

# 2-Isoxazolinium Salts and 3-Isoxazolines: Exploratory Chemistry and Uses for the Synthesis of Branched Amino Polyols and Amino Acids\*

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*Dedicated to Professor Alessandro Dondoni on the occasion of his 75<sup>th</sup> birthday*

2-Isoxazolines represent a well known class of heterocycles, readily accessible in particular by 1,3-dipolar cycloaddition of nitrile oxides to alkenes. 2-Isoxazolines are easily transformed into 2-isoxazolinium salts by *N*-methylation, and further into 3-isoxazolines by deprotonation. In contrast to the parent system, less is known concerning the chemistry of the derived classes, and potential applications in synthesis. – 2-Isoxazolinium salts, due to their iminium part, are prone to the attack of nucleophiles, and examples for this, addition of hydride (reduction) and C-nucleophiles like methylmagnesium bromide, cyanide, methane nitronate, and malonate are given. With these adducts, syntheses of  $\beta$ - and  $\alpha$ -amino acids with OH-containing side chains have been effected. The cyanide products also are useful as precursors of branched, unsymmetrical 1,2-diamino polyols. – On the other hand, 3-isoxazolines due to their oxy-enamine part, represent species with nucleophilic sites and therefore react with electrophilic reagents. Examples given are [3+2] cycloadditions with nitrile oxides, [2+2] cycloadditions with dimethyl acetylenedicarboxylate, and [2+1] cycloaddition in the form of epoxidation which, however, led to a dihydro-1,3-oxazine nitron by initial attack at the nitrogen atom, in an unprecedented oxidation/*N*-dealkylation/rearrangement sequence.

*Key words:* 2-Isoxazolines, 2-Isoxazolinium Salts, 3-Isoxazolines, Nucleophilic Additions, Electrophilic Additions