

# The Structure of the Pyoverdinin Isolated from Various *Pseudomonas syringae* Pathovars<sup>a†</sup>

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From seven different pathovars of *Pseudomonas syringae* representing various genetic subgroups, and one strain of *Pseudomonas viridiflava* the same pyoverdinin siderophore (**1**) was isolated, probably identical with the pyoverdinin whose amino acid composition (but not their sequence) had been reported before. **1** is the first pyoverdinin where two of the ligands for Fe<sup>3+</sup> are  $\beta$ -hydroxy Asp units. Its remarkably high complexing constant for Fe<sup>3+</sup> at pH 5 as compared with other pyoverdins offers a definite advantage in plant infection. The structure elucidation of **1** will be described and the taxonomical implications regarding pyoverdins with different structures ascribed previously to *P. syringae* strains will be discussed.

<sup>†</sup> Part CV of the series "Bacterial constituents". For part CIV see Hohlneicher *et al.* (2001).

**Abbreviations:** Common amino acids, 3-letter code; aThr, *allo*Thr; OHAsp,  $\beta$ -hydroxy-Asp; AcOHOrn, N<sup>5</sup>-acetyl-N<sup>5</sup>-hydroxy-Orn; cOHOrn, *cyclo*-N<sup>5</sup>-hydroxy-Orn (3-amino-1-hydroxy-piperidone-2); TAP, N/O-trifluoroacetyl (amino acid) isopropyl ester; Chr, pyoverdinin chromophore; Suc, succinic acid side chain; Suca, succinamide side chain; ESI, electrospray ionization; FAB, fast atom bombardment; CA, collision activation; u, mass units based on the <sup>12</sup>C scale; COSY, correlated spectroscopy; DEPT, distortionless enhancement by polarization transfer; HMBC, heteronuclear multiple bond correlation; HMQC, heteronuclear multiple quantum coherence; NOE, nuclear Overhauser effect; ROESY, rotating frame nuclear Overhauser and exchange spectroscopy; TOCSY, total correlation spectroscopy; WATERGATE, water suppression by gradient-tailored excitation; DSS, 2,2-dimethyl-2-silapentane-5-sulfonate; TMS, tetramethylsilane; pv, pathovar; ATCC, American Type Culture Collection; CFBP, Collection Française de bactéries phytopathogènes; LMG, Laboratorium voor Microbiologie van Ghent, Belgian Coordinated Collection of Microorganisms.