STUDY ON THE PHYSICO-CHEMICAL PROPERTIES OF STRAINS OF *PSEUDOMONAS FLUORESCENS* OF DIFFERENT ORIGINS.

Meylheuc[1], T., Ngoya, S[2]., Hémery[2], G., Duclairoir[2], C., Feuilloley[2], M., Bellon-Fontaine[2], M.N., Orange[2], N.

[1] Unité de Recherche en Bioadhésion et Hygiène des Surfaces des Matériaux. INRA , 25 rue de la république- 91 744 – Massy-France
[2]Laboratoire de Microbiologie du Froid-UPRES 2123-Université de Rouen - 55, rue saint-Germain-27000-Evreux-France

Four strains of Pseudomonas fluorescens have been selected on the basis of their property to produce biosurfactants using a simple physicochemical test of drop spreading. These strains were isolated from different environments, i.e. vegetals leaves (Strain E9), raw milk (Strain MF0), hospital (Strain 3608), or were obtained in the laboratory as a spontaneous rifampicin resistant mutant of MF0 (Strain MF37). A noticeable production of biosurfactant was only detected with strains 3608 and E9 when grown in liquid media. This production is depending on growth temperature and was found maximal between 17 and 20°C whereas the optimal growth is about 28°C for both strains. In contrast, whereas the strain 3608 can multiply at 37°C, the strain E9 can not growth at temperatures over 28°C. The hydrophobic/hydrophylic properties of the two strains were determined by their affinity for solvants of different polarity using the MATS (Microbial Adhesion to Solvent) method and electrophoretic mobility. The MATS methods has been used to determine the Lewis acid-base characteristics and hydrophobicity of microbial cell walls whereas the electrostatic characteristics of micro-organisms were obtained by determination of electrophoretic mobility measurements. Both strains E9 and 3608 showed a high affinity for hydrophobic solvents. The electrophoretic mobility of the two bacterial strains was also in the same range (between –2,3 and –2,8 um/s/V/cm). These values were depending on the growth temperature of bacteria, as shown by the measurements realized with the strain 3608. Whereas the electrophoretic mobility of the bacterium was about –1,08 um/s/V/cm at 17°C, it reached –2,34 and –1,62 um/s/V/cm at 20°C and 37°C, respectively. The Pi of the bacterium was also changing with the temperature between 2.4 at 17°C and 3.2 at 37°C. It can be noted that these physico-chemical properties may interfere in micro-organisms/surface interactions. The production of biosurfactants appears as the principal parameter responsible for the characters of charge and polarity of bacteria. Micellar electrokinetic chromatography (MEKC) was applied to investigate the forms of surfactant produced by E9 taking adavantage of its absence of production of biosurfactant when grown on KBA at 30°C (surface tension = 50,6 mN/m) and its important production when grown at 22°C (surface tension = 31,6 mN/m). A single and major molecule responsible for the physico-chemical properties of the bacterium was not detected. However, comparison of the electropherograms obtained in the two conditions allowed to distinguish a minimum of two peaks that should be different forms of biosurfactant. Implication of biosurfactants in the cytotoxic activity and adhesion properties of P. fluorescens on natural, medical and industrial surfaces is now under study.