

Bile acids as a geochemical tool: an analytical procedure

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Bile acids are efficient taxa-specific paleoenvironmental tools indicating the past activity of vertebrates. Their application includes but not limited to reconstruction of animal and early human migration processes, identification of predominant type of animal husbandry etc.

However, due to sophisticated analytical procedure, bile acids usage is relatively limited. Their chemical structure requires a two-steps pre-derivatisation for GC-MS, which is not very convenient in routine analysis of numerous samples. As for LC-MS, procedures of analysis of bile acids extracted from sediments by this method are not reported in recent papers.

In this study, we aimed to develop a rapid and efficient analytical procedure for bile acids in marine and lacustrine sediments.

The work was implemented through two directions: an improvement of existing sample pre-treatment techniques for GC-MS, and development a novel procedure of LC-MS analysis.

Different derivatising conditions, including reagents, temperature and exposure time, were tested. For methylation step, TMCS in methanol and 5% HCl in methanol have shown similar efficiency, but TMCS method seems to be less time consuming, shortening the total derivatisation time for more than 30%. For silylation, the most important parameter is a choice of derivatising reagent. Best performance has been shown by BSTFA+TSIM (99:1 v/v) and TSIM. In LC-MS part, 2 μm and 3 μm C18 columns were tested.