



Abstract

30 Years of a Collection of Cyanobacterial and Microalgae Cultures: LEGE-CC and Its Contributions to Cyanobacterial Ecotoxicology and Biotechnology [†]

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Abstract: The LEGE-CC- Blue Biotechnology and Ecotoxicology Culture Collection is a cyanobacteria and microalgae culture collection containing mainly Portuguese strains but with a biodiversity comprising strains from all over the world. It was started in 1991, aiming to collect and maintain toxin-producing cyanobacteria, in its first few years being mostly dedicated to *Microcystis aeruginosa* strains that were not previously represented in national collections. It evolved into having a theme of freshwater toxin-producing cyanobacteria during its first few years, and then other environments (brackish and saltwater) were added. Today, it comprises strains producing most of the known cyanotoxins, e.g., microcystins, anatoxin-a, cylindrospermopsins, saxitoxins and BMAA, as well as other peptides which do have toxic properties but are not well studied from an ecotoxicological point of view, e.g., aeruginosin, microginin, cyanopeptilin, anabaenopeptin and microviridin. More recently, we diversified the collection by adding freshwater microalgae strains that may have interesting biotechnological applications, the collection now comprising nearly 2000 strains. Apart from the initial information regarding the occurrence and prevalence of microcystins in Portuguese freshwaters—which allowed us to develop and implement the first national cyanobacteria monitoring program, together with the ministries of Environmental and Health—it was possible to establish and legislate a guideline value for microcystin-LR in Portugal in 2007 (DL n° 306/2007). The toxin-producing strains were also the bases of many ecotoxicological studies on the impact of the toxins in organisms at different trophic levels. Around 2006, other applications for the LEGE-CC started to be envisaged, including using the non-toxin-producing strains for applications such as antimicrobial, cytotoxic and allelopathic application. In the last ten years, more intense research has been conducted on the biotechnological applications of the cyanobacteria strains in diverse areas such as antifouling, anticancer and anti-obesity, as well as in sensor development, cosmetics and skin diseases.

Keywords: LEGE-CC; cyanobacteria; microalgae; toxins; biotechnology



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