Chiral anion exchanger based on α-methylbenzylamine for enantioselective separation of racemic acids

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Chirality is a property of asymmetry that is responsible for the existence of enantiomers, molecules that are mirror images of one another. In a symmetrical environment, these molecules have the same chemical properties. However, the way in which they interact with other chiral substances, may be very different. Since human metabolism involves many stereoselective interactions, it is especially important to consider chirality during the development of new drugs, where the unwanted enantiomers may burden patients' organs or even be toxic. Preparation of enantiomerically pure drugs is, however, not always possible and the separation of racemic mixtures on larger than analytical scale has been a challenging task.

Among analytical methods, high performance liquid chromatography (HPLC) has been successfully used for the separation of many racemic chemicals. However, scale-up to preparative or industrial scale is typically not economically feasible. In this work, new enantioselective material based on α-methylbenzylamine as the chiral selector (recently utilized by our group in the preparation of chiral membranes[1]) covalently attached to Merrifield resin beads is proposed and discussed as a potentially cost-effective alternative to typically expensive stationary phase materials. It is shown that charged chiral methylbenzylamine works as an enantioselective anion exchanger potentially suitable for the separation of chiral acids, such as N–protected amino acid, or non-steroidal anti-inflammatory drugs (NSAID), such as ibuprofen. In a glass column chromatography experiment, racemic N–(tert–butoxycarbonyl) tryptophan was partially separated, reaching enantiomeric excess in eluates of around 10%.

References

1. Otmar, M.; Gaálová, J.; Žitka, J.; Brožová, L.; Cuřínová, P.; Kohout, M.; Hovorka, Š.; Bara, J. E.; Bruggen Van der, B.; Jirsák, J.; Izák, P. *Eur. Polym. J.* **2020**, *122*, 109381