

**EGYWINE PROJECT 2016-2018**

**ANCIENT EGYPT'S WINE REBIRTH**

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Image: Viticulture scene from the tomb of Intef, TT155 at Dra Abu el-Naga, Western Thebes

## **EGYWINE PROJECT, UNIVERSITÉ PARIS-SORBONNE**

The present paradigm on wine history states that viticulture originated in the Near East and that Europe's wine culture is a Greek and Roman heritage. The Egyptian wine culture is one of the world's most ancient, however, the extensive archaeological evidences (iconography, texts, artefacts and organic remains) have not been fully analysed.

EGYWINE addresses the viticulture origins, production and preservation of the ancient Egyptian wines, and the diffusion of the Egyptian wine culture legacy to Europe.

In ancient Egypt, wine was a prestigious drink consumed mainly by the royalty and the elite, offered to gods in daily temple rituals, used in medicine and in the Pharaoh's resurrection ritual. From the Predynastic onwards, wine jars were placed in tombs as funerary offers and, from the Early Dynastic Period (c.3300 BC), the inscriptions on jars indicate the wine's geographic origin. This is part of the evidence that wine production in Egypt was highly sophisticated since at least the beginning of this period. During the New Kingdom Period (1550-1069 BC), the Egyptian wine jars were inscribed in hieratic to indicate: harvest year, product, quality and sweetness, provenance, property and winemaker's name and title. However, no mention concerning the wine's colour is found on documents from ancient Egypt; the only known evidence was the representation of red grapes in tombs and the myths that connect the wine with the blood of Osiris, the god of the underworld, until the chemical analysis by Guasch-Jané *et al* revealed that in the New Kingdom three kinds of wines were made: red ["Liquid chromatography with mass spectrometry in tandem mode applied for the identification of wine markers in residues from ancient Egyptian vessels", *Analytical Chemistry* 76 (2004): 1672-77], white ["First evidence of white wine in ancient Egypt from Tutankhamun's tomb", *JAS* 33, 2006: 1075-80] and a different kind of wine named *shedeh* ["The origin of the ancient Egyptian drink *shedeh* revealed using LC/MS/MS", *JAS* 33 (2006): 98-101]. These analyses confirmed that *shedeh* was a red grape wine and ended a substantial discussion about *shedeh*'s botanical source that lasted over a hundred years. Further research on the three wine amphorae surrounding Tutankhamun's body revealed the significance of these wines in the royal burial ["The meaning of wine in Egyptian tombs: the three amphorae from Tutankhamun's Burial chamber", *Antiquity* 85, 329 (2011): 851-58].

From the Old Kingdom (2680-2160 BC) to the Greco-Roman Period (332 BC-395 AD), scenes of viticulture and winemaking were depicted on the walls of the tombs of noble people. The procedures are similar to the method used in Europe and we have recently studied and catalogued them [[www.wineofancientegypt.com](http://www.wineofancientegypt.com)].

### **Objectives of the EGYWINE project:**

- 1) Identify which material is linked with wine from the Predynastic Period (3800-3300 BC) to the New Kingdom Period (1550-1069 BC)
- 2) Study the main concentration of the Ancient Egyptian wine jars
- 3) Analyse ancient wine residues from pharaonic Egypt through paleogenomics

**Research Methodology and Approach**

**Objective 1: Identify which material is linked with wine from the Predynastic to the New Kingdom Period (3800-1069 BC).** This includes about 5000 pottery (jars, strainers, cups), inscriptions (*ostraca*), papyrus and organic remains (grapes, wine residues, vine wood).

Eight museums and institutions having wine-related objects from ancient Egypt in their collections have been identified: Louvre in Paris (France), IFAO, Agricultural Museum and Egyptian Museum in Cairo (Egypt), British Museum and Royal Botanic Gardens in London, and Ashmolean in Oxford (UK) and Egyptian Museum in Turin (Italy).

**Objective 2: Study the main concentration of the Ancient Egyptian wine jars**

(a) Study the Ancient Egyptian wine jars:

About 300 according to chronology, material, typology, inscriptions, provenance and current location. Relevant photos/drawings will be compiled. The cultural (archaeological context, chronology, shape, coating, décor, manufacturing techniques) and technical (characterization of the fabrics) aspects of the wine jars, including typology, inscriptions, sealing, stopper and stamp; visual examination and fluorescence X analysis will be studied.

(b) Study the wine inscriptions: hieratic or hieroglyphic.

(c) Create the Ancient Egyptian wine jars database:

A datasheet with two information levels related to provenance and jars will be developed: Archaeological site name and location, current location (Egypt or another country) and map, site type (necropolis, habitat, temple), chronology and total of wine jars identified; Wine-jar typology, chronology, inscription, geographical provenance in Egypt, current location (site or museum), technical description, photo and drawing (if available).

**Objective 3: Analyse ancient wine residues from pharaonic Egypt through paleogenomics**

EGYWINE is the first attempt to analyse the DNA of ancient grape and wine samples. If DNA preservation can be demonstrated, various projects could be developed that would open an avenue of novel informative research with (i) high historical value, (ii) basic evolutionary value as it could provide important insights in the evolution of vine and yeast, and (iii) insights into the knowledge of the wine making process, with potentially some applied consequences.

Paleogenomic analysis of ancient wine residues from pharaonic Egypt offer multiple perspectives: (i) study of the evolution of the genome of vine since its initial domestication; (ii) study of the evolution of fermentation yeasts, in particular, but not only, *S. cerevisiae*; (iii) study of the evolution of the process of wine making, in particular through a metagenomic analysis of the multiple microorganisms that were used during, or along, the wine making process including the identification of the multiple microorganisms acting at the various steps of fermentation, the potential presence of the microorganisms involved in “velum” formation that might protects wine of oxidation. The wine studies are in line with current European trends on new varieties and ancient production methods.

## **EGYWINE PROJECT, UNIVERSITÉ PARIS-SORBONNE**

EGYWINE involves a diversity of collaborative partner labs each bringing specific expertise:

The "Mondes Pharaoniques" laboratory (UMR 8167 "*Orient et Méditerranée*") at Paris-Sorbonne, under the direction of Prof. Pierre Tallet, will contribute to the wine jars and wine inscriptions study and sample collection.

The 'Epigenome and Paleogenome' laboratory, directed by Professors Thierry Grange and Eva-Maria Geigl at the Institute Jacques Monod (UMR 7592 Université Paris-Diderot/CNRS), has excellent technological resources and high-containment facilities as well as the know-how to perform aDNA extraction, sequencing and analysis of ancient material.

The UMR 1334 "*Amélioration Génétique et Adaptation des Plantes*" (AGAP) at MontpellierSupAgro-INRA, under supervision of Prof. Jean-Michel Boursiquot, will contribute to the molecular characterization, to bioinformatics and databases, and to the study of wine fermentation and yeasts (Dr. Jean-Luc Legras, UMR 1083 "*Sciences pour l'Oenologie*" SPO).

EGYWINE will compare the results of the aDNA analysis with the available large INRA (*Institut National de la Recherche Agronomique*) databases to determine the grapes originality and genotypes category (wild versus cultivated). They may give indications on geographical origin and their use (table grape versus wine variety), and to identify new grape varieties.

If good samples are identified, a deeper knowledge of the wine making process can be achieved, in particular through the characterization of the various microorganisms playing a role at the various steps of the process.

If exceptional samples are identified, it is even conceivable that complete genomic information of some of these microorganisms could be retrieved. Novel pipelines and procedures for analyses of the wine making process in history will be generated that could be used to explore other time periods and geographical areas.

### **Originality and Innovative Aspects of the Research:**

Based on Dr. Guasch's previous study of Egyptian wine types, EGYWINE will explore how the Egyptian wines were made to understand the ancient traditional elaboration methods for the knowledge advancement and heritage conservation.

EGYWINE will investigate:

- The wine jars typology and production to know how the jars were made to contain wine,
- The wine inscriptions to know the winemaking procedures such as maceration (ex. how many days grapes were kept with the juice for colour extraction?),
- The impact of the wine production on the Egyptian economy from ceramic material, inscriptions, texts,
- The origin (Egyptian or foreign) of the one-handled jars of the Amarna Period (c.1350 BC),
- The ancient Egyptian grape varieties,
- The ancient Egyptian bacteria and fermentation yeasts involved in the fermentation process to know the way of preserving wine.