

## Permeability tests THAP Amphorae

Since micro-oxidation plays a crucial role in the maturation of wines and other fluids, we conduct controlled tests in our factory to measure the permeability of our amphorae in 40 l THAP amphorae with different clay mixtures and different firing temperatures. This way we can measure realistic and develop amphorae with different oxygen permeabilities. We used optical oxygen sensors from PyroScience with a temperature sensor to measure the oxygen level in a synthetic wine.

We developed already two different clay mixtures with different permeability:

1. Clay M4 (blue line in the graph) has an OTR (Oxygen Transmission Rate) of 90 Microgram/dm<sup>2</sup> Day and considering the different volumes of our amphorae this means:

- 40 l: 49 mg/L Year
- 230 l: 27 mg/L Year
- 500 l: 21 mg/L Year
- 800 l: 17 mg/L Year
- 1000 l: 17 mg/L Year

2. Clay M8 (black, red and green lines in the graph) has an average OTR of 62 Microgram/dm<sup>2</sup> Day and considering the different volumes of our amphorae this means:

- 40 l: 33 mg/L Year
- 230 l: 19 mg/L Year
- 500 l: 15 mg/L Year
- 800 l: 12 mg/L Year
- 1000 l: 12 mg/L Year

In general the average OTR of wooden barrels is considered between 10 mg/L Year - 20 mg/L Year.

We can assume that Clay M4 has a permeability 50 % higher than Clay M8 and the permeability depends also from the amphora volume (volume/surface ratio). Clay M8 has a lower permeability and has approximately the same permeability as a wooden barrel. The 40 l amphora has the highest permeability.

Here is an extract of the graph of a test with liquid:



