

TRACING THE BIOLOGICAL ORIGIN OF SICCATIVE OILS USED IN PAINTINGS THROUGH CHLOROPLAST DNA ANALYSIS

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In order to realize their paintings, Renaissance artists commonly used a variety of natural binding media selected on the basis of technological and esthetic criteria. The characterization of binders provides valuable information for art historians and conservators toward a better understanding of painting techniques and in planning the best conservation strategies. In fact, this would be very helpful in determining their authenticity, as well as revealing important historical, economic, social, and cultural aspects. The characterization of binding media is currently carried out on micro-samples taken from the cultural heritage object and analyzed by vibrational spectroscopy and gas-chromatographic methods. Micro-FTIR analysis provides valuable chemical composition of the binder, allowing for a first discrimination between protein, glycosides, and lipids, while GC-MS gives insight on their specific typology, but does not allow identifying their biological origin. In this context, we moved toward the exploitation of the high specificity and high sensitivity offered by the state-of-the art DNA analysis, focusing our efforts in the development of a suitable protocol for the identification of the biological origin of binding media on minuscule samples obtained from ancient paintings. We have already applied this strategy for the molecular characterization of mitochondrial regions of species traditionally employed in animal-based glues (Albertini et al. 2011, *Anal. Bioanal. Chem.* 399:2987-2995). We now report the development of a suitable protocol for the identification of the biological origin of oil binding media found in tiny samples obtained from ancient paintings through DNA analysis. The current protocol discussed in this study was developed using fresh siccative oils (flax, poppy, and walnut oils) from aged painting models and old painting samples.