

# Synthesis, characterization 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 trend to reduce our impact on the environment. In the field of Materials Science, this is reflected by using more renewable resources and biodegradable polymers. In this aspect, the natural abundance of chitin, its biocompatibility, biodegradability and non-toxicity, along with its derivatives, make it a biopolymer with great potential.

Chitin is primarily found in the exoskeleton of crustaceans, mollusks, insects, etc., but its low solubility in water and organic solvents limits its applications. On the other hand, chitosan, obtained from the chitin by a deacetylation process, is soluble in aqueous acidic solutions.

This project aims to contribute to the knowledge of chitosan and its chemical modifications, using 100% deacetylated chitosan -or chitosan with a very high degree of deacetylation- as the starting material, and then making chemical changes (acyl groups) to modify its properties. The first point is crucial to ensure that changes in properties are due to the modification itself and not to original 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 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 were determined from IR spectroscopy, they increased as the aliphatic chain of the acyl chloride increased, in a range from 26% to 70%. Higher degrees of substitution were obtained when the modification was performed in aqueous solution.