

## **Towards a non-invasive analytical protocol for the study of wooden artefacts: potential and limits**

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### **Abstract**

Wooden artefacts embrace wide-ranging types of objects like paintings on panels, sculptures, musical instruments and furniture. Generally, in the manufacturing process of an artwork, wood is firstly treated with organic and inorganic materials to make it nonporous and morphologically homogeneous [1,2] and, at last, the superficial treatment consists of varnishes or coatings applied with the aims of conferring aesthetic properties as well as protecting wood from biological growth, external degradation agents as well as mechanical damage [3,4].

In this work, different wooden mock-ups were prepared by varying some parameters: concentration of filler and pigment respectively in the ground and paint layers, thickness of the protective varnish coat, and sequence of the layers. The mock-ups were subsequently exposed to time-varying artificial aging processes. The multi-analytical non-invasive approach involved spectroscopic (reflection FT-IR, Raman and X-Ray fluorescence), tomographic (optical coherence tomography) and colorimetric techniques. Data were interpreted using both univariate and multivariate methods. The aim was to evaluate potential and limits of each non-invasive technique into the study of different stratigraphies of wooden artworks. This approach was supported by microscopic observations of cross-sections obtained from selected mock-ups.

The methodological approach proposed here would add valuable technical know-how and information about the non-invasive techniques applied to the study of wooden artworks.

## Riferimenti

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