QUANTITATIVE GAS CHROMATOGRAPHIC ANALYSIS OF OILS USED IN CULTURAL HERITAGE OBJECTS

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Quantitative analysis of binders used in cultural heritage objects is necessary to acquire information about the exact type of the used binder or to determine the different components of a binding mixture. However, paints are complex multicomponent mixtures, that consist of different organic binders (oils, waxes, proteins or their combinations, in modern times also numerous synthetic binders), pigments (inorganic or organic) and various additives. Therefore, for obtaining the maximum possible amount of information from such complex paint samples, accurate methodologies for the analysis of small sample amounts and very low analyte contents, are needed.

Gas chromatography (GC), combined with MS detector or FID, is a widely used method for the analysis of organic compounds in coating materials. Since fatty acids (triacylglycerides) are polar macromolecules that are not volatile enough for GC analysis, it is necessary to take apart and derivatize the lipids mainly to corresponding methyl, ethyl or silyl esters. Various derivatization reagents have been used for this purpose, however, less have these derivatization methods been compared to each other. In this study, the results obtained with MS detector and FID for four common derivatization procedures [1-4] were compared based on absolute quantities and the determination of degradation products.

References

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