



## INTRODUCTION: HPCD as non-thermal treatment

Traditional **preservation methods** are based mainly on thermal treatments, however, some quality attributes are lost.

Alternative

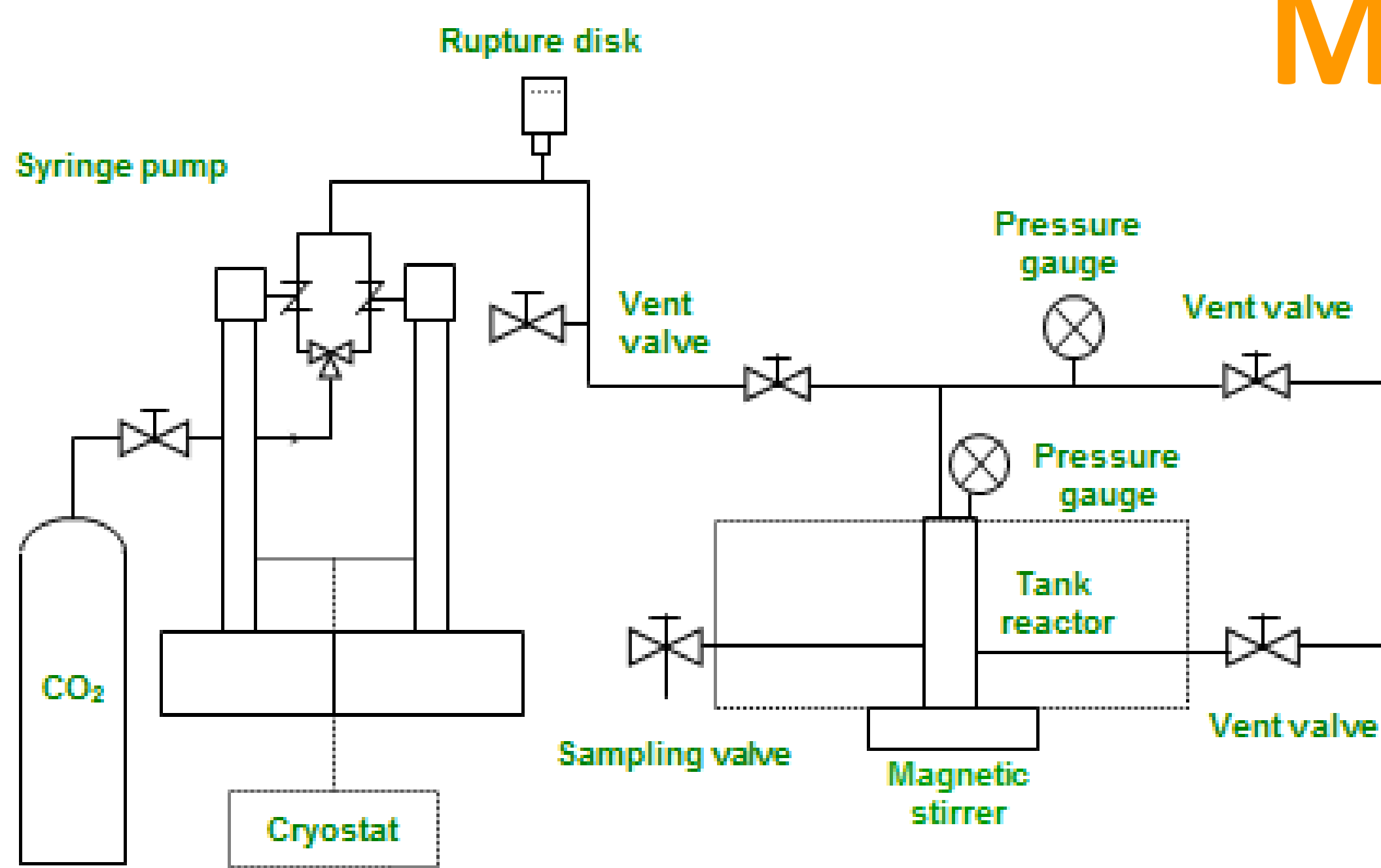
**HPCD TECHNOLOGY**  
(High Pressure Carbon Dioxide)

**Objective:** Study of enzyme inactivation of some endogenous enzymes are responsible for undesirable changes in fresh products such as:

- **Polyphenol oxidase (PPO)** causes enzymatic browning
- **Polygalacturonase (PG) and Pectin Methylesterase (PME)** influences the viscosity and influences the stability of cloudy juices



## METHODOLOGY



### PME inactivation

#### Operating variables

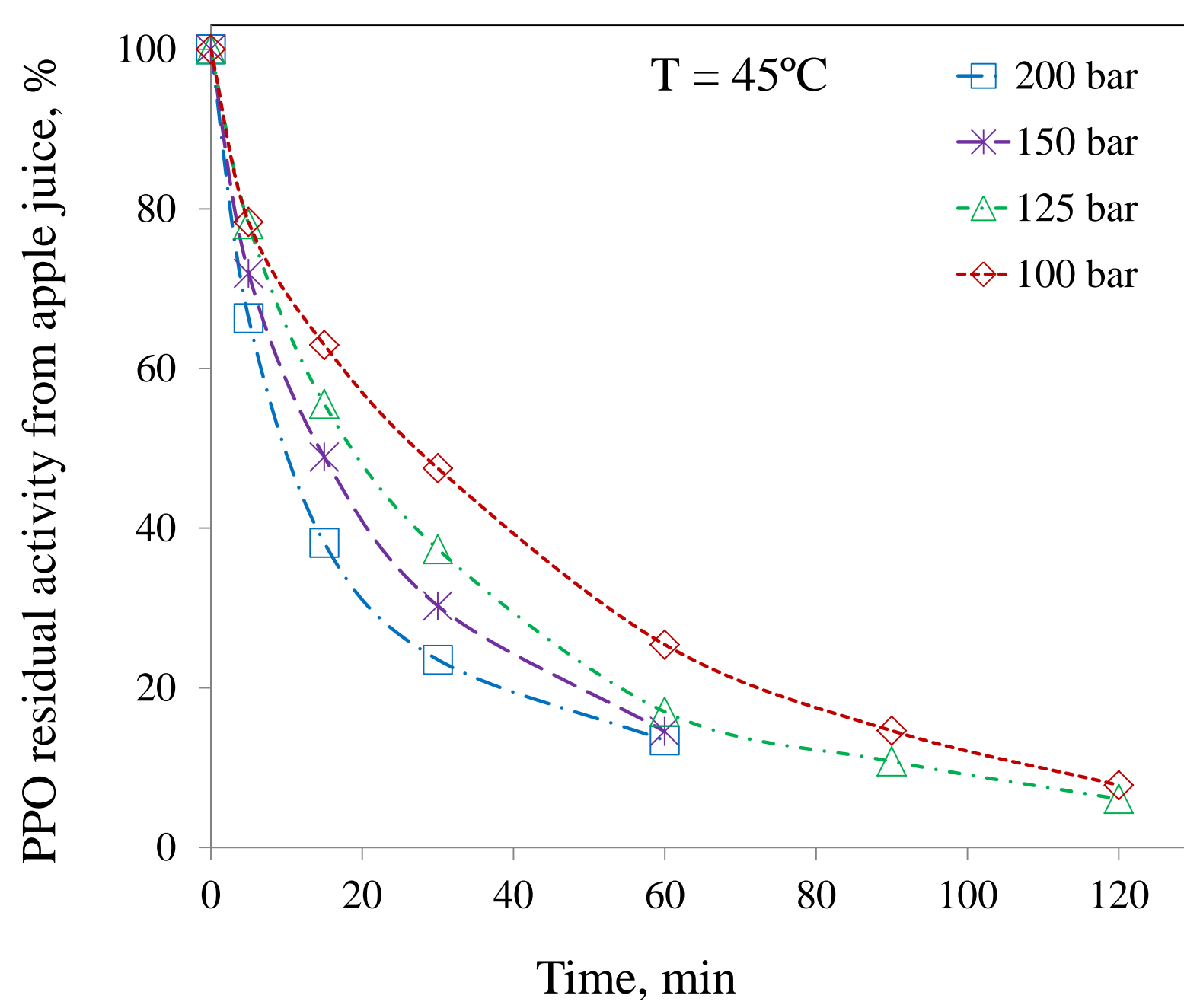
p (MPa)	8-30
T (°C)	21 – 55
t, min	3-60

### Other quality parameters

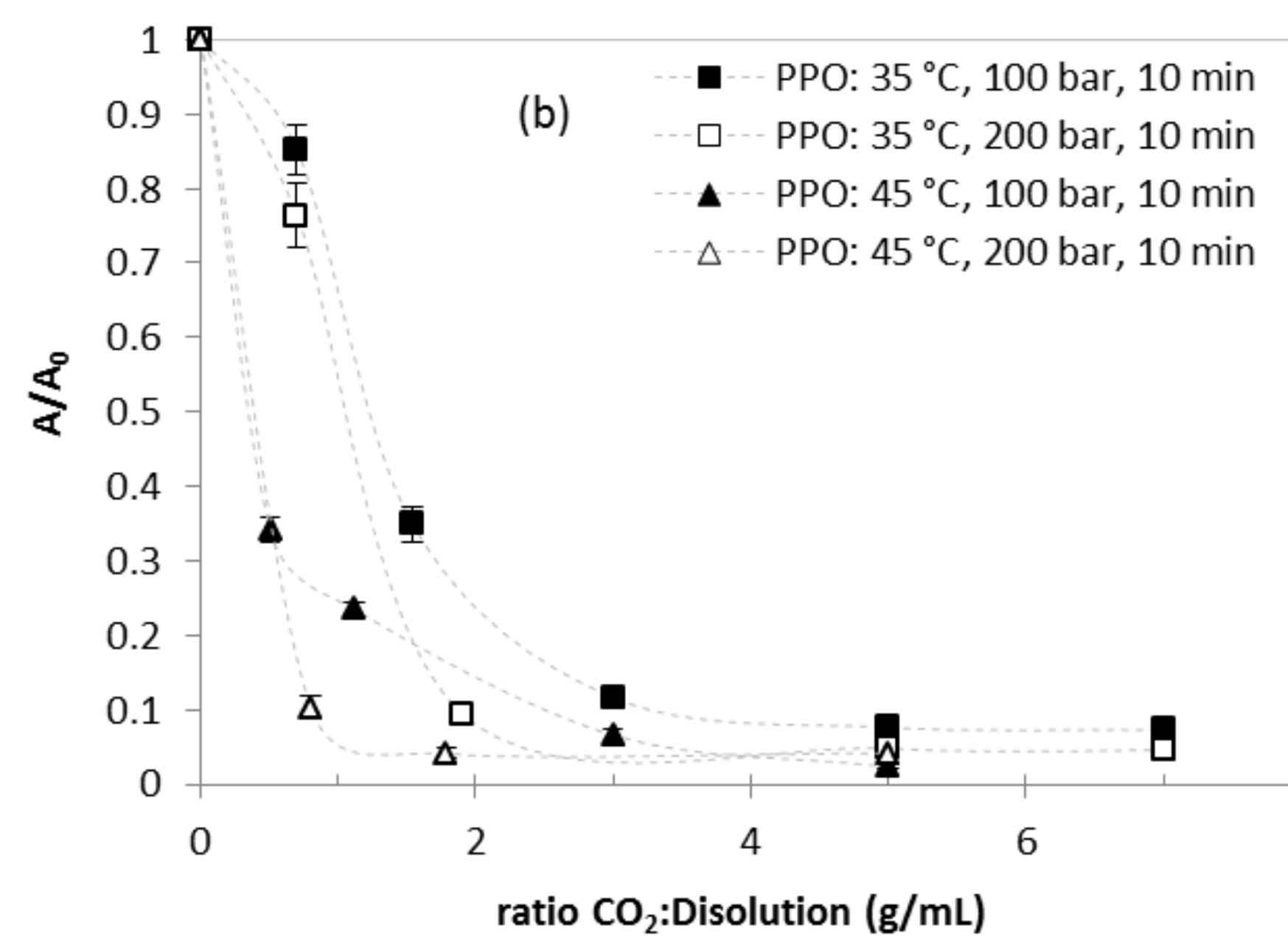
Colour: L, a, b ( $\Delta E$ )  
Turbidity  
Particle size distribution

## RESULTS

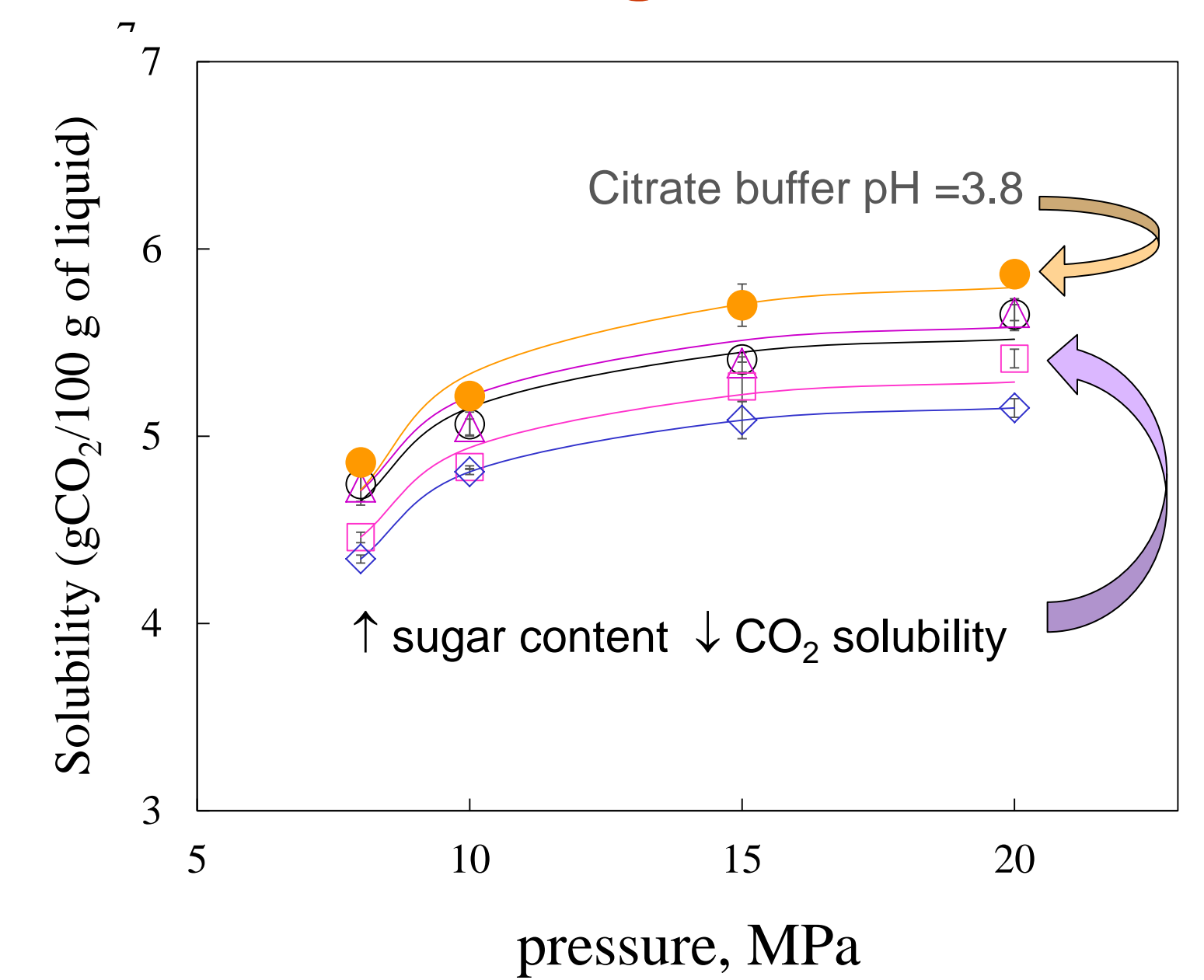
### PPO inactivation kinetics



### Effect of CO<sub>2</sub>:sample ratio of pure mushroom tyrosinase



### Solubility of CO<sub>2</sub> in buffer + sugar solutions

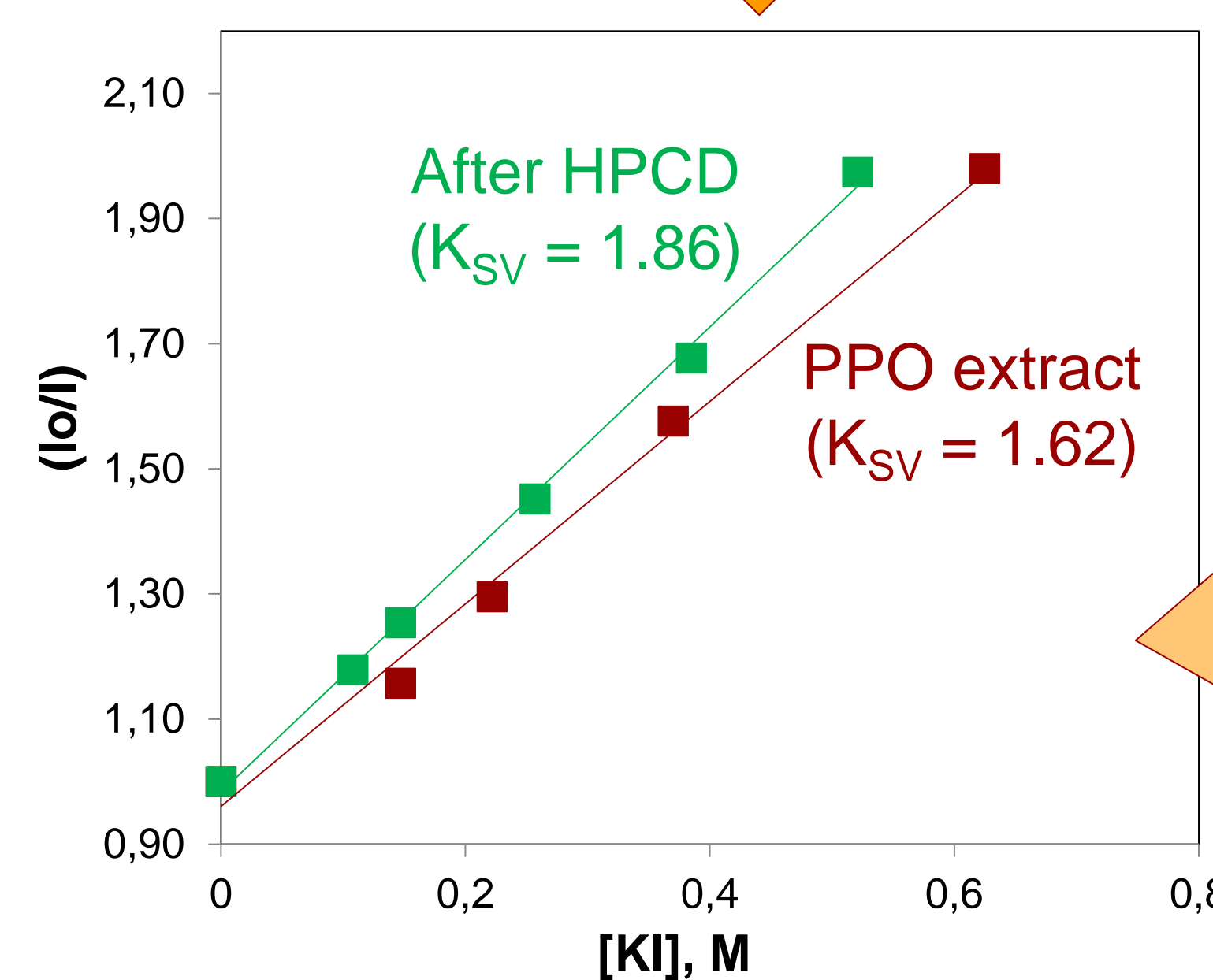


In general, inactivation rate increase with pressure and temperature. The solid lines represent Weibull model

- ✓ Mass transfer limitations in CO<sub>2</sub> contact with the enzyme
- ✓ Molecular effect of CO<sub>2</sub> on the enzyme

## BIBLIOGRAPHY

- Briongos, H., Illera A.E., Sanz M.T. Melgosa R., Beltrán S., Solaesa, A.G. (2016) *LWT Food Science and Technology*, 74, 411-419
- Illera A.E., Sanz M.T., Beltrán S., Melgosa R., Solaesa A.G., Ruiz M.O., (2018) *J. Food Engineering*, 221, 141-150.



After HPCD treatment of PPO extracts (from apple) conformational changes can be observe. Fluorophore accessibility ( $K_{SV}$ ) was affected as determined by quenching experiments

$$I_0/I = 1 + K_{SV}Q$$

### Conformational changes

#### ACKNOWLEDGEMENTS:

To MINECO and ERDF for financial support of AEI's contract through project CTQ2015-64396-R To JCYL and ERDF for financial support of project BU055U16 and O.Benito-Román's Post-doctoral contract To MINECO for RM's pre-doctoral contract (BES-2013-063937).

