

## Chemical modification of polysaccharides

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**The PhD project** focuses on development of efficient methods for regioselective chemical modification of polysaccharides with different structural features. The aim is to enhance the functionalities of existing biopolymers, allow deeper understanding about the structure-functionality relationships and to develop new substances with potential biomedical applications. The main focus is on the polysaccharides derived from seaweeds, fungi and bacteria (e.g. carrageenans, agarans, alginates, fucoidans, ulvans, dextrans, pullulans, levans, etc).

The main experimental tasks of the project are as follows.

- Development and optimization of chemical modification procedures, including sulphation, desulphation, acetylation, phosphorylation assays and click-chemistry approaches.
- Purification and fractionation of the modified compounds by chromatography, ultrafiltration and selective precipitation procedures.
- Elucidating the structure of the isolated compounds by various spectroscopic techniques, including NMR (both solution and solid state), FT-IR and FT-Raman spectroscopy.
- General characterization of the isolated compounds by HPLC coupled with pulsed amperometric detection (monomeric composition), GC-MS/FID (linkage analysis) and HP-SEC (molecular weight analysis).
- Characterization of the obtained polysaccharide preparations by rheometry and biochemical methods.

The main analytical/instrumental methods used in the project are: multidetector HPLC, HPLC-PAD (pulsed amperometric detection), HPLC-MS, preparative chromatography, GC-MS/FID, NMR, FTIR, FT-Raman, spectrophotometry, fluorimetry, dynamic rheometry, automated ultrafiltration techniques.

**Keywords:** Carrageenans, Agars, Alginates, Fucoidans, Ulvans, Levans, Polysaccharides, Chemical modification.

*More information about Complex Systems in Natural Sciences PhD programme:*

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