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Reactions of Unsaturated Phosphonic Acids with 2-Aminopyridine

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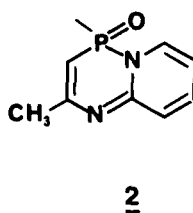
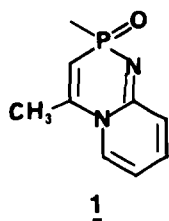
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Different unsaturated phosphonic acids of the general formula $\text{CH}_2=\text{C}=\text{CH}-\text{P}(\text{R})_2$ (R = Cl, OCH₃, OH, NMe₂, C₆H₅ ; R' = Cl, OCH₃, H, NMe₂) have been prepared starting from propargyl

alcohol. Reaction of chlorophosphonic acids with 2-aminopyridine yields phosphoramidates, which in the next step undergo a base-catalyzed cyclization by addition of the ring nitrogen across the unsaturated bond, leading to the unstable derivative 1. In the case of the allenic phosphonic acid in which R = R' = NMe₂, the NH₂ group of 2-aminopyridine adds first to the allenic system yielding an enamine, which on heating cyclizes to give a new phosphorus-nitrogen heterocyclic system 2.



The mechanism of the above reactions and the structure of the resulting products are discussed.