As many yeast species, Yarrowia lipolytica is able to transform ricinoleic acid (a hydroxylated C18 fatty acid) into γ-decalactone, a fruity and creamy aroma compound. Unfortunately, this species is also able to degrade the produced lactone. The pathway of biotransformation involves γ-oxidation and requires the lactonisation at the C10 level (when the hydroxy group is in γ-). Y. lipolytica possesses a five-member family of acyl-CoA oxidases (Aox1 to 5), the enzyme catalysing the first step of γ-oxidation, some of which are long-chain specific (Aox2) or short-chain specific (Aox3). In a previous paper, we have tried to decrease the lactone degradation by constructing a strain with no more activity on short-chain substrates. However, this strain was growing and biotransforming very slowly. In this study, we have constructed strains without acyl-CoA oxidase activity for short-chain substrates but with increased activity on long chains. These strains are able to grow at the same rate as the wild type but produce about 10 times more in only 48 hr, and this amount does not significantly decrease in 250 hr.

REFERENCES

P155 GENETIC ENGINEERING OF THE γ-OXIDATION PATHWAY IN THE YEAST Yarrowia lipolytica TO INCREASE THE PRODUCTION OF AROMA COMPOUNDS

YVES WACHÉ, ERANDI ESCAMILLA GARCIA, MARIOC AGUEDO, MARIE-THÉRESE LEDALL, JEAN-MARC NICAUD, and JEAN-MARC BELIN

Laboratoire de Microbiologie UMR UB-INRA 1232, ENSBANA, 1, esplanade Erasme, 21000 Dijon, France; Laboratoire de Microbiologie et Génétique Moléculaire, INRA-CNRS-INAPG UMR 2585, 78850 Thiverval-Grignon, France; e-mail: ywache@u-bourgogne.fr

Keywords: γ-oxidation, acyl-CoA oxidase, γ-decalactone

(-)-Heliannuols E and C are naturally occurring sesquiterpenes exhibiting allelopathic activity. We report herein the enantioselective total syntheses of heliannuols E (ref.1) and C employing chemoenzymatic transformations of the prochiral diols 1 and 3 into the optically enriched acetate 2 and 4 as the key reaction steps (Fig. 1). It should be noted that the absolute stereochemistry of heliannuol C was firmly established by the completion of the first total synthesis.

Fig. 1. Syntheses of heliannuols E and C

REFERENCES