

Virtual technical analysis of archaeological textiles by synchrotron microtomography

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Archaeological textile remains from Antiquity are rare due to their perishable nature. In certain cases, the conservation of the morphology and / or of chemical signatures can be exquisite. Detailed archaeological information on the social and cultural life of past societies, such as on funerary practices, can then be deduced from their study. In temperate climates, these cases of exceptional preservation mainly involve textiles closely associated with corroded metal artefacts (i.e. copper or iron based), through a process called mineralisation. An essential step in understanding these textiles is the study of morphometric parameters documenting their manufacturing processes, which is carried out by archaeologists under the name of technical analysis. In this article, we show how the use of high-resolution synchrotron-based microtomography (CT) can contribute to performing a non-invasive 3D technical analysis of archaeological textiles and overpass several limitations of the conventional techniques. We show that several standard parameters (e.g. weave type, type of yarn, direction of twist, thread count) characterising the manufacturing of these ancient textiles can be determined, while some of them are very difficult to obtain using optical and electronic microscopies. In addition, the statistical representativeness of the data can be examined. The comparison between the three approaches – manual measurements either from surface microscopy or from selected virtual sections and automated analysis on 3D volumes – leads to question the differences between the quantitative results obtained. While the manual selection of measurement points is inherently associated to perceptual biases, the automated process may also come with limitations and biases which we detail in order to make the method more robust for future use. We analyse these implications by studying a textile from the locality of Le Paradis in Creney-près-Troyes (Aube, France, 5th century BC), taken as a typical case of fragmentary textile difficult to analyse by standard analytical methods.

Thème(s) de recherche

[5. Matériaux, techniques, métiers : approches théorique et pratique du faire artistique](#)

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