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Synthesis of natural biologically active poly[3-(3,4-dihydroxyphenyl)-glyceric acid] analogues

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The caffeic acid-derived polyether poly[3-(3,4-dihydroxyphenyl)glyceric acid] (PDPGA) isolated from comfrey species is a biologically active, water soluble polymer with antioxidant, antilipoperoxidant, antiinflammatory and anticancer properties. This compound is a representative of a new class of natural polyethers The first step for obtaining of PDPGA analogue was performed by cationic polymerization of 2-methoxycarbonyl-3-(3,4-dimethoxyphenyl)-oxirane (MCDMPO). An unsymmetrically 2,3-disubstituted oxirane monomer was synthesized from veratraldehyde (3,4-dimethoxybenzaldehyde, methyl vanillin) and methyl chloroacetate. MCDMPO was polymerized using $BF_3 \cdot OEt_2$ in CH_2Cl_2 under various conditions. Under all conditions examined, the monomer was almost completely consumed to afford a polymer. *Mn* of the polymer ranged from 2900 to 12 800 as determined by size-exclusion chromatography (SEC) with right-angle laser light scattering detection. MCDMPO leads to a polymer having a rather stiff conformation having a novel π-stacked structure between aromatic and carbonyl groups of neighbouring monomeric units, leading to ICT interactions. Although regulated π-stacked structures of a polymer have been prepared for accumulated aromatic groups in the side- and main-chain, such a "hetero π-stacked conformation" of the polymer chain consisting of different types of π-electron systems is unprecedented to the best of our knowledge.

Biography

Maia Merlani has completed her PhD from Tbilisi State University. She is Senior Research Scientist at Tbilisi State Medical University and at the same time holds a position of an Assistant Professor at Caucasian International University. Her field of interest is a chemistry and synthesis of natural compounds. She is the author of more than 45 papers in reputed journals and presentations at 55 international scientific conferences. She was granted Georgian Presidential scholarship for young scientists (1997), NATO scholarship (2002) and Matstumae International foundation scholarship (2013).

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