Title: BIOREDUCTION OF BETA-KETOESTERS BY *KLUYVEROMYCES MARXIANUS*

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Kluyveromyces marxianus presents important characteristics for microbial technology such as thermo and low pH tolerance, fast growth, ability to grow in a wide variety of inexpensive carbon source and is not pathogenic. By these features, the yeast has been used in several applications include food, beverages, enzymes and fine chemicals production. The enantiopure β-hydroxy esters are building blocks of high interest for the synthesis of many fine chemicals and pharmaceuticals. In this respect, methyl 3-hydroxypentanoate (**3**) is a key intermediate in the synthesis of the natural pheromone (+)-sitophilure and ethyl 3-hydroxyhexanoate (**4**) is an important intermediate in the synthesis of the anti-proliferative macrolide (+)-neopeltolide and the antifungal (+)-monocerin. The aim of this work was to study the ability of *K. marxianus* in the reduction of methyl 3-oxopentanoate (**1**) and ethyl 3-oxohexanoate (**2**) to obtain the corresponding β-hydroxy esters (**3** and **4**). The biomass was obtained by cultivation of *K. marxianus* for 48 hours in 50 mL of medium (glucose, 10.0; yeast extract, 5.0; peptone, 5.0; $(NH_4)_2SO_4$, 1.0; $MgSO_4.7H_2O$, 1.0 per liter and pH 6.5) in 250 mL Erlenmeyer flasks under 150 rpm and 30 ^oC. The grown cells were harvested by centrifugation at 3500 rpm for 10 min and added to 50 mL of biotransformation medium (glucose, 50.0 and $MgCl_2$, 1.0 per liter and pH 6.5) in 250 mL Erlenmeyer flasks. After 30 min, 0.25% (v/v) of the appropriate substrate in ethanol was added to the medium and the flasks were incubated for 24 h at the same conditions used to obtain the biomass. After incubation time cells were harvested by centrifugation and the supernatant was extracted with ethyl acetate, and concentrated under vacuum. The experiment was done in triplicate. A chiral gas chromatograph analysis revealed the products as (*R*)-(-)-enantiomers (**3** and **4**). The retention time and yields were 11.2 and 16.5 minutes and 73% and 96%, respectively. Both of them presented enantiomeric purity (>99 %). The results indicated that *K. marxianus* was able to catalyze the bioreduction of beta-ketoesters (**1** and **2**) with extraordinary chemo-, regio-, and stereoselectivity.

Keywords: Biocatalysis, *Kluyveromyces marxianus*, Methyl 3-oxopentanoate, Ethyl 3-oxohexanoate.

Development agency: FAPERJ