

Chemoenzymatic epoxidation of alkenes and reusability study of the phenylacetic acid

ABSTRACT

Here, we focused on a simple enzymatic epoxidation of alkenes using lipase and phenylacetic acid. The immobilised *Candida antarctica* lipase B, Novozym 435 was used to catalyse the formation of peroxy acid instantly from hydrogen peroxide (H₂O₂) and phenylacetic acid. The peroxy phenylacetic acid generated was then utilised directly for in situ oxidation of alkenes. A variety of alkenes were oxidised with this system, resulting in 75–99% yield of the respective epoxides. On the other hand, the phenylacetic acid was recovered from the reaction media and reused for more epoxidation. Interestingly, the waste phenylacetic acid had the ability to be reused for epoxidation of the 1-nonene to 1-nonene oxide, giving an excellent yield of 90%.

Keyword: Enzymatic epoxidation; Alkenes; Phenylacetic acid