

Reduction of α -Keto Esters Using *Pisum Sativum* Sprouts

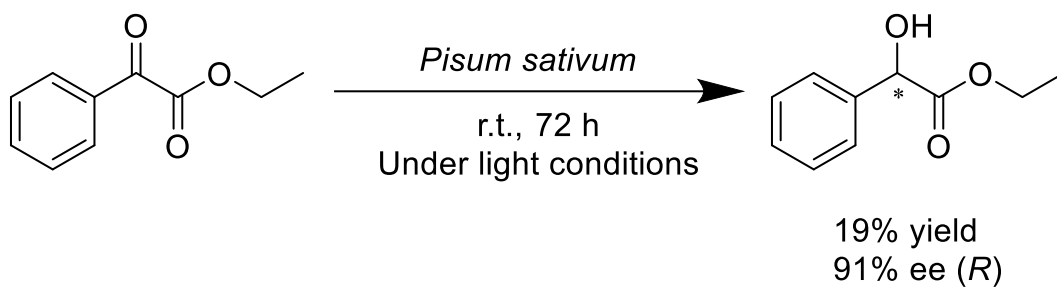
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Optically active alcohols are important chiral starting materials for preparing pharmaceuticals and agrochemicals. Asymmetric reduction is one of useful methods of obtaining optically active alcohols. We have been studying the asymmetric reduction of prochiral ketones using plant cells of species such as *Nicotiana tabacum*¹ and *Arabidopsis thaliana*² as biocatalysts. Germinated plants have also been used as biocatalysts for asymmetric reduction of ketones³. *Pisum sativum* is an annual plant in the family Fabaceae which is grown worldwide and its sprouts are utilized as foods. Previously, it was reported that the reduction of ketones using sprouted *Pisum sativum* proceeded enantioselectively under dark conditions⁴. In this study, we have investigated asymmetric reduction of α -keto esters using *Pisum sativum* sprouts under illumination of light.

Sprouted plant, *Pisum sativum*, (2 g) was added to the solution (5 mL) of α -keto esters (0.65 mg/mL) in H₂O. The reaction was carried out at room temperature under dark or illumination (fluorescent light, 110 $\mu\text{mol photons m}^{-2} \text{ s}^{-1}$) conditions for 24–72 hours. After extraction with diethyl ether, the resulting solution was analyzed by gas chromatography.

For example, ethyl benzoylformate was converted into ethyl mandelate in 30% yield and 67% ee (*R*) under dark conditions. Under light conditions, we found that the ee value increased to 91%. In this lecture, we will present the experimental details.



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