

**UNIVERSIDAD DE LA FRONTERA**

Facultad de Ingeniería y Ciencias

Doctorado en Ciencias de Recursos Naturales



**MEMBRANE ASSISTED MICROAERATION FOR  
SULFIDE REMOVAL IN ANAEROBIC DIGESTION  
PROCESS**

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

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**TEMUCO-CHILE**

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**“MEMBRANE ASSISTED MICROAERATION FOR SULFIDE REMOVAL IN ANAEROBIC DIGESTION PROCESS”**

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## **Thesis summary**

"Rapidly increasing global energy consumption, vital for economic growth, alongside the anticipated decline in fossil fuel reserves, points toward an impending crisis. Renewable energies, crucial for mitigation, offer a solution. Biogas, a product of anaerobic digestion, emerges as a viable alternative, potentially playing a substantial role in the future renewable energy landscape. The biogas quality is pivotal, dictating its range of applications, and impurities might necessitate conditioning or treatment to meet specific standards. Various upgrading methods exist to enhance biogas purity and energy content; however, these treatments can complicate and raise the costs of production. This thesis proposes an innovative approach by introducing micro-aeration during biogas production, a process involving minimal oxygen addition, aimed at hydrogen sulfide reduction. Applied across different anaerobic reactor configurations, this method effectively diminished pollutant levels without compromising the overall anaerobic process yield, offering a cost-efficient means to enhance biogas quality for diverse applications."