UNIVERSIDAD DE LA FRONTERA

Facultad de Ingeniería y Ciencias

Doctorado en Ciencias de Recursos Naturales

ROLE OF VOLATILE SULFUR COMPOUNDS (VSCS) EMITTED BY PSEUDOMONAS SPP. IN THE BIOSYNTHESIS OF CdS QUANTUM DOT (QDS

DOCTORAL THESIS IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE DOCTOR OF SCIENCES IN NATURAL RESOURCES

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“Role of volatile sulfur compounds (VSCs) emitted by Pseudomonas spp. in the biosynthesis of CdS quantum dot (QDs)”

Esta tesis fue realizada bajo la supervisión de la directora de tesis, Dra. María Cristina Diez del Instituto de Agroindustrias de la Universidad de la Frontera y ha sido aprobada por los miembros de la comisión examinadora.

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Thesis summary

Interest in the biological production or biosynthesis of nanocrystals of high scientific and technological value has grown dramatically in recent times due to the advantages observed over other methodologies in the manufacturing process and in the product obtained. The use of certain bacteria as nanoparticle biofactories is one of the most frequent examples of this synthesis. However, not all these microorganisms have the metabolic characteristics necessary to carry out this function, which is why the isolation of bacteria from unfavorable conditions, such as those found in the Antarctic Continent, increases this possibility due to the versatility of their metabolism. In this research, the capacity of Antarctic bacteria to perform extracellular biosynthesis of cadmium-sulfur Quantum Dots from the release of volatile sulfur compounds was evaluated. Additionally, the role of the volatile compounds identified in the biosynthesis process was studied, as well as the possible bacterial genes involved in the formation of these nanoparticles