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PURPOSE OF THE ABSTRACT
The (S)-selective amine transaminases (EC 2.6.1.X) belong to fold type I, and they have been demonstrated to have great potential for biotechnological applications due to their ability to catalyze the stereoselective amination of prochiral ketones. However, their industrial use is still limited due to issues such as stability and recycling. Covalent immobilization is a promising solution to these drawbacks, allowing biocatalyst reuse and providing higher stability.

In this work, three (S)-selective amine transaminases, namely (PDB entries) 3HMU, 3FCR_4M_I234M, and 3FCR_4M_L382M_G429A, were covalently immobilized on amino-functionalized beads using glutaraldehyde as a crosslinker. The resultant immobilized biocatalysts were characterized in terms of residual activity, thermal stability and reusability. The immobilization efficiency was higher than 95% in every case, and the immobilization time was approximately 3 hours. Also, despite the fact that residual activity was less than 10%, the biocatalysts could be successfully reused for at least 5 cycles retaining at least 50 % of their initial activity. In addition, 3HMU was also evaluated in terms of co-solvent (DMSO) stability where immobilized catalyst didn't show any improvement when compared to the free. Furthermore, both immobilized 3FCR mutants were improved in terms of storage stability. Finally, the immobilized biocatalysts were applied to the asymmetric synthesis of chiral amines using either sopropylamine or alanine as the amino donor.

This study provides new insights into the development of efficient immobilized biocatalysts for the production of chiral amines with industrial relevance.

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FIGURES

FIGURE 1

FIGURE 2

KEYWORDS
transaminases | immobilization | asymmetric synthesis

BIBLIOGRAPHY