2-Cyanoethyl \( N,N,N',N' \)-tetraisopropylphosphorodiamidite

Compiled by Jichao Zhang

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Abstracts

(A) 2-Cyanoethyl- \( N,N,N',N' \)-tetraisopropylphosphorodiamidite was used by Sheppard and co-workers to prepare carbohydrate phosphoramidites as nucleoglycoconjugate building blocks in good yield in the presence of disopropylammonium tetrazolide under anhydrous conditions. Then, the monosaccharide phosphoramidite was coupled with DNA oligonucleotides by solid-phase chemistry.\(^1\)

(B) Recently, Yamada and co-workers used 2-cyanoethyl \( N,N,N',N' \)-tetraisopropylphosphorodiamidite to synthesize the uridine 3'-phosphoramidite building block in good yield with disopropylammonium tetrazolide as a catalyst under anhydrous conditions, for developing oligonucleotides containing new 2'-O-modified ribonucleosides as nucleic acid based drugs.\(^6\)
Lin and colleagues used 2-cyanoethyl N,N,N'-tetraisopropylphosphoramidite as the phosphorylating reagent in the presence of disopropylammonium tetrazolate to couple with 2',3'-di-O-acetyl-adenosine to generate boron-containing coupled ADP analogues (in an overall yield of 36%).

Smith and co-workers developed an efficient method to prepare aldose phosphate diesters using 2-cyanoethyl N,N,N'-tetraisopropylphosphoramidite. A 5-O-protected diol was firstly reacted with the phosphorylating reagent and 1H-tetrazole as an activator at room temperature, followed by oxidation, generating cyclic phosphate triester diastereoisomers in high yield.

2-Cyanoethyl- N,N,N',N'-tetraisopropylphosphoramidite was used to prepare glycoconjugate polymers which carry GGPL analogues, bioactive segments of main cell membrane glycolipids of Mycoplasma fermentis. Therein, Nishida and co-workers reacted 4-nitrophenyl 2,3,4-tri-O-benzyl-α-D-glucopyranoside with 2-cyanoethyl N,N,N',N'-tetraisopropylphosphoramidite in high yield.

Rodriguez and co-workers reported the synthesis of glucose-nucleoside conjugates as anti-HIV produgs by using 2-cyanoethyl N,N,N',N'-tetraisopropylphosphoramidite as the phosphorylating reagent. Glucosyl phosphoramidite was firstly prepared in the presence of pyridinium trifluoroacetate under anhydrous conditions, and then coupled with nucleosides generating the desired compounds.

References


