Asymmetric Reduction of Ketones Using *Cabomba Caroliniana*

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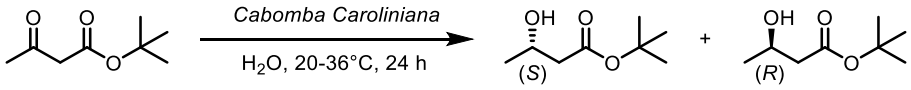
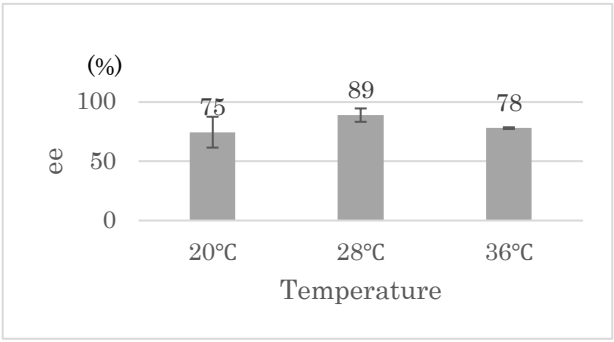
Optically active alcohols are important chiral starting materials for preparing pharmaceuticals and agrochemicals. Biotransformation can be used as an environmentally benign tool for obtaining optically active alcohols. We have been studying the asymmetric reduction of prochiral ketones using terrestrial plant cells as biocatalysts.[1] We have revealed that the yields and enantiomeric excess (ee) values of the reactions are closely related to photosynthetic activities of the cells. We focused on aquatic plant cells whose photosynthetic environments are different from those of terrestrial plant cells. *Cabomba caroliniana* is one of submerged perennial aquarium plants growing in freshwater. There are some papers on growth and photosynthetic metabolism of *Cabomba caroliniana*.[2] We investigated the asymmetric ketone reduction using *Cabomba caroliniana* as a biocatalyst.

Aquatic plant, *Cabomba Caroliniana*, (200 mg) was added to the solution (5 mL) of ketone (0.65 mg/mL) in H_2O. The reaction was carried out at 20°C, 28°C, and 36°C under illumination (fluorescent light, 3000 lux) for 24 hours. For example, in the case of *tert*-butyl 3-oxobutanotate was converted into *tert*-butyl (3*S*)-3-hydroxybutanoate in 89% ee at 28°C. At 20°C and 36°C, the ee decreased.





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