

Biomarkers are fossil molecules, that are organic compounds with the known precursors and path of changes lead to their formation, which remained in rocks. In exceptionally favorable sedimentary conditions, compounds with unchanged (biological) configuration are found in sediments. Identification of biomarkers and multiple indexes calculated on base of their relationships are one of the various tools used to reconstruct the conditions prevailing on the Earth millions years ago.

The main goal of the project is the reconstruction of the flora inhabiting the lands surrounding the North Sudetic Basin during the Late Cretaceous. Research material will be collected from the outcrops, active quarries and drill cores. In this project several well-known organic geochemistry methods will be used, e.g.: measurements of total sulfur (TS), total carbon (TC), total inorganic carbon (TIC) and calculation of total organic carbon (TOC), then extraction of organic matter and its separation into aliphatic, aromatic, and polar fractions, total extracts derivatization and their analyses via gas chromatography coupled with mass spectrometry (GC-MS).

The Upper Cretaceous (Coniacian–Santonian) succession of paralic deposits is exposed in Rakowice Małe, an inoperative quarry, near Lwówek Śląski. A wide variety of outcropped lithofacies indicates various types of sedimentation: coastal, lacustrine, paludal and lagoonal. In sandstone quarry in Żeliszów, 10 km north-east of Rakowice Małe, layers of dark shales and coals (lignites) with common occurrence of gelified wood fragments (jets). However, due to the poor preservation of wood fragments within these rocks, the only method to reconstruct palaeoflora is chemotaxonomy – the detailed biomarkers characteristic.

Preliminary tests on samples from Rakowice Małe indicate the occurrence of organic compounds, which have not been described in pre-Paleogene rocks. These include saccharides and diterpenoids (biomarkers of resin origin), e.g. *chamaecidins* and *callitrisic acid*. *Chamaecydins* are compounds of *Cupressaceae* origin, found both in modern plants and sedimentary organic matter, not older than Paleogene, though. Whereas *callitrisic acid* is described as component of modern resins and well known from the medical and pharmaceutical literature from its biological activity against cancer and a variety of infectious (viral and bacterial) diseases.

Therefore, the discovering of *chamaecydins* and *callitrisic acid* in the Cretaceous deposits would be respectively the earliest and the first confirmed occurrence of these compounds in sedimentary rocks. Moreover, the challenge faced by the author of this project is determination of the conditions which are favorable for the preservation of certain organic compounds for tens of millions of years with an unchanged biological structure.