

S13-1 Screening of unique microbial functions and their industrial applications

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Single cell oil production by *Mortierella alpina*: A filamentous fungus, *Mortierella alpina* 1S-4, was obtained, as a potential producer of triacylglycerol containing C20 polyunsaturated fatty acids (PUFAs) such as arachidonic acid. The parental and mutant strains bred by metabolic engineering technologies are now used for large-scale production of a variety of PUFAs.

Lactonase process for the optical resolution of racemic pantolactone: The process involves stereospecific hydrolysis step with a novel enzyme “lactonohydrolase” as the catalyst for the optical resolution of DL-pantolactone (DL-PL). The commercial production of D-PL has started since 1999, through which it has been shown that the process is highly satisfactory not only economically but also environmentally.

Bioreduction system for large-scale production of chiral alcohols

A novel whole cell bioreduction system, in which transformant cells co-expressing a cofactor-dependent carbonyl reductase gene and that of cofactor regeneration enzyme are used as a catalyst, for asymmetric reduction of prochiral carbonyl compounds to chiral alcohols. The process has been shown to be useful for large-scale production of various kinds of chiral alcohols.