ANATOMICAL-PART *N*-ALKANE DISTRIBUTIONS AND THERMAL ALTERATION IN *CELTIS AUSTRALIS*: NEW INSIGHTS ON PALEOFIRE INTERPRETATION

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In archaeological sediments, black layers are the main material of combustion structures and represent either carbonized fuel [1] or charred fine organic material derived from the soil substrate [2] and it is difficult to discern between the two sources. The use of anatomical part-specific organic compounds might enhance strategies for solving this problem.

Anthropogenic fire wood usually involves branches, while natural soil covers contain mainly leaves and roots. To explore the possibility of identifying different anatomical fractions as components of archaeological combustion structures, *n*-alkanes from a modern plant, *Celtis australis* (leaves, branches and bark), were extracted and analysed by GC-MS and taken as a reference. To further investigate the role of thermal alteration, charred biomass was produced under limited oxygen conditions in a muffle furnace at 150ºC, 250ºC, 350ºC and 450ºC (1h) and analysed for aliphatic hydrocarbons. Since average temperatures associated with black layers are around or below 300ºC [2] the reference materials were heated at 250ºC for different time intervals.

The *n*-alkane profiles in unaltered plant parts of *C. australis* are different enough to allow their identification as components of combustion structures under low combustion temperature conditions. This observation should be examined for other species to determine if this is a common pattern. If so, it could help reconcile differences in the types of fuel used in archaeological fire places and their distinction from the underlying soil substrate. Moreover, higher CPI values at 250ºC corroborate the good preservation states of charred organic matter in the black layers of combustion structures and their potential to conceal plant lipid molecules.

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[1] Leroi-Gourhan A (1973) *Séminaire sur les structures d'habitat: témoins de combustion.* Collège de France, Paris. [2] Mallol et al (2013) *J. Archaeol. Sci*. **40** 2515-2537.