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BIOTECHNOLOGY

Edited by C. F. PHELPS and P. H. CLARKE

The fourteen contributions forming this volume were presented at a London meeting of the Biochemical Society including the Society's Forty-Eighth Symposium 'Biotechnology', in December 1982. With today's increasing pressures to develop latest laboratory findings into practical industrial processes as quickly as possible the chosen theme of this Symposium was a timely one. The papers represent up-to-date reports from international biochemists whose work is of direct relevance to the wide areas of interests concerned with biotechnology, together with glimpses of the early development of its techniques and a look at its exciting future.

List of contents and authors:

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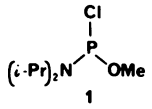
Phosphoramidite Reagents

for DNA Synthesis



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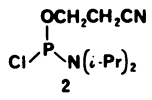

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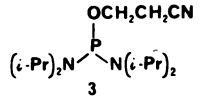

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Until very recently, the most popular method of DNA synthesis has been based on nucleoside phosphoramidites prepared with reagent **1**.[1] This method produces oligonucleotide intermediates with phosphotriester groups protected by a methyl group.

Of growing importance is a new technology recently described by Köster[2] based on 2-cyanoethyl protection using nucleoside phosphoramidites prepared with reagent **2**. The cyanoethyl protecting group is removed during the extremely mild reaction (aqueous ammonia, 50°C) used for deprotection of the heterocyclic bases,[2] eliminating the need for the harsher conditions used for the cleavage of methyl protecting groups.[1,2] Cyanoethyl protection also prevents a potentially serious side reaction, the methylation of thymine bases by internucleotidic methyl phosphate.[3] Alkylation of base residues by internucleotidic cyanoethyl phosphate is usually insignificant.[4]

Very recently, **1** has been employed successfully in the phosphitylation of the anomeric hydroxyl function of sugar derivatives in the preparation of biologically important glycosyl derivatives.[5]

We have just added another phosphoramidite reagent, **2-cyanoethyl *N,N,N′,N′*-tetraisopropylphosphorodiamidite (3).**

References:
1) For reviews, see Giles, J.W. *Am. Biotechnol. Lab.* **1985**, *3*, 22; Crockett, G.C. *Aldrichim. Acta* **1983**, *16*(3), 47.
2) Köster, H. *et al. Tetrahedron Lett.* **1983**, *24*, 5843; *Nucleic Acids Res.* **1984**, *12*, 4539.
3) Jones, R.A. *et al. Nucleic Acids Res.* **1985**, *13*, 573.
4) Jones, R.A., personal communication.
5) van Boom, J.H. *et al. Tetrahedron Lett.* **1986**, *27*, 1211.

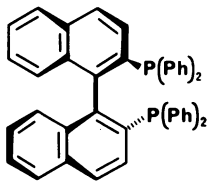
26,252-8 ***N,N*-Diisopropylmethylphosphonamidic chloride** (**1**, methyl *N,N*-diisopropylchlorophosphoramidite) **1g $10.60; 5g $35.30**

30,230-9 **2-Cyanoethyl *N,N*-diisopropylchlorophosphoramidite (2) 1g $18.50; 5g $73.30**

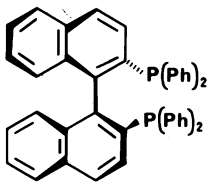
30,599-5 **2-Cyanoethyl *N,N,N′,N′*-tetraisopropylphosphorodiamidite (3) 500mg $18.00; 1g $30.00**

Chiral BINAP Ligands

for Asymmetric Synthesis



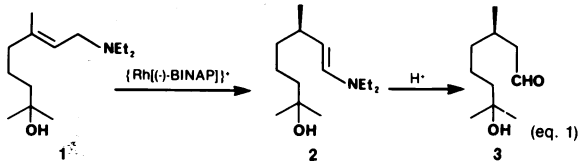
(*R*)-(+)-BINAP



(*S*)-(-)-BINAP

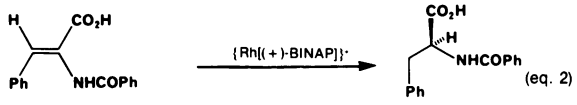
(*R*)-(+)- and (*S*)-(-)-BINAP's [2,2′-bis(diphenylphosphino)-1,1′-binaphthyls] are atropisomeric triarylphosphines which are proving to be valuable additions to the repertoire of the organic chemist. For example, their cationic rhodium(I) complexes have been employed in the preparation of optically active enamines[1,2] (asymmetric olefin isomerization) and in amino acid synthesis[3,4] (asymmetric hydrogenation).

A chemoselective isomerization of the allylamine derivative **1** with the rhodium(I)-(-)-BINAP catalyst gave the optically pure (≥98% ee) enamine **2**, which on mild hydrolysis gave (+)-7-hydroxydihydrocitronellal **3**, (eq. 1), which has the odor of lily of the valley.[1]



1 2 3 (eq. 1)

The asymmetric hydrogenation of the α-(acylamino)acrylic acid **4** with the rhodium(I)-(+)-BINAP catalyst gave (*S*)-*N*-benzoylphenylalanine (**5**) in 97% yield (100% ee) (eq. 2).[3]



4 5 (eq. 2)

References:
1) Tani, K. *et al. J. Am. Chem. Soc.* **1984**, *106*, 5208.
2) Tani, K. *et al. Angew. Chem., Int. Ed. Engl.* **1985**, *24*, 217.
3) Noyori, R. *et al. J. Am. Chem. Soc.* **1980**, *102*, 7932.
4) Noyori, R. *et al. Tetrahedron* **1984**, *40*, 1245.

29,581-7 **(*R*)-(+)-2,2′-Bis(diphenylphosphino)-1,1′-binaphthyl**, 99% [(*R*)-(+)-BINAP] **100mg $19.00**

29,582-5 **(*S*)-(-)-2,2′-Bis(diphenylphosphino)-1,1′-binaphthyl**, 99% [(*S*)-(-)-BINAP] **100mg $19.00**

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