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<sup>1</sup>H-<sup>1</sup>H NMR 2D-TOCSY, ATR FT-IR and SEM-EDX for the identification of organic residues on Sicilian prehistoric pottery

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# **$^1\text{H}$ - $^1\text{H}$ NMR 2D-TOCSY, ATR FT-IR and SEM-EDX for the identification of organic residues on Sicilian prehistoric pottery**

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## **Abstract**

Insights into the diets of early societies can be gained, indirectly, from the cultural evidence of artefacts related to food procurement, preparation and consumption and human skeletal remains. However, more direct evidence for dietary constituents derives from the identification of intact plant and animal remains collected during the excavations but also from the exam of the amorphous remains of foodstuff associated with artefacts. Organic residues adhering to the surface or absorbed into the porous fabric of an unglazed cooking vessel should provide important information both about the usage of the vessel and dietary practices. This contribute deals with the results of a combined analytical research via  $^1\text{H}$ - $^1\text{H}$  NMR 2D-TOCSY, ATR FT-IR and SEM-EDX on organic residues on pottery from two Sicilian prehistoric sites of Monte Kronio and Sant'Ippolito. The goal was that to shed new light on the use of certain ceramic shapes and infer some hypothesis about ancient dietary habits.

**Keywords:** prehistoric Sicily, organic residues, paleo-diet,  $^1\text{H}$ - $^1\text{H}$  NMR 2D-TOCSY, ATR FT-IR, SEM-EDX

## **1. Introduction**

The opportunity to reconstruct ancient culinary and dietary habits of ancient civilizations through the application of laboratory analyses has drastically changed our approach to the study of the archaeological record.

Food habits are constructed in accordance with a broad range of cultural, ideological, and interpersonal factors such as status, religion, gender, age, wealth, and more. In this perspective food is not just biologically necessary but also it becomes a cognitively prominent material culture that plays an active role in constructing and negotiating social distinctions.

Food practices construct and negotiate identity on numerous levels. At the broadest scale, specific foods and cuisines may be used as markers of particular cultures. Food is commonly used to establish intra-societal cultural strata, as its acquisition, preparation and consumption patterns are usually associated with certain cultural categories. Finally it is an integral component of individual identities as people use it to present themselves to the world, using food habits to construct their identities.

The analysis of organic residue employs analytical organic chemical techniques to identify nature and origins of remains that cannot be characterized using traditional techniques of archaeological investigation (because they are either amorphous or invisible). This field is based upon the principle that the biomolecular or biochemical components of organic materials associated with human activity survives in a wide variety of locations and archaeological

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