

Abstract

This thesis is focused on the preparation of monosubstituted derivatives of γ -cyclodextrin (γ -CD) which can form supramolecular polymers. These polymers can be utilized in capillary electrophoresis.

Set of monosubstituted 2¹-*O*-, 3¹-*O*- a 6¹-*O*-(3-(naphthalen-2-yl)prop-2-en-1-yl) derivatives of γ -CD was prepared (naphthylallyl derivatives). Reaction was performed by cross metathesis of *O*-allyl derivatives of γ -CD with a 2-vinylnaphthalene in yields 16 – 25 %. Hoveyda-Grubbs 2nd generation catalyst was used. Alkylation of γ -CD with 2-(3-bromoprop-1-enyl)naphthalene followed by peracetylation of remaining hydroxyl groups and separation of isomers resulted in the per-*O*-acetyl-3¹-*O*- a per-*O*-acetyl-6¹-*O*-(3-(naphthalen-2-yl)prop-2-en-1-yl)- γ -CD in yields 5 and 1 %. A set of dimers of γ -CD 1,4-bis(γ -CD-2¹-*O*-yl)-but-2-ene, 1,4-bis(γ -CD-3¹-*O*-yl)-but-2-ene and 1,4-bis(γ -CD-6¹-*O*-yl)-but-2-ene was prepared, too. Reaction was performed by cross metathesis of *O*-allyl derivatives of γ -CD in yields 1 – 8 % using again Hoveyda-Grubbs 2nd generation catalyst.

The dimers of naphthalene guests (1,2-bis(naphthalen-2-yl)ethene and 1,2-bis(naphthalen-2-yl)ethane) for preparation of complexes with CD dimers were also prepared.

Further optimization of synthesis of naphthylallyl derivatives of γ -CD was carried out. These reactions were performed by alkylation of γ -CD with 3-(naphthalen-2-yl)-allyl alkylation reagents (chloride, bromide, mesylate). HPLC with UV detection was used for quantification. Dependence of the yield and regioselectivity on (a) leaving group of alkylation reagent (b) solvent and (c) base was observed. In some cases 3¹-*O*- and 6¹-*O*- derivatives were obtained in high yields and regiospecificity.

Properties of naphthylallyl derivatives of γ -CD (for preparation of supramolecular polymers AB-AB) and dimers of γ -CD (for preparation of supramolecular polymers AA-BB) will be investigated as well as the properties of supramolecular polymers based on them.