

## Ancient Wine and Beer

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*Recent research on ancient organic residues at the molecular level has transformed our knowledge of very early alcoholic beverages. We now know that in the past humans around the world fermented available sugar sources into alcoholic drinks, shedding important new light on cultural innovation and development, agricultural and horticultural skills, and technologies for making special vessels to serve, drink and present the beverages ceremonially.*

### Neolithic experimentation

The Neolithic period was the first time that all the necessary pieces for making wine, beer and other alcoholic beverages on a large scale fell into place. Permanent settlements, based on domesticated plants and animals, led to the emergence of a 'Neolithic cuisine' that included new alcoholic beverages. The invention of pottery (c. 10,000 BC in east Asia and c. 6000 BC in western Asia) enabled fermented beverages to be kept for extended periods inside well-stoppered vessels. Pottery also absorbed and preserved ancient organic molecules, whose natural sources can now be identified by modern chemical techniques.

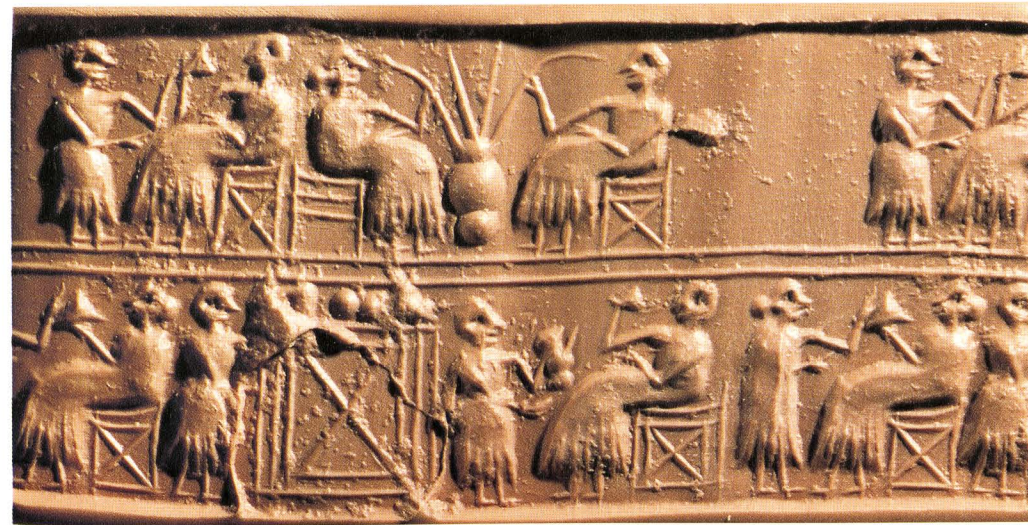
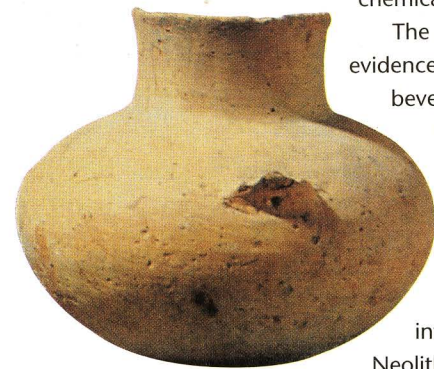
The earliest chemical evidence for an alcoholic beverage from anywhere in the world is not a wine or beer *per se*, but a mixed beverage, or 'cocktail'. Based on a chemical investigation of early Neolithic pottery jars dating

to c. 7000–6600 BC from the village of Jiahu in the Yellow River valley of China, the University of Pennsylvania Museum's Biomolecular Archaeology Laboratory determined in 2004 that the mixed drink was made from rice, fruit (grape and/or hawthorn fruit) and honey.

### Specialization takes root

The prehistoric beverage at Jiahu paved the way for unique cereal beverages of the 2nd millennium BC in China, remarkably preserved as liquids inside sealed bronze vessels of the Shang and Western Zhou dynasties (c. 1250–1000 BC). The vessels had become hermetically sealed when their tightly fitting lids corroded, preventing evaporation.

Chemical analysis in 2004 revealed that the 3,000-year-old liquids, which still retained a fragrant aroma when first opened, represented filtered rice or millet 'wines'. Tree resins (e.g. China fir), flowers (such as chrysanthemum) and herbs accentuated the aromatic and medicinal qualities of these special brews. The beverages were likely made by mould saccharification, a uniquely Chinese contribution to beverage-making in which an assemblage of mould species are used to break down the carbohydrates of rice and other grains into simple, fermentable sugars.



**above left**  
Molecular investigation of this pottery jar from Jiahu, in China, dating to the 7th millennium BC, revealed that it once contained a mixed fermented beverage of honey, rice and fruit – either grape or hawthorn.

**left**  
A banqueting scene on an impression of a seal from the Royal Cemetery at Ur, of the mid-3rd millennium BC. In the centre of the upper row a male and female drink barley beer from a large jar through tubes; below, dignitaries raise their cups, probably of wine.

### Red or white?

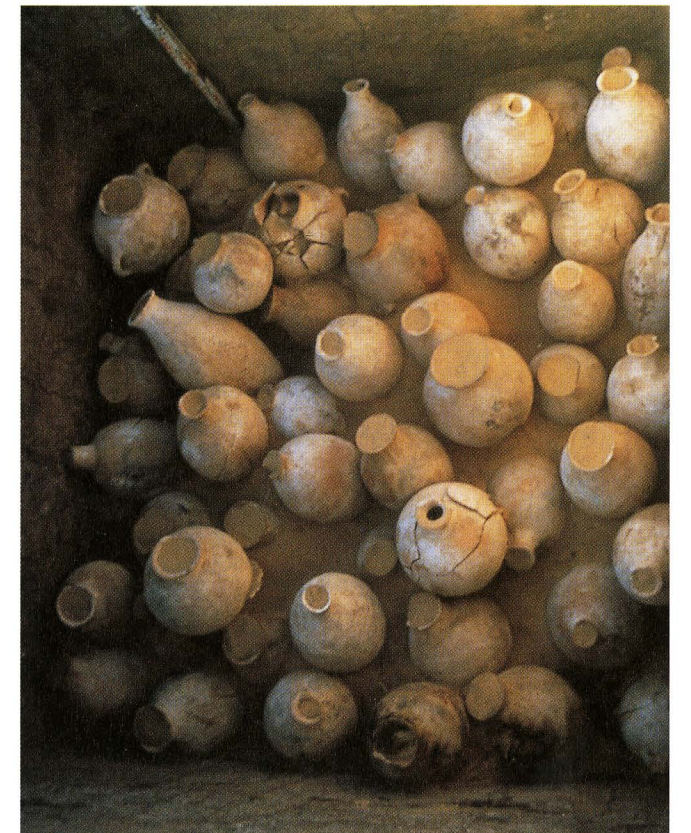
At approximately the same time or perhaps somewhat later, beverage-makers had begun to make barley beer and grape wine in western Asia. In 1994 the Pennsylvania Museum laboratory reported that two jars from Hajji Firuz Tepe (Iran), dating to c. 5400–5000 BC, had contained resinated wine.

One of the most exciting recent discoveries using molecular techniques is the study carried out in 2004–05 by researchers at the University of Barcelona. They analyzed amphoras from the famous tomb of the boy-king Tutankhamun in western Thebes (Egypt), dated to around 1322 BC. When Howard Carter and Lord Carnarvon opened the tomb in 1922, among many artifacts related to wine, they found 26 amphoras, which had reddish and yellowish residues on their interior. These vessels, which had been tightly stoppered and sealed, had burst open, possibly under the pressure of secondary fermentation gases that had built up in the hot tomb. The Barcelona researchers showed that a characteristic red pigment of red wine, malvidin, accounted for the reddish colour of the residues inside two of the jars, and that the yellowish residue inside another lacked the pigment, and probably derived from a white wine. The inked labels on the outside of the amphoras provided additional important information. The wines had been made without exception in the Nile Delta region, where the pharaohs had originally established a royal winemaking industry c. 3000 BC.

Fermented beverages became increasingly more specialized in the millennia to follow around the world – so much so that single-product drinks such as grape wine and barley beer were held up as marks of civilization or barbarity depending upon where one lived. Humans were primed by their genetics and environment to discover how to make fermented beverages. Without exception, they readily incorporated these beverages into their social lives, religions, cuisines, pharmacopeias, and economies.

### below

Jars filled with imported wine in a chamber in Tomb U-j at Abydos, Egypt, dating to around 3150 BC (see also p. 238).



### bottom

A painted scene from the tomb of Nakht, Thebes, Egypt, dating to around 1400 BC, showing grape harvesting and wine-making. Recent research on vessels from Tutankhamun's tomb has shown that they contained both red and white wine.

