BIOTECHNOLOGICAL EXPLOITATION OF SIDEROPHORES FROM AN EVOLUTIONARY APPROACH: NEW BIOSYNTHETIC PATHWAY OF SIDEROPHORES IN *Citricoccus*

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Introduction. *Citriccocus CH26A* is a member of *Micrococcaceae* family belong to phylum Actinobacteria was isolated from Cuatro Ciénegas Basin (CCB). Genome mining of *Citriccocus* CH26A showed a gene cluster of the biosynthetic pathway of siderophores (des) associated to putative phenyl-acetate degradation cluster (paa) (1). In 2004 was identified a gene cluster (des) that directs desferrioxamine biosynthesis in *Streptomyces coelicolor* (2). In this work we pretended to explain the relationship between des cluster in *Micrococcaceae* family and paa cluster.

Methods. A phylogenetic analysis was realized with homologous enzyme sequences retrieved in NCBI. The amino acid sequences were aligned with SeaView (5). The phylogenetic tree was obtained with FigTree (6). We also realized fermentation to know the optimal growth conditions in minimal media of the *Citricoccus* CH26A strain and we used phenylalanine as carbon source. The siderophores were produced by fermentation under iron deficient conditions (2). Purification and structure elucidation has been realized by HPLC-MS (3), (4).

Results.

The figures 1 and 2, shows the differences between des cluster in *Streptomyces coelicolor* and *Citricoccus* CH26A. First, we discovered that desC is merged with desD in *Citricoccus* CH26A also des cluster is next to paa cluster which does not occur in *Streptomyces coelicolor*.

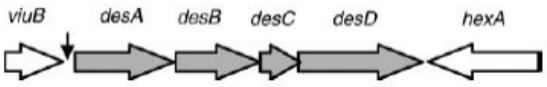

Fig.1 Organization of the des cluster in *Streptomyces coelicolor* (2).

Fig.2 The Des-Paa cluster. The nearness between both clusters and the presence of the iron box suggested a possible interaction.

In the figure 3, we show the chromatogram with six peaks two of them identified as siderophores: FeOB and FeOE. *Citricoccus* CH26A produces another kind of siderophores probably news.

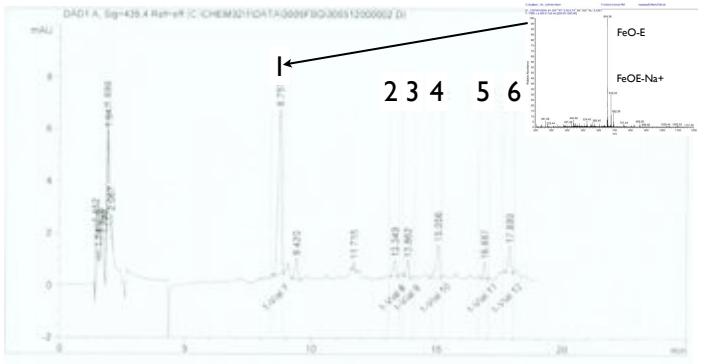

Fig.3 HPLC Analyses of siderophore production by *Citricoccus* CH26A grown under iron deficient conditions. The inset in the top trace shows that high-resolution mass spectrum of ferrioxamine E measured for the compound eluting at approximately at 8.75 min from *Citricoccus* CH26A

Conclusions. All assays showed a link between the degradation pathway of aromatic compounds and the production of siderophores. Additionally, to understand the siderophores biosynthetic pathway in this kind of microorganism is an opportunity to found less restrictive pathways without to forget the ecological and biotechnological value. Further, the elucidation of new potential siderophores being performed.

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