Proteomic analysis of nicotine response in *Paenarthrobacter nicotinovorans* pAO1

Marius Mihasan[1,2,*], Cornelia Babii[2], Devika Channaveerappa[1], Roshanak Aslebagh[1], Emmalyn Dupree[1],Costel C. Darie[1]

[1]Biochemistry and Proteomics Group, Department of Chemistry & Biomolecular Science, Clarkson University, Potsdam, NY, USA
[2]Biochemistry and Molecular Biology Laboratory, Faculty of Biology, Alexandru Ioan Cuza University, Iaşi, Romania
*marius.mihasan @uaic.ro

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Introduction

Paenarthrobacter nicotinovorans is soil bacteria able use the toxic alkaloid nicotine as carbon and energy source. This ability was linked to the presence of the pAO1 megaplasmid and might offer a unique way of exploiting nicotine containing waste for the production of ''green'' chemicals. In the current study, we attempted to identify all the proteins expressed by *P. nicotinovorans* in the presence of nicotine by using shotgun proteomics.

Results

SDS-PAGE of proteins from the bacteria grown on nicotine-containing media showed several extra bands in the range of 60 and 30 kDa. One particularity of P. *nicotinovorans* proteome is the high abundance of small proteins of around 14 kDa (Fig 1).

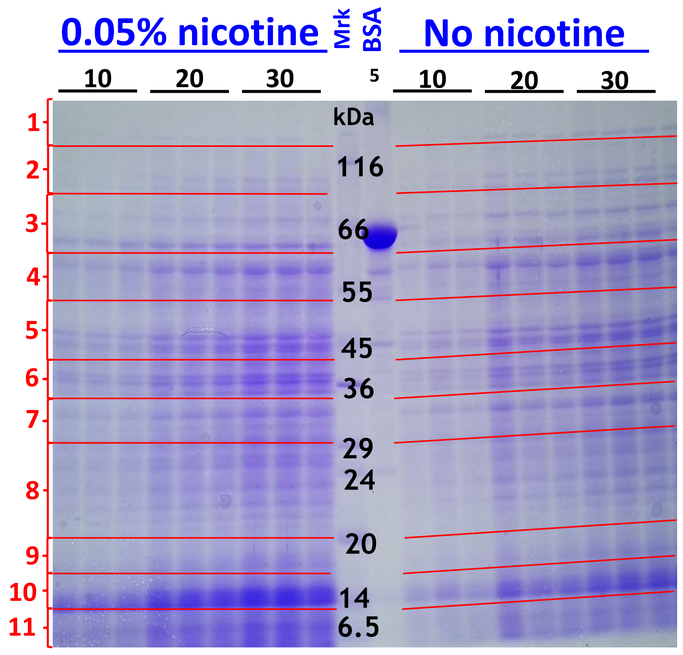


Figure 1. SDS-PAGE of *Arthrobacter nicotinovorans* proteins grown on citrate medium supplemented with 0.05% nicotine (left) or citrate medium without nicotine (right). Details of the 66-55 kDa and 24-29 kDa areas of the same gel showing different band patterns.

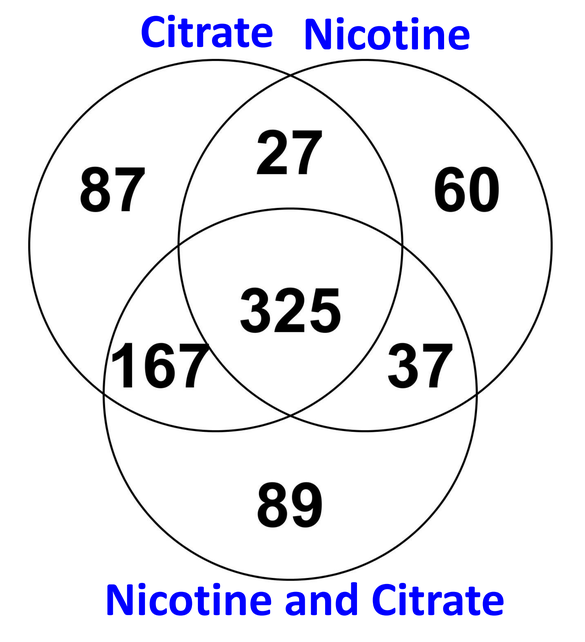
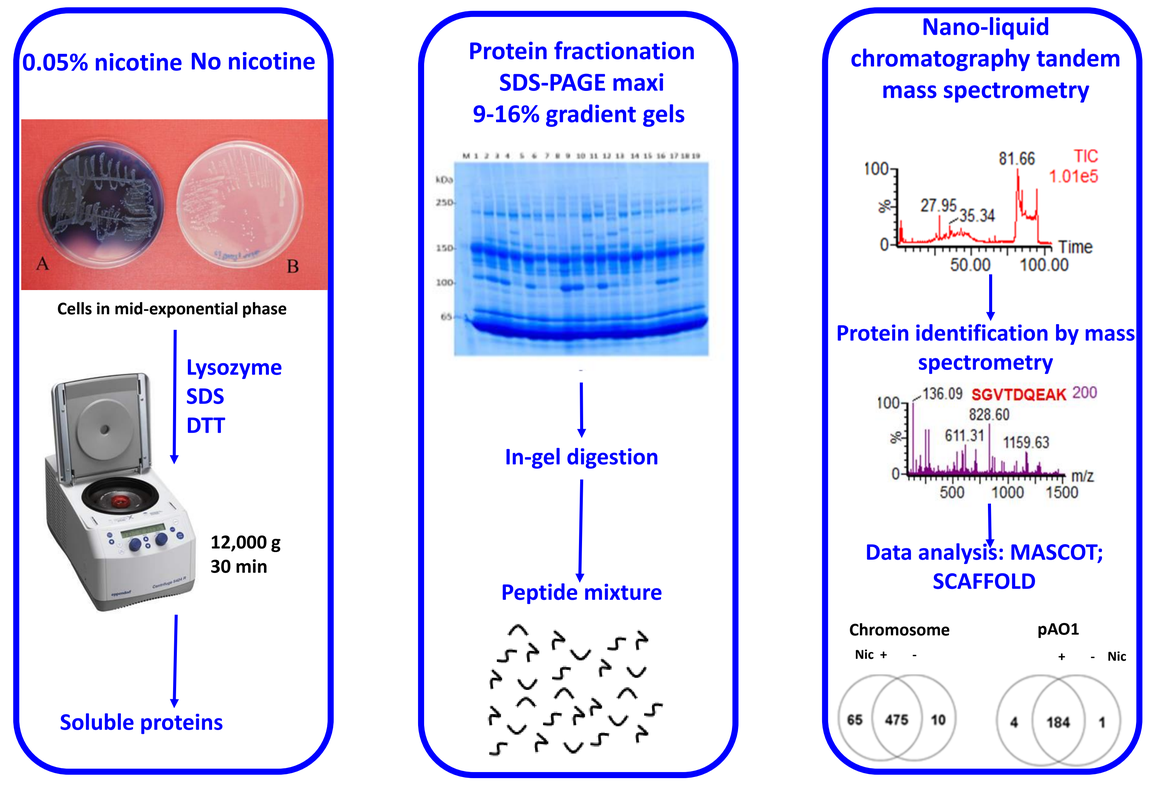
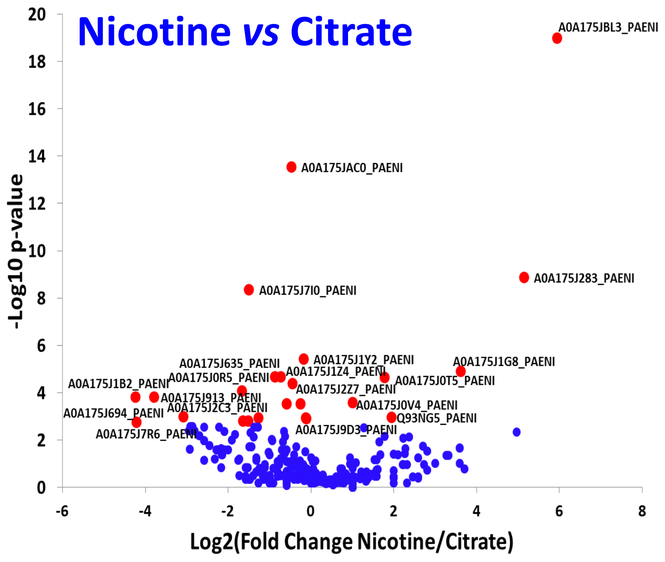
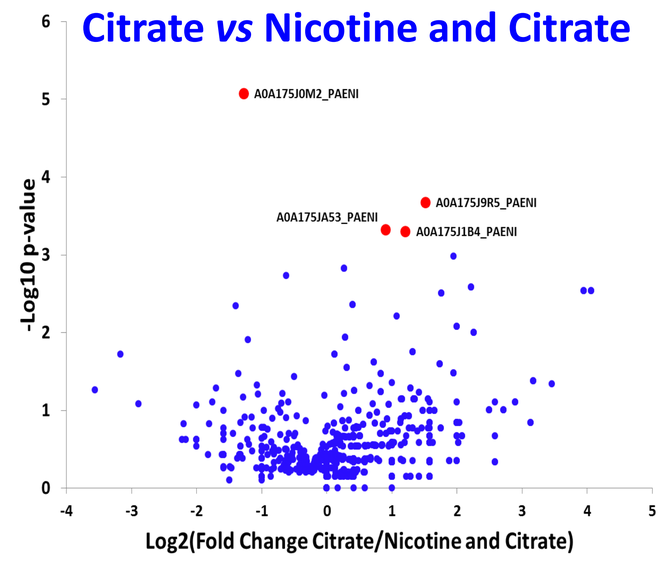


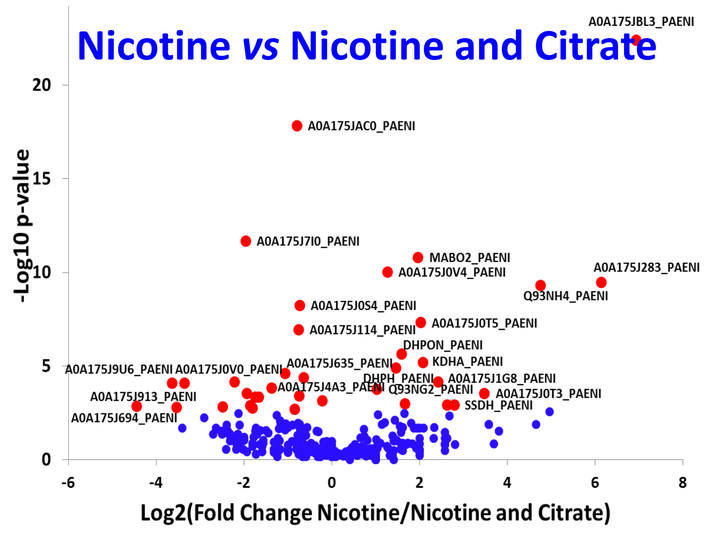
Figure 2. Venn diagram illustrating overlaps between the substrate specific non redundant proteins identified by LC-MS/MS analysis of *Paenarthrobacter nicotinovorans* pAO1 grown of different carbon sources.

Methods

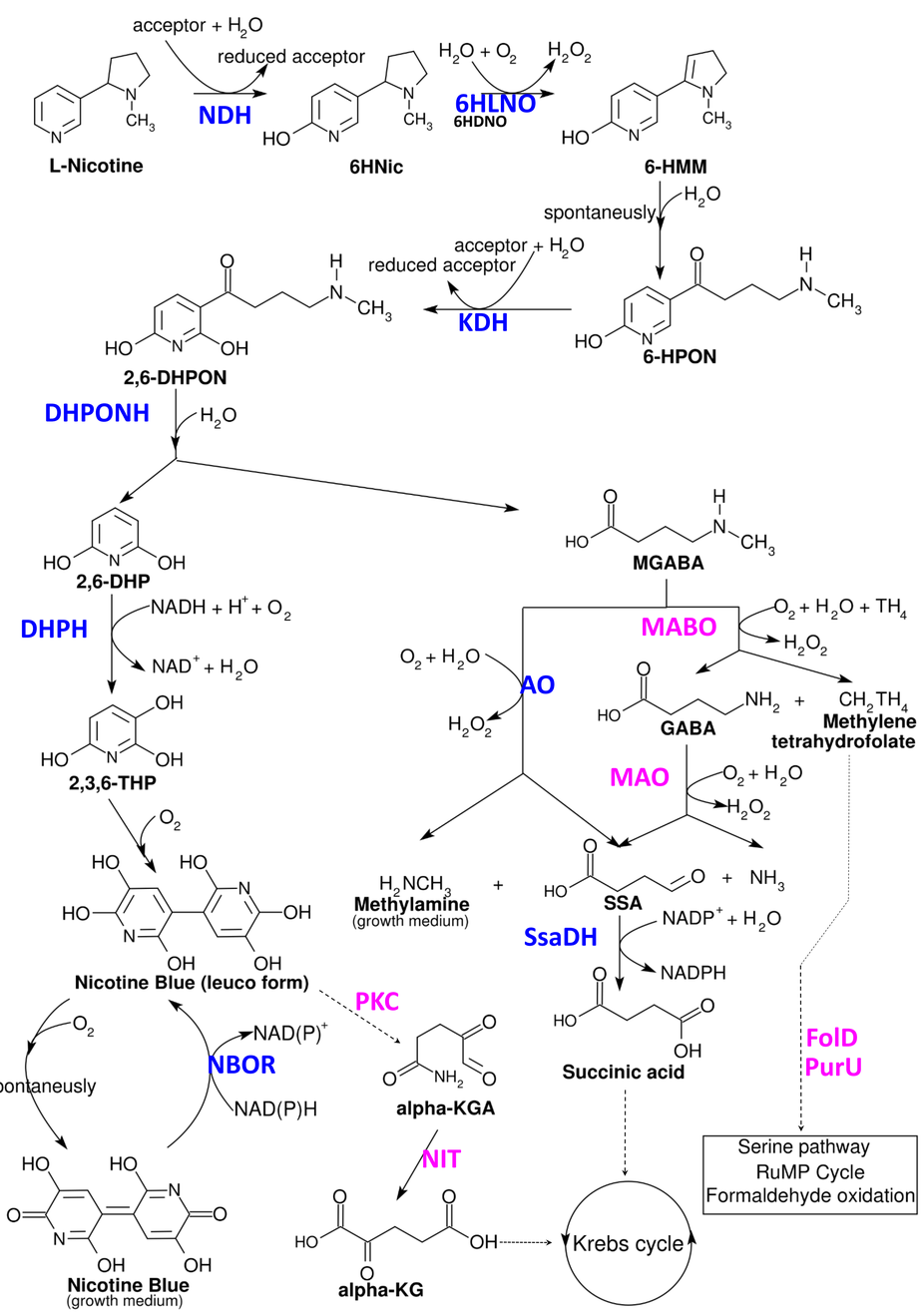








Conclusion



Deamination is preferred in the lower nicotine pathway when citrate is present. A hypothetical polyketide have been shown to have a nicotine-dependent expression and we hypothesize that the enzyme would hydrolyze the N1-C6 bond from the pyridine ring with the formation of alpha-keto- glutaramate.

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