

A SPECTROSCOPIC NON INVASIVE STUDY OF THE PRE-COLUMBIAN *COSPI CODEX*

Antonio Sgamellotti^{1,2}, Costanza Miliani², Brunetto G. Brunetti¹, Davide Dominici³

¹Centro di Eccellenza SMAArt, Dipartimento di Chimica, Università di Perugia,
Via Elce di Sotto 8, Perugia, Italy

²CNR-ISTM, Dipartimento di Chimica, Università di Perugia,
Via Elce di Sotto 8, Perugia, Italy

³Dipartimento di Paleografia e Medievistica, Università di Bologna,
Piazza S. Giovanni In Monte 2, Bologna, Italy

The Cospi codex is one of the fifteen pre-Colombian American books, which survived the destruction of the Spanish conquerors. It is a pictograph astrologic calendar from the area Mixteca Puebla (Mexico) dating back to approximately XV century and consisting of 20 pages painted in each side.

A non-invasive spectroscopic investigation was carried out using seven portable instruments (XRF, mid-FTIR, near-FTIR, micro-Raman, UV-*vis* spectroscopy in absorption and in emission, fiber optical microscopy) belonging to the mobile laboratory MOLAB. MOLAB is an infrastructure coordinated by the Centre SMAArt, which performs *in situ* non-invasive investigations to study the materials and the conservation state of artworks.

Measurements were carried out at the library of University of Bologna, where the Mexican codex is conserved. More than 100 points were measured and analysed paying special attention on possible differences between the obverse and the reverse.

Near-FTIR spectroscopy allowed for the identification of the leather support and ground. The fibre optic optical microscope highlighted differences in the execution technique used to paint the obverse and the reverse. The combined use of XRF, micro-Raman, mid-FTIR and UV-*vis* fluorescence was successful in revealing differences in the dye/pigment composition of the two sides. These results are in agreement with the hypothesis proposed by the archaeologists who state that the two sides of the Cospi codex were painted by two different artists. In particular, on the obverse three different type of yellow dyes supported on clay have been detected by UV-*vis* fluorescence and mid-FTIR, whereas on the reverse an inorganic pigment –orpiment, an arsenic trisulfide- has been identified by micro-Raman spectroscopy.