Darstellung chiraler heterocyclischer β-Aminosäureester

Preparation of Chiral Heterocyclic Esters of β-Amino Acids

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Chiral β-amino alcohols were successively prone to N-benzylation, O-allylation and oxidation of the resulting benzylamino group to give nitrones **3** which on hydrolysis afforded chiral hydroxylamines HO-NH-CH(R)-CH_2-O-CH_2-CH=CH_2 ((S)-**4**: R = Me, Bn, *i*Pr, (R)-**4**: R = Et). Swern oxidation of methyl 2,2-dimethyl-3-hydroxypropionate (**16**) and treatment of the resulting aldehyde **17** with hydroxylamines (S)-**4b** (R = Bn) or (R)-**4d** (R = Et) provided nitrones **18** that underwent an intramolecular 1,3-dipolar cycloaddition on heating yielding the bicyclic β-amino-acid esters **19b** and *ent*-**19d**, respectively. Reductive cleavage of the N,O-bond of compounds **19** afforded the eight-membered ring compounds **20b** and *ent*-**20d**, respectively.

N-Benzylalaninol (**22**) was treated with β-bromo-methacrylate to give the amino alcohol **23**. Swern oxidation and subsequent treatment with N-*tert*-butylhydroxylamine provided the bicyclic ester **26a** (R = *t*-Bu) via the corresponding nitrone **24**. Oxime **25** was prepared in an analogous way as **24** with unsubstituted hydroxylamine. It underwent an intramolecular 1.3-dipolar cycloaddition yielding **26b** on heating in toluene. Reduction of **26a** afforded the pyrrolidine-carboxylic ester **27a**.

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