.

Results: All the strains studied showed some degree of reduction of acetophenone to 1-phenylethanol. However, two fungi showed a behavior that stands out over the others: ZBC4 which presented a 23% reduction with 99 e.e% (*S* isomer) and GZ1 which present a 99% reduction with 99.9 e.e.% (*R* isomer).

Conclusions: The excellent percentage of reduction and stereoselectivity achieved with *GZ1* (*Geotrichum spp* isolated from carrot) makes this microorganism a good candidate for conducting further studies.