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About the role of the bottleneck/cork interface on O₂ transfer

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Context

During post bottling aging of wine, oxygen transfer occurs through the stopper, but also through the glass/stopper interface, and can lead to oxidation reaction [1].



Objectives

To determine the role of glass/cork interface on oxygen transfer

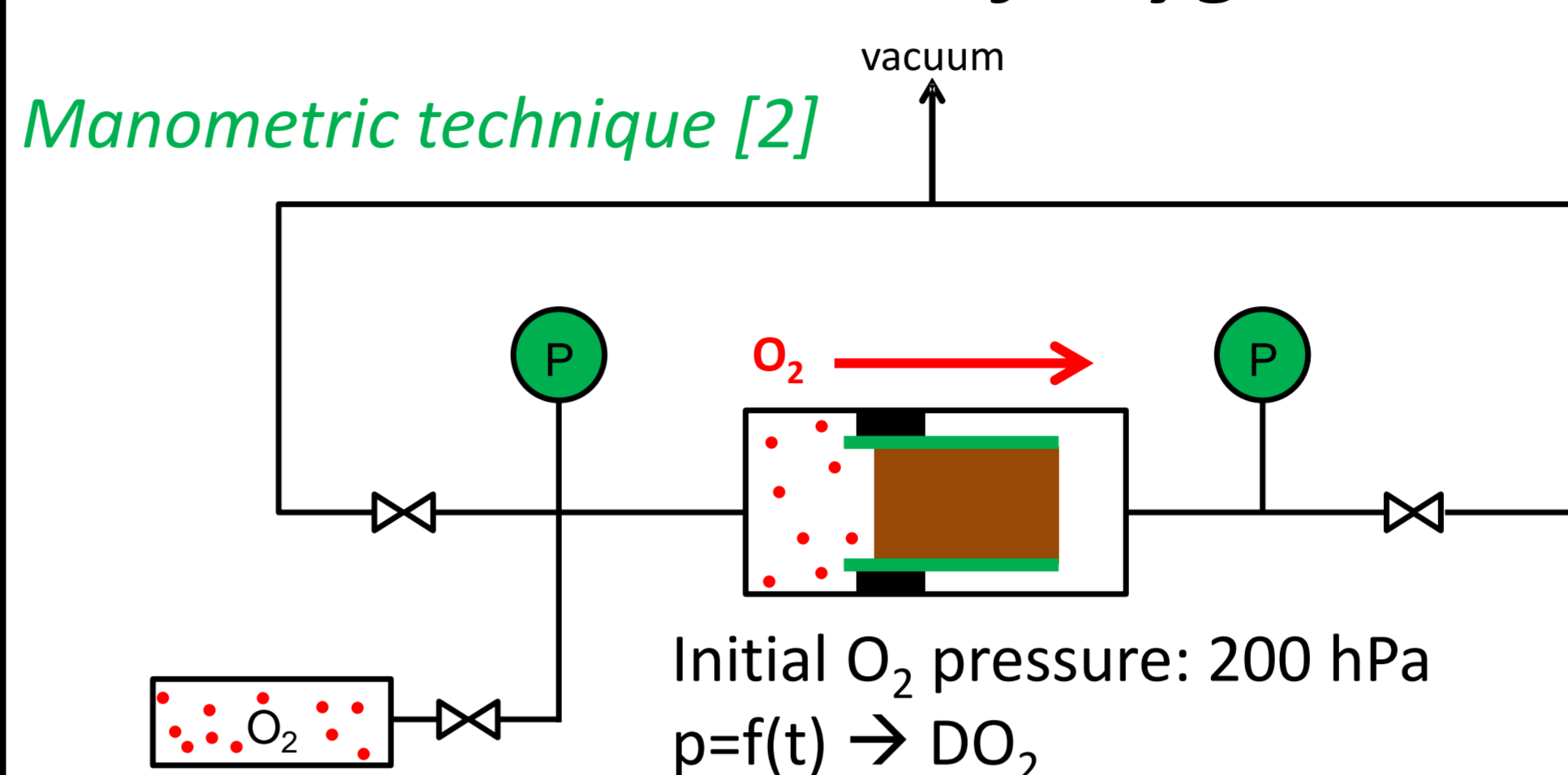
1. Effect of cork stopper compression alone (without glass)
2. Contribution of the interface (with glass)

Materials & Methods

Cork stopper

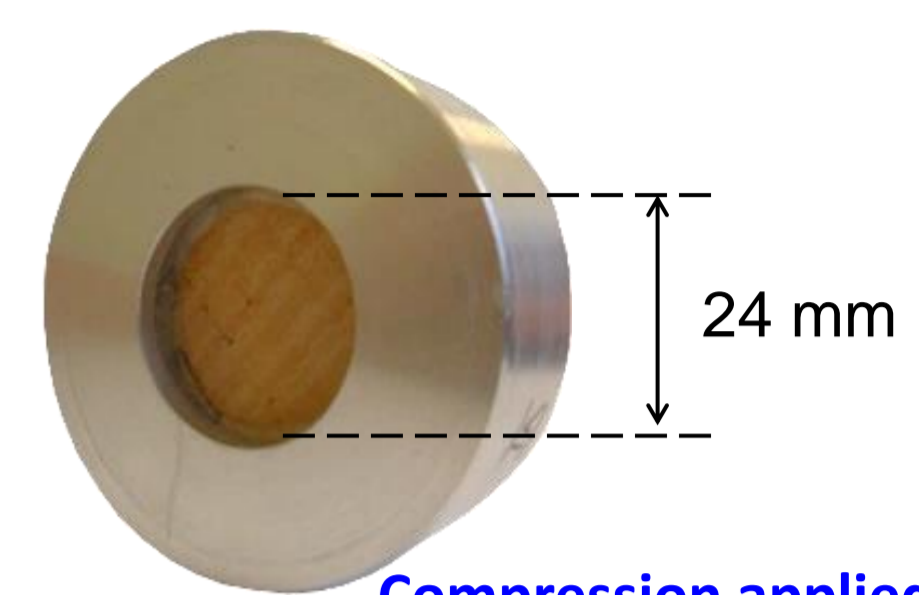
- High quality (class 0)
- No washing
- No surface treatment

Permeation of oxygen

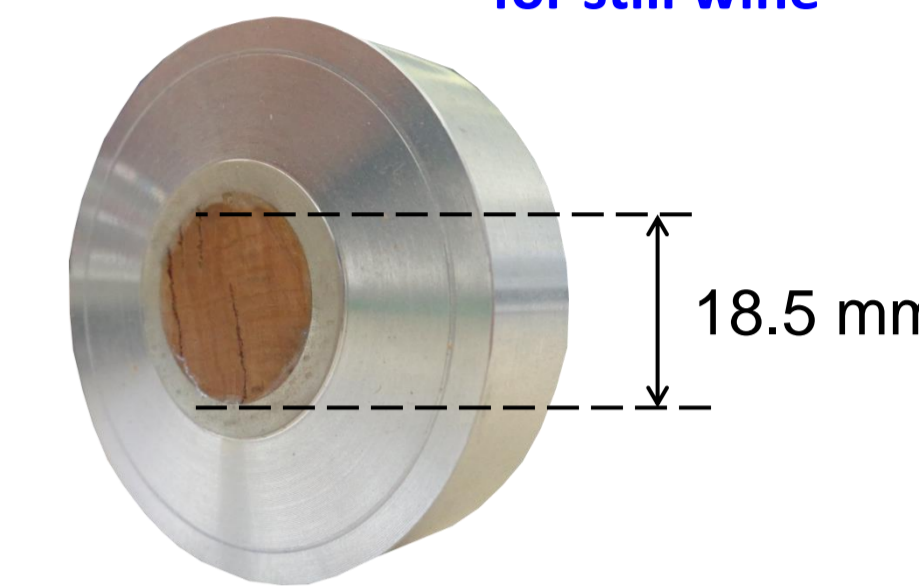


Sample preparation

Not compressed
wafer of 3 mm thick



Compressed
(without interface)
wafer of 6 mm thick

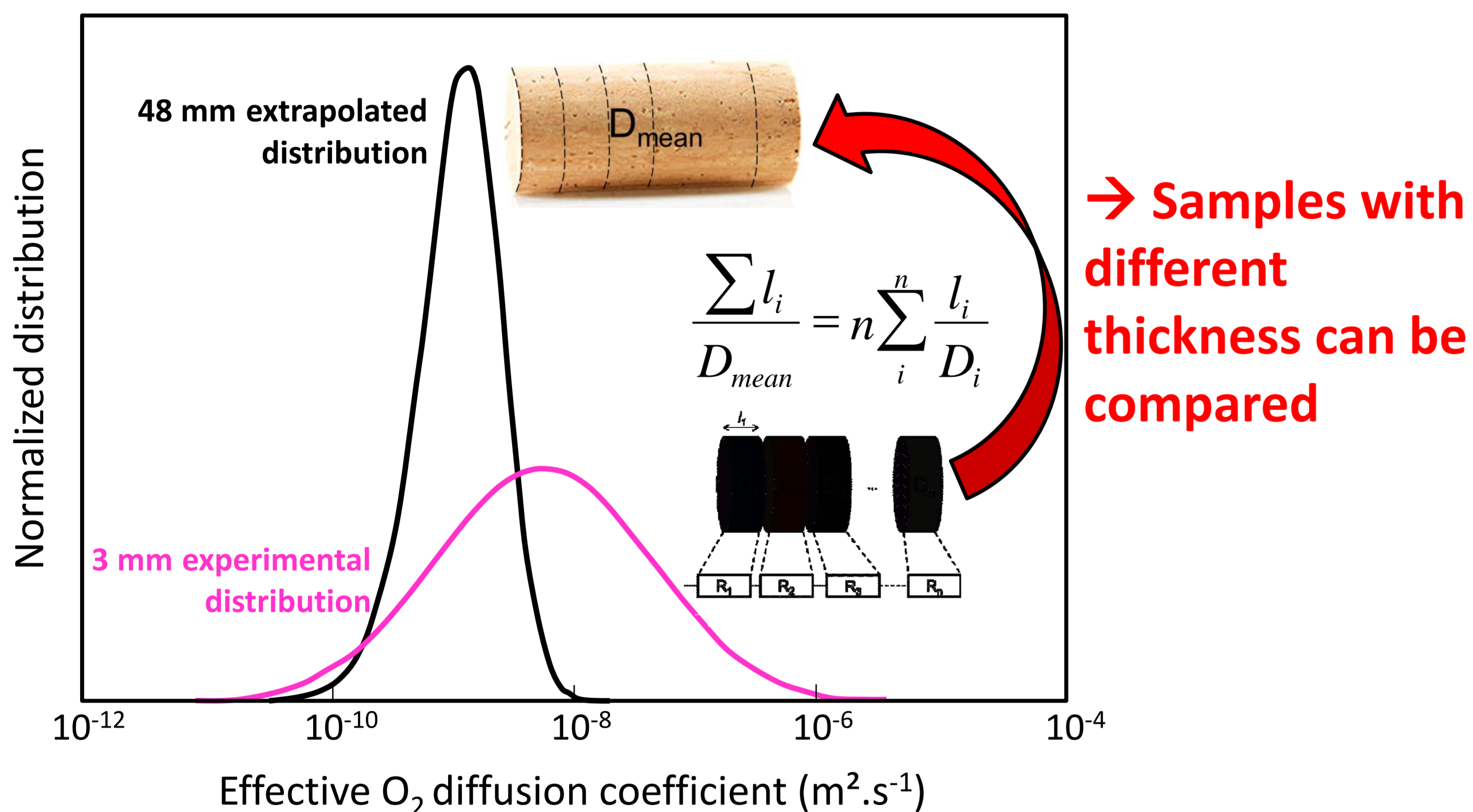


Compressed in
the bottleneck
(glass/cork interface)
whole stopper of 48 mm
length

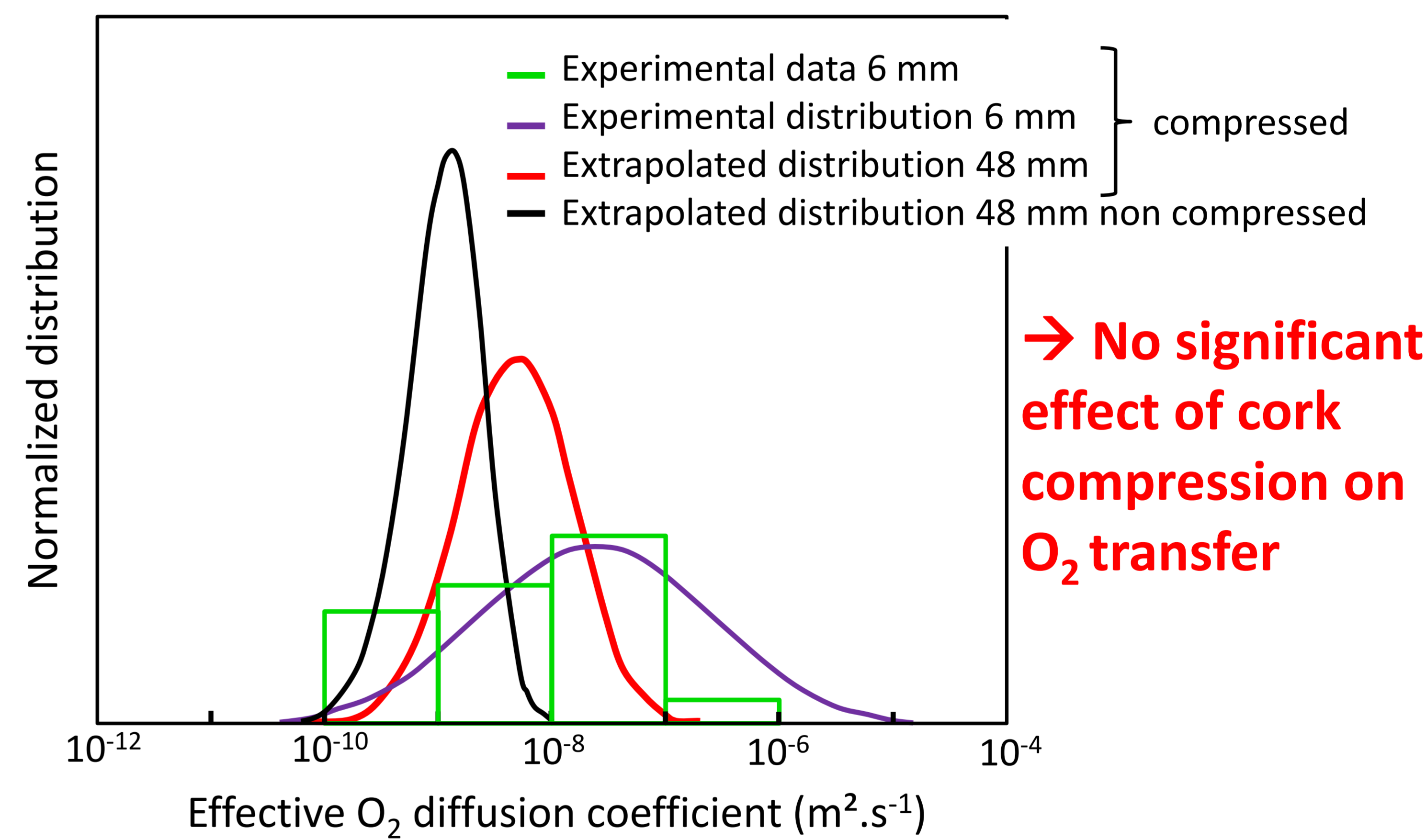


Results

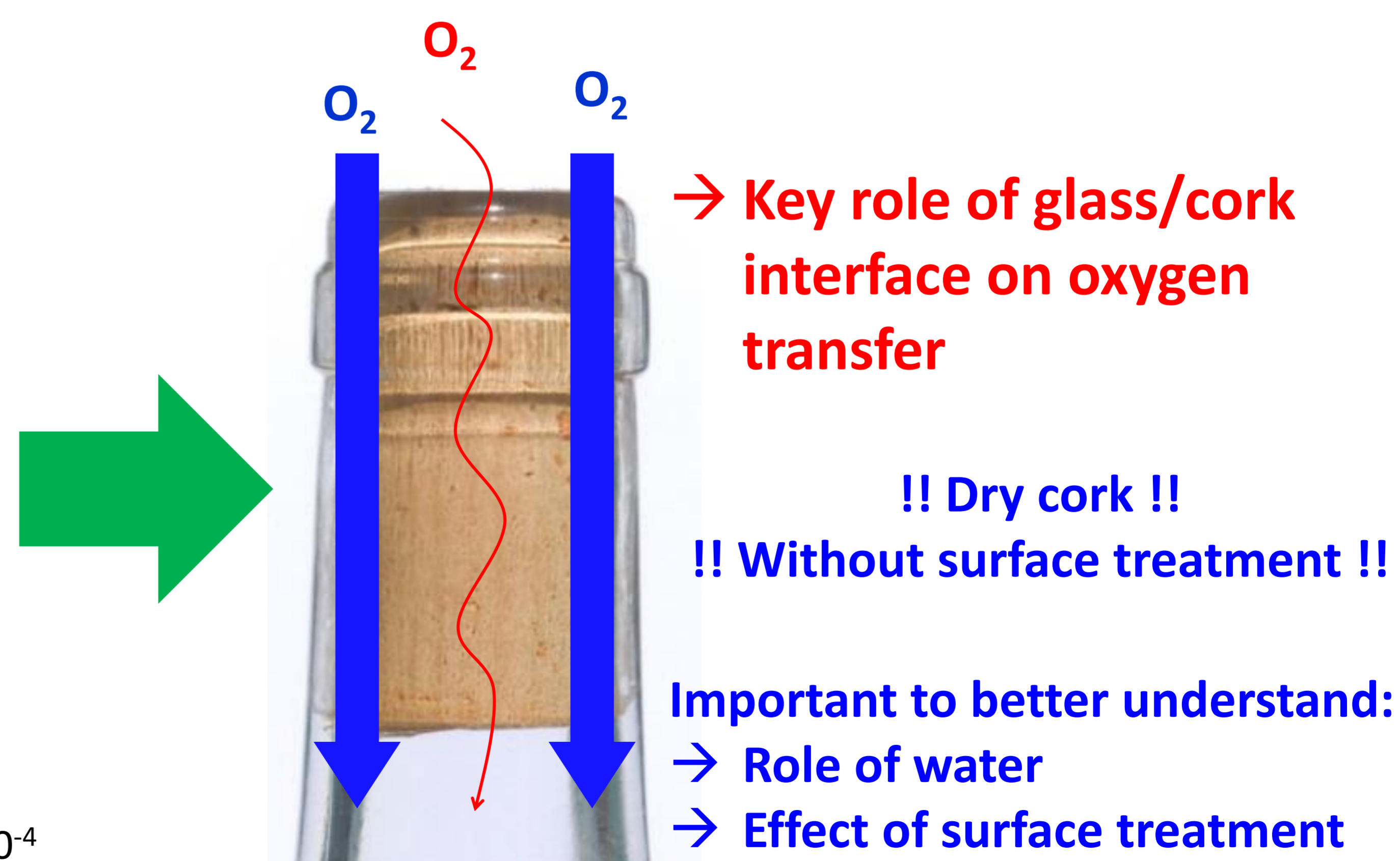
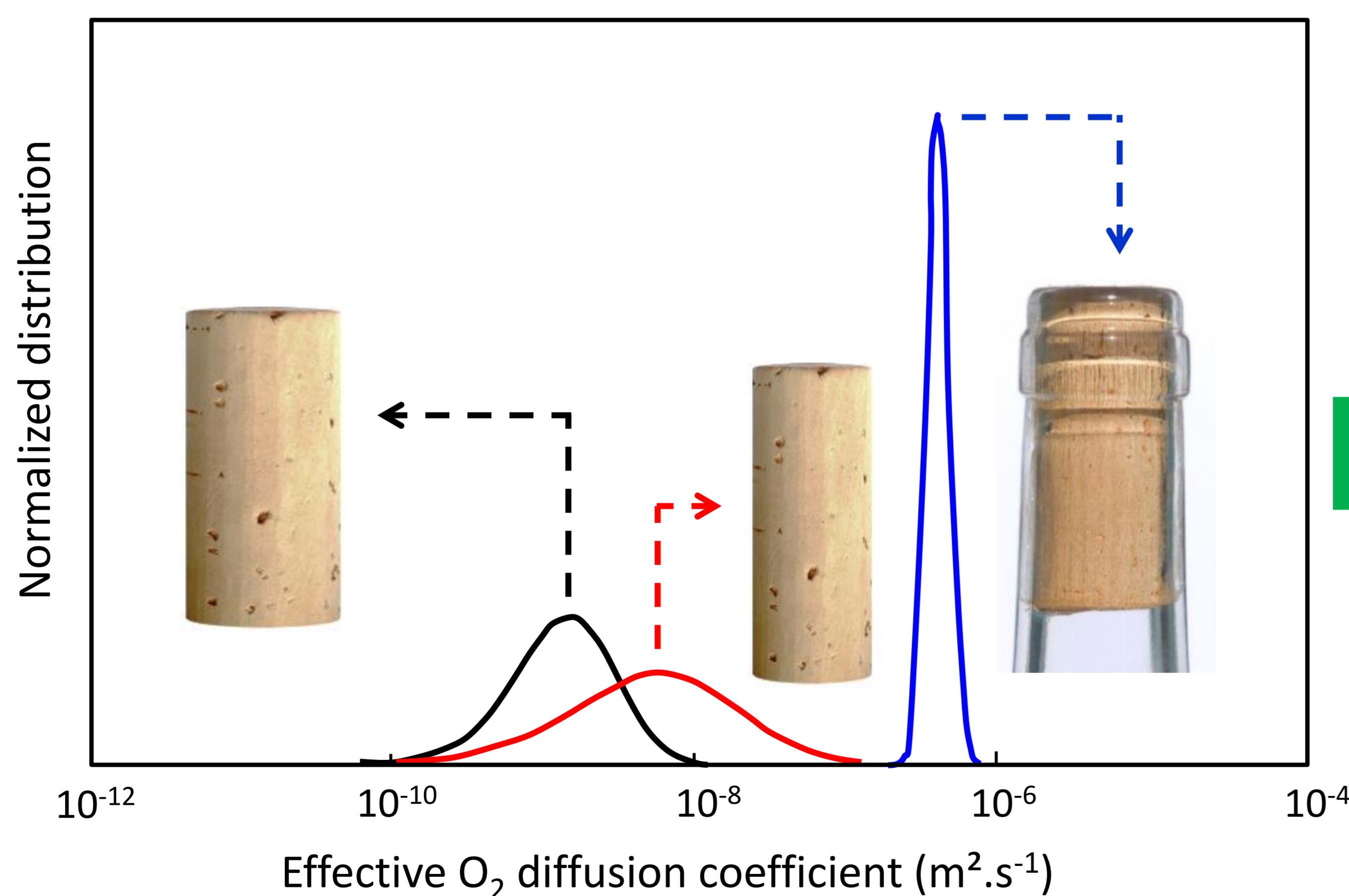
From wafer to a whole cork stopper



Effect of compression on oxygen transfer



Role of the glass/cork interface



Conclusion

The compression does not significantly affect the effective diffusion coefficient of oxygen through crude cork. However, when considering the transfer of oxygen through cork stopper compressed in a glass bottleneck, the effective diffusion coefficient is 50 times higher. These results point out that the glass/cork interface may play a key role in the oxygen transfer [3].

References

- [1] Karbowiak, T., Gougeon, R.D., Alinc, J-B., Brachais, L., Debeaufort, F., Voilley, A., Chassagne, D. (2010). Wine oxidation and the role of cork. Crit. Rev. Food. Sci., 50 (1), 20-52
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- [3] Lagorce-Tachon, A., Karbowiak, T., Paulin, C., Simon, J-M., Gougeon, R.D., Bellat, J-P. (2016) About the role of the bottleneck/cork interface on oxygen transfer. J. Agric. Food. Chem., 64 (35), 6672-6675