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Title:

Chitosan prepared as chiral stationary phases in open-tubular capillary electrochromatography

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The chiral selector, chitosan (CS), was attached to the silanized capillary via a silane coupling agent, (3-glycidyloxypropyl)trimethoxysilane (GTS), to form the GTS-CS capillary, and results for this capillary were compared with those of a previous study on the copolymerization of CS with methacrylamide (MAA) (forming the MAA-CS capillary). The GTS-CS capillary did not exhibit enantioselectivity for D/L-tryptophan, whereas the GTS-BSA capillary, which was prepared by replacement of CS with bovine serum albumin (BSA), succeeded in the chiral separation with an Rs = 2.4 in Tris buffer (50 mM, pH 8.5). To increase CS attachment, the CS units were crosslinked by succinic acid, and the resulting GTS-CS-s capillary phase improved the resolution to 1.9. Alternatively, the SiH-CS-s capillary was constructed by CS attachment on the silicon hydride phase via stepwise silanization and hydrosilation reactions and crosslinking by succinic acid, but this approach could only achieve a resolution of 1.4 in Tris buffer (50 mM, pH 9.5). Although the GTS-CS-s and SiH-CS-s capillaries were still inferior to the MAA-CS capillary (Rs = 3.8), the enantioselectivities of the three capillaries were all in the range of 1.4−1.6. For the (±)-catechin sample, the plate heights of the GTS-CS-s and SiH-CS-s capillaries conditioned in pH 8.5 Tris buffer with 60% MeOH modifier were 0.9 cm ((−)-catechin) and 6.0 cm ((+)-catechin)) and 2.9 cm (−) and 3.2 cm (+), respectively, and these heights were comparable to the MAA-CS capillary (2.5 cm (−), 6.0 cm (+)) in pH 6.6 phosphate buffer with 80% MeOH.