



## **TECHNART 2009**

**Non-destructive and Microanalytical Techniques in Art  
and Cultural Heritage**

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## **PROGRAM and ABSTRACTS**



**TECHNART 2009 LOGO**

TECHNART 2009 logo shows an ancient bronze statue of Venus, the goddess of love and beauty. The statue is dated back to the Roman period and exhibited in the National Museum, Damascus, Syria (No 4309). The photo, courtesy of the Syrian Ministry of Culture, was taken during on site micro-XRF and LIBS measurements (PROMET campaign in Syria).

## GILDING MATERIALS AND TECHNIQUES USED IN ERUDITE AND POPULAR PORTUGUESE POLICHROME BAROQUE WOODEN SCULPTURES

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### Introduction

Very little is known about the materials and techniques used in Portuguese polychrome wooden sculpture from the Baroque, although it had great symbolic importance in this period. The published studies based on a scientific approach are scarce and, although a detailed review already exists, it is still very limited, since it was based on a small number of cases [1]. Among other aspects, the technical differences between pieces that can be classified as erudite or popular remain undiscussed. More specifically it is not known if the artistic features of each group, mainly related to the wood carving quality, are followed by the use of different materials and techniques in the polychrome layers that coat the wooden support. Here we address this issue in relation to the use of gold leaf, a material extensively employed in polychrome Baroque sculptures, particularly for the representation of brocades and other rich textiles. The effects were mainly obtained through the *estofado* technique, which involved the application of paint layers over the gold leaf and its scraping off before the paint is completely dry, revealing the gold beneath according to a certain pattern.

### Experimental

Seven sculptures (Table 1), four with erudite features (E1-E4) and three with popular ones (P1-P3), were studied. They have been made in Northern Portugal during the last quarter of the 17<sup>th</sup> century and the first half of the 18<sup>th</sup> century and undertaken conservation treatment in the School of Arts of The Portuguese Catholic University, in Oporto. The identification of the materials and characterization of the techniques used in the polychrome layers were made through in situ analysis by non invasive energy dispersive X-ray spectrometry (EDXRF) and through analysis of microsamples by optical microscopy (OM), polarized light microscopy (PLM), scanning electron microscopy equipped with an energy dispersive X-ray spectrometer (SEM-EDS), Fourier transform infrared spectroscopy (FTIR) and microchemical tests [2-4].

### Results

The gold leaf was identified in the areas of *estofado* and, in some pieces, also in some attributes and base. The gold was applied over a layer of natural bole, a fine clay with high content of iron compounds. The bole was applied over a ground layer mainly composed of calcium sulphate. This corresponds to the

expected sequence when water gilding is used, as it is the case of all pieces. The gold is partially covered by one or more paint layers. In general, the gold leaf

**Table 1:** Sculptures and composition of the gold leaf

Sculptures		Gold leaf composition		
Cod e	Subject	Au/%	Ag/%	Cu/%
E1	Saint Dominic	84.4	6.3	9.3
E2	Saint Francis Xavier	88.5	5.9	5.6
E3	Saint Paul Martyr	82.9	7.6	9.6
E4	Saint Andrew	95	-	-
P1	Saint Stephen	88	6	4
P2	Virgin of the Annunciation	77.2	16.3	6.5
P3	Saint John Evangelist	75.4	16.9	7.6

was applied in the entire area of the garments, that is, both where the *estofado* technique was used and where the garments do not show any decoration. However, in two erudite pieces the rear side of the garments has gold leaf only in areas of *estofado* (E2, E4). In one erudite (E1) and the three popular sculptures the *estofado* technique was not employed at all at the rear side, as the gold was not used there. Besides, in one of the popular pieces (P2) the use of gold at the front side was limited to the area of *estofado*. In average, the gold content of gold leaves used in erudite sculptures is 87.7% (Table 1). Although in one popular piece a similar value was also found (P1), in the others (P2, P3) the gold content is significantly lower.

### Conclusions

Regarding the use of gold leaf, some significant differences between erudite and popular pieces were found. In popular sculptures some measures that can be related to cost reduction were adopted: the gilded area was particularly minimized and gold leaves with small gold content were employed.

### References

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