Geophysical Research Abstracts, Vol. 9, 05570, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-05570

Siderophore production in the presence of silicates by *Pseudomonas aeruginosa*

V. A. Geoffroy (1), G. Aouad (2) and J.-L. Crovisier.

(1) Université Louis-Pasteur, Génétique Moléculaire, Génomique, Microbiologie, CNRS-UMR 7156, 28 rue Goethe, 67000 STRASBOURG, France

(2) Ecole et Observatoire des Sciences de la Terre, Centre de Géochimie de la Surface, UMR 7517, 1 rue Blessig, 67000 STRASBOURG, France

valerie.geoffroy@gem.u-strasbg.fr / Fax : 03 90 24 20 28 / Phone : 03 90 24 19 61

The genus *Pseudomonas* represents a group of bacteria of major environmental interest and known for their capacity to colonize various ecological niches. It is composed of bacteria widely distributed in nature, and moreover, many representatives demonstrate behaviours of biotechnical values, bioremediation, crop protection or plant growth promotion. They often rank among the proeminent bacterial population in soil and natural water samples, representing very often 5 to 10% or more of soil isolates, whereas at least half of the contaminating bacteria present in mineral waters are pseudomonads (Verhille *et al*., 1997). Iron plays a central role in the metabolism of most bacteria since it is a constituent of many enzymes and RNA synthesis. Despite iron abundance in nature, bacteria face an acute iron supply problem due to the extremely low concentration of soluble Fe^{3+} at physiological pH under aerobic conditions. To face this problem, microorganisms have evolved sophisticated and diverse iron uptake systems which reflect their adaptability. This bacteria produce in iron-limited condition a fluorescent siderophore, named pyoverdine which will be used as a biological indicator of iron deficiency of the bacteria. We investigated if *Pseudomonas* was able to use as nutriments some constituants of complex silicates under well-defined conditions, similar to the natural environment (neutral pH and 25˚C). Tested materials were a glass contained in municipal solid waste incinerator (MSWI) bottom ash used as aggregates in road construction, a vitrified bottom ash and a basaltic glass.

We focused on siderophore production under Fe-limited conditions, wherein Fe was

supplied as Fe-containing materials. We determined that the presence of materials allowed the bacteria to grow above levels of control without materials, in Fe-limited conditions. Same results were obtained in magnesium limited conditions, implicating that materials need to be considered as additional sources of nutriments in aerobic environments. Moreover concomitantly with the bacterial growth stimulation, addition of each material to the iron-depleted medium resulted in a decrease in pyoverdine production, thus mimicking an iron supplementation.

Verhille, S., M. Elomari, I. Coroler, D. Izard and H. Leclerc. 1997. Syst. Appl. Microbiol. 20, 137-149.