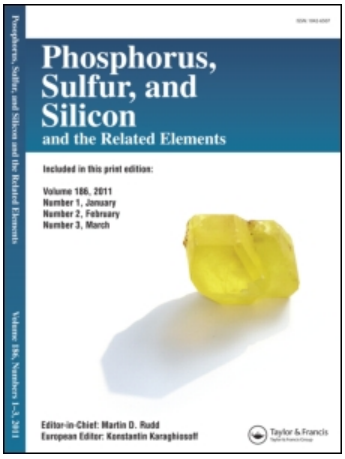

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Phosphorus Analogues of Homoproline

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PHOSPHORUS ANALOGUES OF HOMOPROLINE

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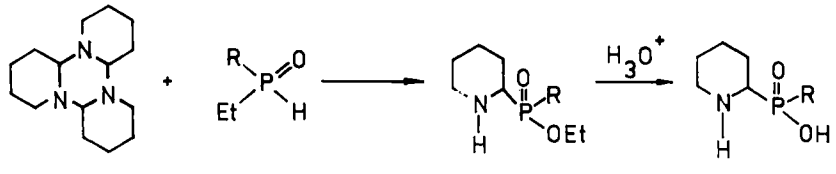
Aminophosphonic and aminophosphinic acid analogs of most of the natural amino acids have been synthesized recently (1). We describe here the synthesis of phosphonic and phosphinic analogs of the natural iminocarboxylic acid homoproline. The compounds were obtained by the iminoalkylation of P(O)H-containing organophosphorus compounds with the trimer of tetrahydropyridine. This trimer adds three equivalents of dialkyl phosphite or monoalkyl alkyl(aryl)phosphonite to form the esters of piperidine-2-phosphonic or piperidine-2-alkyl(aryl)phosphinic acids. Hydrolysis of the esters in acidic medium leads to the phosphorus analogs of homoproline.



The substitution of the alkyl esters by trimethylsilyl esters of phosphorous and phosphonous acids in this reaction facilitates the isolation of the products and increases their yields. Piperidine-2-phosphonic acid was found to form stable complexes with a number of transition metals and was suggested as chelating ligand for the determination of microquantities of zirconium.

(1) V.P.Kukhar, V.A.Solodenko, Uspekhi Khimii, 56, 1504 (1987).