

LUMINOUS BACTERIA CHARACTERIZATION IN MEDITERRANEAN SEA WATERS

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Abstract

To investigate luminous bacteria distribution in the Mediterranean Sea a multiyear study (2000-2009) was carried out in several areas from W to E (Gibraltar Straits - Crete Island), during several oceanographic cruises carried out in various seasons. By means classical identification pathways and molecular analyses (PCR, sequencing, etc) was carried out a taxonomic characterization from ca. 800 bioluminescent strains isolated in several sampling sites. *Photobacterium phosphoreum* was the more representative strain in the whole sampling area.

Keywords: *Bacteria, Biogeography, Open Sea*

Luminous bacteria (LB) are widely distributed and most abundant organisms light-emitting and are ubiquitous in the marine environment. LB interest several ecological niches: planktonic/free-living, parasitic, saprophytic, gut-symbiotic and light organ-symbiotic ([1],[2]). There are some studies describing the distribution and abundance of this group in the ocean ([3],[4]) but are very few data on LB distribution in the Mediterranean region. However are not yet perfectly known information regarding population dynamics, ecological function and role. According to molecular characterization and phylogeny, 11 species belonging to genera *Vibrio*, *Photobacterium* and *Shewanella* are reported to gather marine luminous bacteria ([5]) that can be divided in four groups: *Shewanella* group, *Photobacterium* group, *Vibrio fischeri* group and *Vibrio harvey* group ([6]). To understand better the distribution and ecology of luminous bacteria in the Mediterranean Sea, we examined over 3500 samples from about 210 sampling stations from the Straits of Gibraltar to the Island of Crete. Samples were filtered through a Millipore filter (0.47µm pore size), seeded on Petri dishes containing SWC agar medium and incubated in the dark at 20°C. Luminous colonies from plates of sampled depths (ca. 800 strains) were randomly selected, isolated and purified and 250, grown on replicates, were employed for taxonomic analysis. Total genomic DNA of each bioluminescent strain was extracted and PCR amplification of the 16S rRNA genes was performed using the primers 16F27 and 16R1492. Results were grouped into 7 areas: Gibraltar-Alboran, S-W Mediterranean, N-W Mediterranean, Sicily Straits, Tyrrhenian Sea, Ionian Sea, E Mediterranean. In the whole studied area *P. phosphoreum* (66.5%) was the most representative, whereas *V. fischeri* and *V. harveyi* presented values of 9.0% and *P. leiognathi* 8.5%. Other isolated strains belonged to *S. woodyi* (4.6%), *P. profundum* (0.5%) and unidentified strains (1.9%). Collected results (Fig.1) showed a significant geographical difference: the abundance of *P. phosphoreum* decreased moving from west to east, while *V. fischeri* and *V.harveyi* showed an opposite behavior. As far as vertical distribution is concerned, *P. phosphoreum* showed a wide distribution along the water column preferring the batypelagic layer (800m-bottom) while *V. fischeri*, did not found below 800m depth.

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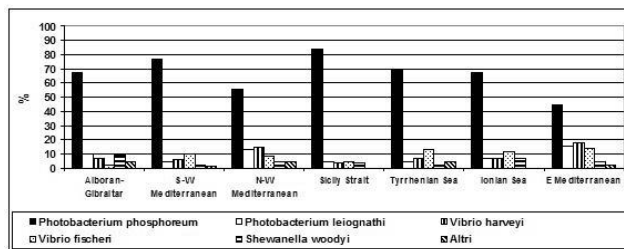


Fig. 1. Luminous bacteria strains distribution in Mediterranean Sea

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