



Tissue-based analysis of a charred flat bread (*galette*) from a Roman cemetery at Saint-Memmie (Dép. Marne, Champagne-Ardenne, north-eastern France)



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ABSTRACT

During a rescue excavation by the Institut de recherches archéologiques préventives (Inrap) at the Gallo-Roman cemetery of Saint-Memmie (Champagne-Ardenne, France) in 2006, a remarkably well-preserved charred flat bread was unearthed from a pit containing a secondary deposit of burnt objects (feature 109/110), dating to a time frame between the middle of the 1st century AD and the beginning of the Flavian period (69 AD). As a part of the archaeobotanical research on the charred plant remains from the site, the bread was analyzed with the aim to reveal the cereals used in the bread's preparation and to investigate the processes involved (grinding, sieving, leavening, baking). The results indicate that the bread is composed of finely ground flour of a mixture of barley (*Hordeum vulgare* L.) and either einkorn (*Triticum monococcum* L.) or emmer (*Triticum dicoccon* Schrank.), and apparently was prepared without leavening. © 2014 Elsevier Ltd. All rights reserved.

R É S U M É

En 2006, pendant la fouille d'une nécropole gallo-romaine à Saint-Memmie (Marne, Champagne-Ardenne, France) par l'Institut de recherches archéologiques préventives (Inrap), une galette carbonisée a été récupérée d'une fosse à dépôt de résidus de combustion (structure 109/110) contenant les résidus d'un bûcher funéraire. Dans le cadre des analyses archéobotaniques, une analyse de la galette a été effectuée, ayant pour but d'obtenir des informations sur sa composition et sur les procédés de sa préparation (mouture, tamisage, levage, cuisson). Les résultats montrent que la galette a été préparée à partir d'un mélange de la farine fine d'orge (*Hordeum vulgare* L.) et d'engrain (*Triticum monococcum* L.) ou d'amidonner (*Triticum dicoccon* Schrank.), et qu'elle a apparemment été préparée sans levage. © 2014 Elsevier Ltd. All rights reserved.

1. Introduction: purpose of, and state of the art in bread analysis

As nutrition science tells us, the various processes involved in the preparation of bread or porridge facilitate digestion of useful components, and help avoiding noxious substances in the cereal plant: Dehusking of hulled cereals removes the silica-rich glumes

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which are not just indigestible but also abrasive to the mucosa (Münzing, 2004). Milling breaks up the grain's starch-containing endosperm tissue improving access of the digestive juices to the cell contents (Heaton et al., 1988; Waldron et al., 2003). In leavened bread, microorganisms degrade phytic acid, which would otherwise inhibit the intake of important macro and micro elements (van Staveren and Dagnelie, 1988; Sanders, 1999). Drying, cooking or baking destroy protease inhibitors which hamper protein digestion (Liener, 1979). The latter two processes also contribute to the product's taste by Maillard reactions (Maillard, 1912; De Kimpe and Keppens, 1996) and improve starch accessibility by gelatinisation (e.g. Dreher et al., 1984; Lund and Lorenz, 1984). Bread, in addition, can serve as a food preserve storable for weeks and months given it is kept in a dry and protected place, and rehydrated (boiled) before consumption (see e.g. Staub, 1868, 9, on rye bread in the Valais, Switzerland).

These nutritional, culinary, and practical advantages make it highly likely to assume that processed cereals may have been of high importance ever since the Neolithic. The accumulating evidence from archaeological finds contributes to this hypothesis, ever increasing the available knowledge of the presence, composition, and properties of these cereal products. Archaeological evidence of cereal products is usually found in charred state. This is due to two main reasons: firstly, as cooking and baking require fire, “baking accidents” easily happen. Secondly, due to their resistance to chemical and microbial decay, charred remains in general are more likely to preserve in the soil than uncharred material (Jacomet and Kreuz, 1999).

The oldest archaeological remains of bread in Europe date back to the Neolithic Cortaillod and Horgen cultures (roughly covering a range from 4500 until 2800 BC; Währen, 1995). Various finds from later periods are documented, as from Bronze Age until medieval Northern Europe (Hjelmqvist, 1990; Hansson, 1994a,b), from Neolithic to Medieval France (Lannoy et al., 2002), from classical Graecia Magna (Ciaraldi, 1997–1998), or from Late Iron Age and Roman Germany (Währen, 1983; Heiss and Kreuz, 2007), to name just a few. From outside Europe, D. Samuel's extensive work on desiccated Egyptian bread has to be mentioned (as e.g. in Samuel, 1989, 1997). For a comprehensive overview on archaeological bread finds in general, also see Samuel (2002).

Apart from these more or less intact bread finds, a long-known biogenic archaeological material, usually subsumed as amorphous charred objects (AOV – “Amorphe Objekte Verkohlt”, see Jacomet et al., 2006; OAC – “objets amorphes carbonisés”, see Brombacher and Klee, 2011; Wiethold, 2011; MOC – “matière amorphe carbonisée” see Wiethold, 2013a,b; BGF – “Brot, Gebäck, Fruchtfleisch” = bread, pastry, fruit pulp, see Kreuz and Schäfer, 2006), has been increasingly well analysed during the past years. Many of these amorphous charred remains were recognised as containing cereal components, and representing fragments of either bread or gruel/porridge (e.g. Valamoti, 2002, 2011; Bouby and Marinval, 2004; Valamoti et al., 2008; Heiss, 2008b, 2010, 2012; Kohler-Schneider and Heiss, 2010; Kubiak-Martens et al., 2015; Kohler-Schneider et al., 2014). However, microscopical analysis of the remains is very time-consuming and is only rarely carried out.

The necessity for investigating archaeological food from the Roman period may seem surprising regarding the vast amount of Roman written sources. But notwithstanding the remarkable amount of literature that Roman culture has left behind, written sources on daily life – and on daily nutrition – in the provinces, here in the southern part of the province of *Gallia Belgica*, are in fact very rare, unevenly distributed, and often enough unreliable (cf. Kreuz, 2005). Only few sites have already revealed evidence of the complete and varied *chaîne opératoire* of funeral rites (cf. Poux, 2009), including the incineration of the body. Thus analysis and

interpretation of food remains are still important means for elucidating the living conditions in the Roman provinces.

The analysis of food remains from ritual contexts as the funeral site of “La Trussonnerie” certainly does not allow direct conclusions on daily nutritional habits. But still the results may contribute significantly to the knowledge of locally available food plants, the attitudes towards food, and ways of cereal processing itself. With this goal in mind, the flat bread from feature 109/110, together with the carpological remains (Wiethold, 2010a), was analysed.

1.1. The site

The Gallo-Roman cemetery of Saint-Memmie “La Trussonnerie” (Dép. Marne, Champagne-Ardenne, France) is situated in the centre of the flat and fertile plain of the central Champagne, in a neighbouring community of the town of Châlons-en-Champagne, about 3 km southeast of today's city centre. Châlons-en-Champagne was the Roman *Durocatelaunos*, belonging formerly to the *civitas* of the Celtic tribe *Catalauni*, historically known as clients of the well known *Remi*, who settled further north (Clause and Ravau, 1983).

After initial prospection trenches on the parcel situated in the corner of Avenue du Maréchal Juin and Rue des Pâtures in Saint-Memmie (“La Trussonnerie”, cf. Fiabane, 2005; location: 48° 56' 49" N 4° 23' 0" E), in 2006 an extensive excavation campaign by the French National Institute of Preventive Archaeology (Inrap, *Institut national de recherches archéologiques préventives*) under direction of Nathalie Pouget partially unearthed a Gallo-Roman funerary site dating to the second half of the 1st century AD (Fig. 1). Among the excavated structures were 24 wells, 22 postholes, 10 inhumation graves, eight *ustrina* (funerary pyres), 27 incineration graves, and 26 pits inside which mainly burnt pottery linked to the funerary rites had been deposited (Fig. 2a).

Among the latter group is feature 109/110 (Fig. 2a, b), a deposit distributed on a rectangular surface of 1.1 m × 0.65 m. The concentration of burnt remains therein, reaching a maximum thickness of 0.14 m, contained six nails possibly deriving from boarding constructions or wooden caskets, charred organic remains (see below), and five almost complete ceramic vessels (two jugs, two cooking or food storage pots, and a small Gallo-Belgian sauce dish), all deposited at the same depth, and all with traces of burning. Belonging most probably to a primary deposit of a funerary pyre, the uncovered ceramics seemed to be only part of the initial deposit, as most of the pottery assemblages that were found on intact funerary pyres at the site also included plates and dishes. No particular arrangement of the pottery in the pit was observed, and the vessels (which were archaeologically complete) are thought to have been thrown in without much care – except for the small dish they were already fragmented when deposited. The pottery assemblage does not give any hints on a possibly elevated social status of the deceased but, in comparison to other local domestic contexts, allowed dating to the middle of the 1st century AD and to the beginning of the Flavian period. No human or animal bone remains were found in feature 109/110. However, as overall bone quantities were very low in comparable pits containing secondary deposits, their lack cannot be regarded as a unique trait and may simply be due to decomposition. At any rate, the find situation implies that only selected objects were taken from the funerary pyre and then discarded in the pit. This secondary deposit could correspond to the final cleaning of a funerary pyre, but its real meaning still remains uncertain (refuse or ritual pit?).

From a regional point of view the graves of *Gallia Belgica* are already well known. However, this is not yet true for the funerary pyres (*bûcher funéraire*) and for the other features containing incinerated remains of the burial, which up to now have only rarely

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