

Scientific Paper:

J. Agric. Food Chem. (2014)

Recent Advances in the Evaluation of the Oxygen Transfer Rate in Oak Barrels

María del Alamo-Sanza¹ and Ignacio Nevares²

¹Department of Analytical Chemistry and

²Department of Agroforestry Engineering, UVaMOX – University of Valladolid, Palencia, Spain

Abstract:

The entry of atmospheric oxygen into wine barrels is a desirable characteristic of the wine aging process. The oxygen transfer rate regulates changes in wine affecting aging rates because some barrels may undergo a greater wine oxygenation. This study measured the transfer rate and oxygen distribution within a barrel. The analysis confirmed the presence of a dissolved oxygen concentration gradient in the liquid, with greater concentrations near the bung. The study of the transfer rate of oxygen over time, in 12 barrels of different types, showed that wetting wood reduces oxygen diffusion and the oxygen transfer rate (OTR). These results are the first to determine the kinetics of oxygen entry into wine barrels and can be used to quantify the annual rate of oxygen entry into wine barrels.

Keywords: dissolved oxygen, oak barrel, oxygen transfer rate, wine