

ROMAN AMPHORAE AROUND THE CHANGE OF ERA: PRODUCTION AND CONSUMPTION PATTERNS IN THE NORTH-EAST OF THE IBERIAN PENINSULA

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During the 1st century BC the *Citerior* Roman province (nowadays Catalonia, Spain) developed an agricultural production system focussed in the production of a surplus to export. This surplus, generally assumed as wine, was transported by amphorae produced in the same province. In this regard more than 50 amphorae production centers have been recovered along the Catalan coast producing several Roman amphorae designs used for the transport of wine. These Roman types, derived from Greco-Italic tradition, replaced the Iberian types derived from the Punic one. Specifically, the first Roman amphora design concerned, the Dressel 1 type, was produced during the first half of the 1st century BC. Later on, during the second half of that century, two new amphorae designs, characteristic from the Catalan area, were introduced and widely produced: Tarraconense 1 and Pascual 1.

To date 350 amphorae recovered from several production and consumption centers of the northern part of the Catalan area have been analyzed. The analytical program has been carried out by a combination of techniques. The chemical composition has been determined by XRF and mineralogical characterization has been achieved by XRD. In some cases SEM has been used to characterize the microstructure and sintering stage of the matrix. Additionally, several mechanical properties tests have been performed on these types of amphorae in order to study the strength and toughness of the material. The materials properties have been studied for the very first time together with the different shapes of these amphorae by Finite Element Analysis. This method enables to evaluate the different designs determining the mechanical performance of the vessels under different kind of loads and simulating transport conditions.

The present work reports on the results that have so far revealed different technological patterns among different workshops and, in some cases, within the same workshop during its activity period. The archaeological implications of these findings are discussed in view of production and distribution of wine in the studied sites.