

UNIVERSIDAD DE LA FRONTERA

Facultad de Ingeniería y Ciencias

Doctorado en Ciencias de Recursos Naturales



**POTENTIAL OF RAPESEED PHOSPHOLIPIDS (BRASSICA
NAPUS) FOR THE DEVELOPMENT OF LIPOSOMES AS A
DELIVERY SYSTEM OF LACTOFERRIN, A PREBIOTIC
PROTEIN.**

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

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“Potential of rapeseed phospholipids (Brassica napus) for the development of liposomes as a delivery system of lactoferrin a prebiotic protein”

Esta tesis fue realizada bajo la supervisión de la directora de tesis, Dra. Paula Cartés del departamento de Ciencias químicas y Recursos Naturales de la Universidad de la Frontera y ha sido aprobada por los miembros de la comisión examinadora.

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Thesis summary

Techniques of technological encapsulation demand novel coatings in the food industry to enhance the stability and shelf life of bioactive compounds. Liposomes are spherical vesicles formed by a phospholipid bilayer enclosing an aqueous core, creating a physical barrier against adverse environmental conditions and enhancing the bioavailability of bioactive compounds. In the development of the Doctoral Thesis, canola phospholipids were employed as an innovative source for liposome formulation, highlighting the significance of utilizing natural and cost-effective materials. Lactoferrin (LF), a protein present in biological fluids (milk, tears, and saliva), was employed as the bioactive compound. LF offers benefits for intestinal microflora, along with antioxidant and immunomodulatory properties. However, the unencapsulated oral administration of LF is susceptible to proteolysis in the gastrointestinal tract, diminishing its therapeutic effectiveness. This study expands the use of canola phospholipids in liposomes, providing an effective administration method for LF in the food industry and making use of a byproduct obtained during canola oil refining.