

# Synthesis, description and properties of n-acylated chitosans

**Responsible researcher:** Javier Nakamatsu Kuniyoshi

**Research assistants:** Luis Alexander Nieva Chávez and Mariela Elgegren Lituma

**Funded by:** Research vice - rector's Office

Department of Science - Chemistry Section

---

At present there is a strong tendency to reduce impacts on the environment. In the field of Materials, it is reflected by using more renewable and biodegradable polymers. In this aspect, the natural abundance of chitin, its biocompatibility, biodegradability and non-toxicity, along with its derivatives, make it a potential biopolymer.

Chitin is found primarily in the exoskeleton of crustaceans, mollusks, insects, etc., but its low solubility in water and organic solvents limits its applications. Furthermore, chitosan, obtained from the chitin deacetylation, is soluble in acidic aqueous **solution**.

This project seeks to contribute to the study of chitosan and its chemical modifications, using 100% deacetylated chitosan -or chitosan with a very high degree of deacetylation- as a starting point, and then introducing chemical changes (acyl groups) to manage and modify its properties. The first point is crucial to ensure that properties introduced with the modification are due to it and not to acetyl groups remaining in the raw material.

The modification of chitosan was performed with Valeryl chloride, Octanoyl chloride and Lauroyl chloride (C5, C8 and C12) in aqueous solution and in organic **media**. The products were characterized by infrared spectroscopy (IR) and nuclear magnetic resonance (NMR). Furthermore, the degrees of substitution of the modified chitosan from IR spectroscopy were determined, increasing as the chain aliphatic acyl chloride increases in a range from 26% to 70%. Higher degrees of substitution were obtained with the modification in aqueous solution.