Sección: Interacciones Procariota - Eucariota

Modalidad: Poster

DEGRADATION OF BACTERIAL QUORUM SENSING MOLECULES BY *Rhodotorula* sp.

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Microorganisms can regulate their physiology in a cell concentration-dependent manner through the production of small regulatory molecules, the concentration of which is directly related to the density of the population. This phenomenon, known as quorum sensing (QS), has largely been described in both Gram positive and negative bacteria. Since it has been related to the control of the production of virulence and colonization factors, the QS regulatory system has also been studied as a putative control mechanism for pathogenic microorganisms. Lactonases and acylases inactivate the QS systems of Gram negative bacteria through the hydrolysis of *N*-acyl homoserine lactones (AHLs), the main signal molecules produced by this group of microorganisms. These enzymes have been isolated from bacteria belonging to the genera of *Bacillus*, *Pseudomonas*, *Streptomyces*, *Comomonas*, and *Ralstonia*, among others. In this work evidence presented shows that *Rhodotorula sp.*, pigmented yeast previously isolated from a filter plant of a copper mine in the province of Tucumán, Argentina, has the capacity of inactivating a wide range of AHLs. *Rhodotorula sp.* was cultured in YM medium in the presence of 1µM of the following AHLs: C6-HSL, C8-HSL, C10-HSL, C12-HSL, 3-oxo-C6-HSL, 3-oxo-C8-HSL, 3-oxo-C10-HSL and 3-oxo-C12-HSL. After incubation, the remaining AHLs in the supernatants were analyzed with bioassays in plates developed with the biosensors *Chromobacterium violaceum* CV026, *C. violaceum* Vir07 and *Agrobacterium tumefaciens* NTL4 (pCF218) (pCF372). Results show that *Rhodotorula sp.* could completely inactivate AHLs with short (C6- and C8-HSLs) and long acyl chains (10- and C12-HSLs). In addition, this pigmented yeast presented AHL-inactivating activity against substituted (3-oxo-derivative) and unsubstituted signal molecules. In contrast to acylases, lactonases hydrolyze AHLs through the opening of the lactone ring that is present in all this type of molecules. The proteinaceous nature of the AHL-inactivating activity could be established after incubating a *Rhodotorula sp.* protein extract with pronase. To study the putative mechanism of signal inactivation by *Rhodotorula sp.*, supernatants were acidified with HCl in order to permit the closure of the lactone ring, and analyzed as described before. The partial recovery of the regulatory activity in the samples suggests that the yeast hydrolyze AHLs through the production of one or more lactonases. Taking together, these results show the potential of *Rhodotorula sp.* to produce enzymes that interfere with quorum sensing systems of pathogenic bacteria.