

Genomics-driven discovery of NO-donating diazeniumdiolate siderophores in diverse plant-associated bacteria.

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Abstract

Siderophores are key players in bacteria-host interactions, with the main function to provide soluble iron for their producers. Gramibactin from rhizosphere bacteria expands siderophore function and diversity as it delivers iron to the host plant and features an unusual diazeniumdiolate moiety for iron chelation. By mutational analysis of the *grb* gene cluster we identified genes (*grbD* and *grbE*) necessary for diazeniumdiolate formation. Genome mining using a GrbD-based network revealed a broad range of orthologous gene clusters in mainly plant-associated Burkholderia/Paraburkholderia species. Two new types of diazeniumdiolate siderophores, megapolibactins and plantaribactin were fully characterized. In vitro assays and in vivo monitoring experiments revealed that the iron chelators also liberate nitric oxide (NO) in plant roots. This

finding is important since NO donors are considered as biofertilizers that warrant iron homeostasis and increase overall plant fitness.

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