

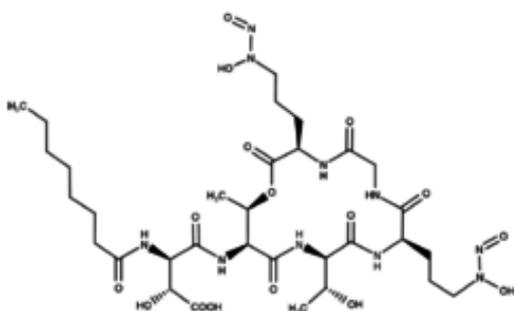
Technology Offer

Gramibactin - A Novel Bifunctional Siderophore-NO-Donor for application in agriculture

Reference Number 10-00106

Challenge

Iron is a crucial element for a broad range of biochemical reactions and although abundant in the environment it is not bioavailable under aerobic conditions. Therefore, microorganisms and plants sequester siderophores - multidentate iron(III)-binding molecules - to ensure sufficient supply. In plants iron is essential for plant growth and thus correlates with high crop yields. Root-associated bacteria may serve the host plant in providing solubilized iron, thus supporting growth and fitness of the plants. In order to improve plant growth, stress tolerance and/or crop yields a continued need exists for novel means that effectively provide soluble iron to plants.



Gramibactin: the unusual N-nitroso-hydroxylamine (diazoniumdiolate) ligands efficiently bind iron and serve as nitric oxide (NO) donors.

Technology

Disclosed is the recently discovered peptide siderophore Gramibactin, which is produced by the rhizosphere bacterium *Burkholderia graminis*. Gramibactin features a rare N-nitroso-hydroxylamine moiety as a novel binding motif for iron complexation. Unlike any known siderophores the iron-binding ligands have a second function as nitric oxide (NO) donor. NO is an important plant hormone involved in several regulation processes in plants. Generally synthetic NO-donors are known to promote plants fitness, root growth and tolerance towards stress. By combining these two features the novel bifunctional siderophore-NO-donor Gramibactin may serve as a natural enhancer for crop plant fitness and yield.

Commercial Opportunity

Gramibactin is offered for licensing and/or co-development.

Development Status

Data from PET-CT tracer studies and supplementation experiments show that maize plants take up iron from the complex, which results in a marked increase (by 50%) in chlorophyll production. In vitro assays and *in vivo* fluorescence imaging illustrate that gramibactin liberates NO.

Patent Situation

A European priority application has been filed in December, 2017 (EP17207667).

Further Reading

Nat. Chem. Biol. 2018 Jul 30. doi: [10.1038/s41589-018-0101-9](https://doi.org/10.1038/s41589-018-0101-9). [Epub ahead of print]