

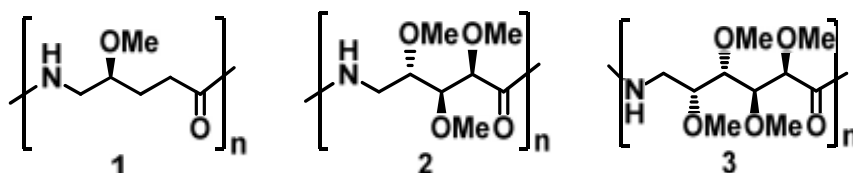
# DESIGN, SYNTHESIS AND CHARACTERIZATION OF NEW CARBOHYDRATE-BASED BIOMATERIALS

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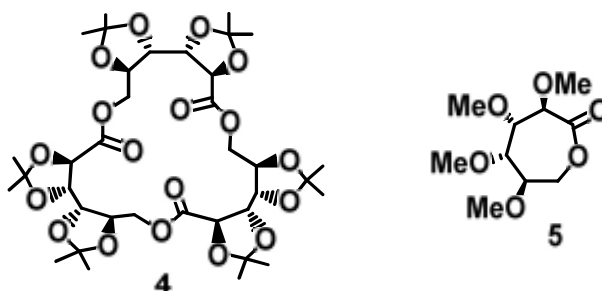
The biomaterials are produced directly or indirectly by living organisms and constitute an alternative to the industrial polymers currently used. In spite of the large production and the great number of applications of industrial polymers there are serious troubles with regard to their fabrication and disposal. Most polymers are derived from petroleum, a non-renewable resource. The petroleum stocks are expected to be consumed in the near future (probably by the end of this century) and the prices will increase rapidly, making the petroleum products uneconomic. On the other hand, the disposal of non-biodegradable industrial polymers has a negative impact on the environment. For example, plastics are considered one of the major pollutants of our time, since the disposal of plastic waste pollutes earth, air and waters. In contrast, the materials based on natural resources may have an unlimited production, are usually biodegradable and benign to the environment. They are also employed as high performance materials, with varied applications. Among the natural products, carbohydrates are preferred precursors of biomaterials because of their abundance and structural diversity.

In view of the interest of the carbohydrate-based materials, we are working on a project on the use of carbohydrate derivatives as monomers of condensation polymers (polyamides, polyesters and polyurethanes). The results on the design, synthesis and characterization of the following materials will be presented and discussed.

i) Stereoregular AB-type polyamides, as oxygen-containing analogues of nylon 5 (**1**, **2**) and nylon 6 (**3**).



ii) Cyclic oligomers (macrolactones, **4**) from aldonic acids and polyesters from caprolactones (**5**).



iii) Polyhydroxy- $[n]$ -polyurethanes (**6**, **7** and **8**) via aminoalditol intermediates.

