UNIVERSIDAD DE LA FRONTERA

Facultad de Ingeniería y Ciencias

Doctorado en Ciencias de Recursos Naturales

CADMIUM REMOVAL FROM HYDROLYZED PROTEIN OF GIANT SQUID (DOSIDICUS GIGAS).

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

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“ Cadmium removal from hydrolyzed protein of Giant Squid (Dosidicus gigas)”

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

Cadmium (Cd), a highly hazardous metal, is introduced into marine environments through human activities, presenting a threat to ecosystems. Giant Squid (Dosidicus gigas), used for protein production in the seafood industry, accumulates Cd in its tissues and digestive glands. This Cd transfer to food processing plants raises food safety concerns, particularly in protein hydrolysates with Cd levels exceeding 100 mg Kg-1. This study evaluates different adsorbents for Cd removal and proposes a pilot-scale continuous process for industrial use. Cd adsorption was tested with three adsorbents, assessing pH, dosage, and contact time for optimal conditions. Adsorption capacity and behavior were analyzed using isotherm and kinetics models, and adsorbent reusability was assessed. Cd removal from Giant Squid Hydrolysate (GSH) in fixed-bed columns was also studied, with iminodiacetic acid resin as an adsorbent. The process aimed at scalability and maintaining GSH's physicochemical properties. This research offers a practical solution to address Cd contamination in seafood processing, safeguarding food safety and industrial practices."