Novel, Pseudomonas-derived Antifungal Lipopeptides From A Disease Suppressive Soil In Greenlandic Potato Fields - DTU Orbit (08/11/2017)

Novel, Pseudomonas-derived Antifungal Lipopeptides From A Disease Suppressive Soil In Greenlandic Potato Fields
Potato cultivation in southwest Greenland omits the use of pesticides, relies on limited crop rotations, and despite the presence of plant pathogenic fungi in the soil, has not suffered from severe disease outbreaks. In this presentation, the bacterial strain *Pseudomonas* sp. In5 which significantly contributes to the suppressiveness of soil at Inneruulalik in southern Greenland will be explored. A combination of molecular genetics and genomics coupled with matrix-assisted laser desorption ionization – time of flight (MALDI-TOF) imaging mass spectrometry (IMS) identified a large genomic island encoding the two non-ribosomal peptides nunapeptin and nunamycin, which are key components of the antifungal activity of In5. Bacterial-fungal interaction studies uncovered a complex interaction whereby nunamycin appears most active against Rhizoctonia solani with no antimicrobial effect against the oomycete *Pythium aphanidermatum*. In constrast, nunapeptin is most potent against *Pythium aphanidermatum* in addition to *Fusarium* sp. To investigate the genetic regulation of both peptides, we have examined the diversity of LuxR-type regulators across the genomic island including upstream and downstream regions flanking the peptide biosynthetic genes. Functional analysis by knockout and complementation studies together with liquid chromatography – high resolution mass spectrometry (LC-HRMS) showed loss and gain of both antifungal activity and peptide synthesis. Current studies are aimed at unravelling further the complex regulation and mode of action of both peptides in order to develop effective microbial biocontrol agents (mBCAs).

General information
State: Published
Organisations: Department of Systems Biology, Metabolomics Platform, University of Copenhagen
Authors: Hennessy, R. C. (Forskerdatabase), Michelsen, C. F. (Ekstern), Glaring, M. A. (Ekstern), Phippen, C. (Intern), Nielsen, K. F. (Intern), Olsson, S. (Ekstern), Stougaard, P. (Ekstern)
Pages: 19-19
Publication date: 2015

Host publication information
Title of host publication: The Danish Microbiological Society Annual Congress 2015 : Programme & Abstracts
Place of publication: Copenhagen
Main Research Area: Technical/natural sciences
Conference: The Danish Microbiological Society Annual Congress 2015, Copenhagen, Denmark, 09/11/2015 - 09/11/2015
Publication: Research - peer-review › Conference abstract in proceedings – Annual report year: 2015