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# Impact of ageing on pea protein volatile compounds and correlation with odor



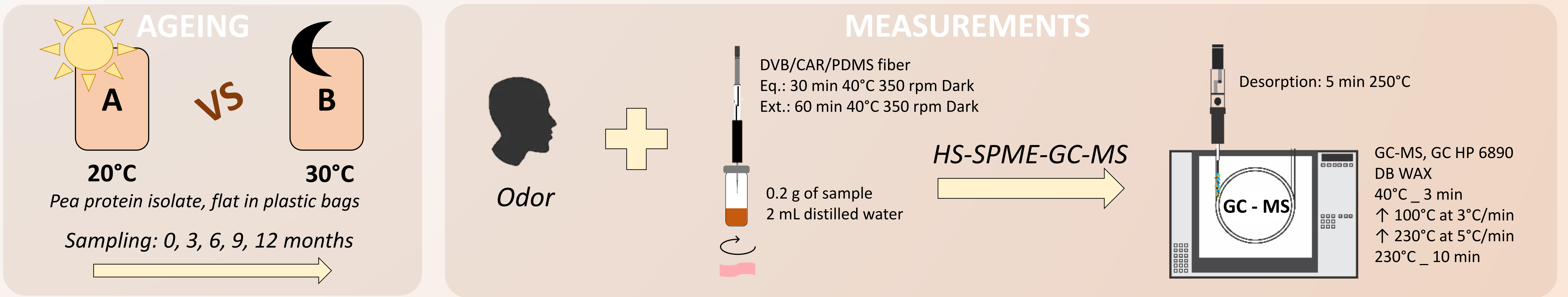
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OBJECTIVE

Plant-based protein consumption → positive effects. Disadvantages: beany off-flavors<sup>1</sup>. Evolution of off-flavor during ageing not well-known<sup>2</sup>.  
**Investigate the evolution of volatile compounds and odor during two ageing processes.**  
**Identify mechanisms involved and the most important factor.**  
**Is it possible to predict the evolution of odor during ageing using data on volatile compounds ?**

MATERIAL & METHODS



RESULTS

## IMPACTS OF THE AGEING

Tab. 1: Odor evolution during the ageing

	0	3	6	9	12 months
A		Beany, sharp, earthy	Beany+, sharp, earthy	Beany+, sharp, earthy, rancid	Beany+, sharp, earthy+, rancid
B		Light beany, roasted	Light beany, roasted	Light beany, roasted, earthy	Beany, earthy

Impact of ageing on odor (Tab. 1) and volatile compounds (Fig. 1). Reactions involved presented Fig 2.

**A:** strong impact (high increase, decrease, equilibrium). Photo-oxidation added to other phenomena, ↑ aldehydes, ↑ alcohols, ↑ ketones ; newly formed.  
**B:** slight impact (slight increase up to 12 months)<sup>2</sup>. ↑ aldehydes, ↑ benzaldehyde, ↑ furans.

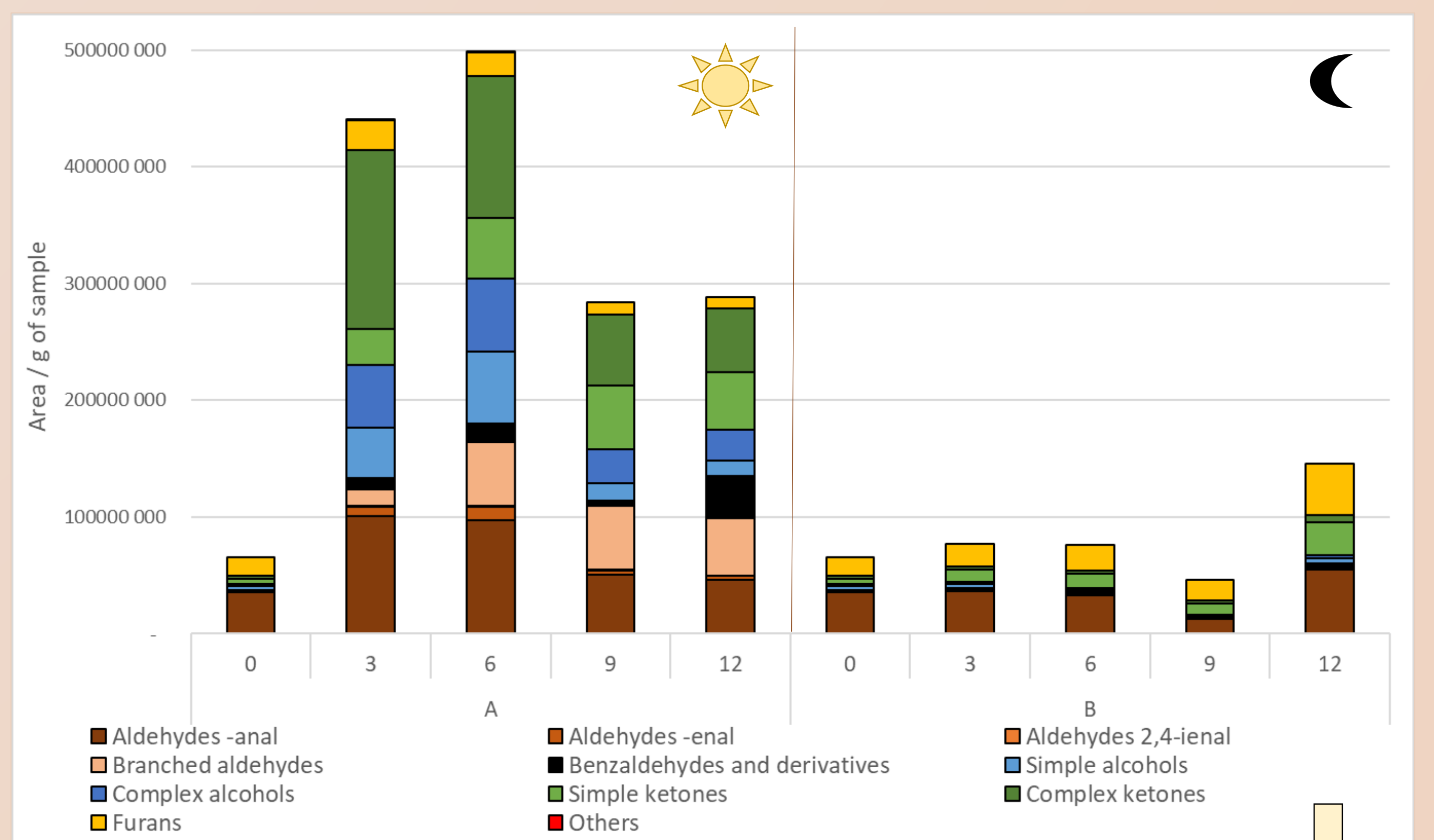


Fig. 1: Profile of volatile compounds by chemical family during the ageing

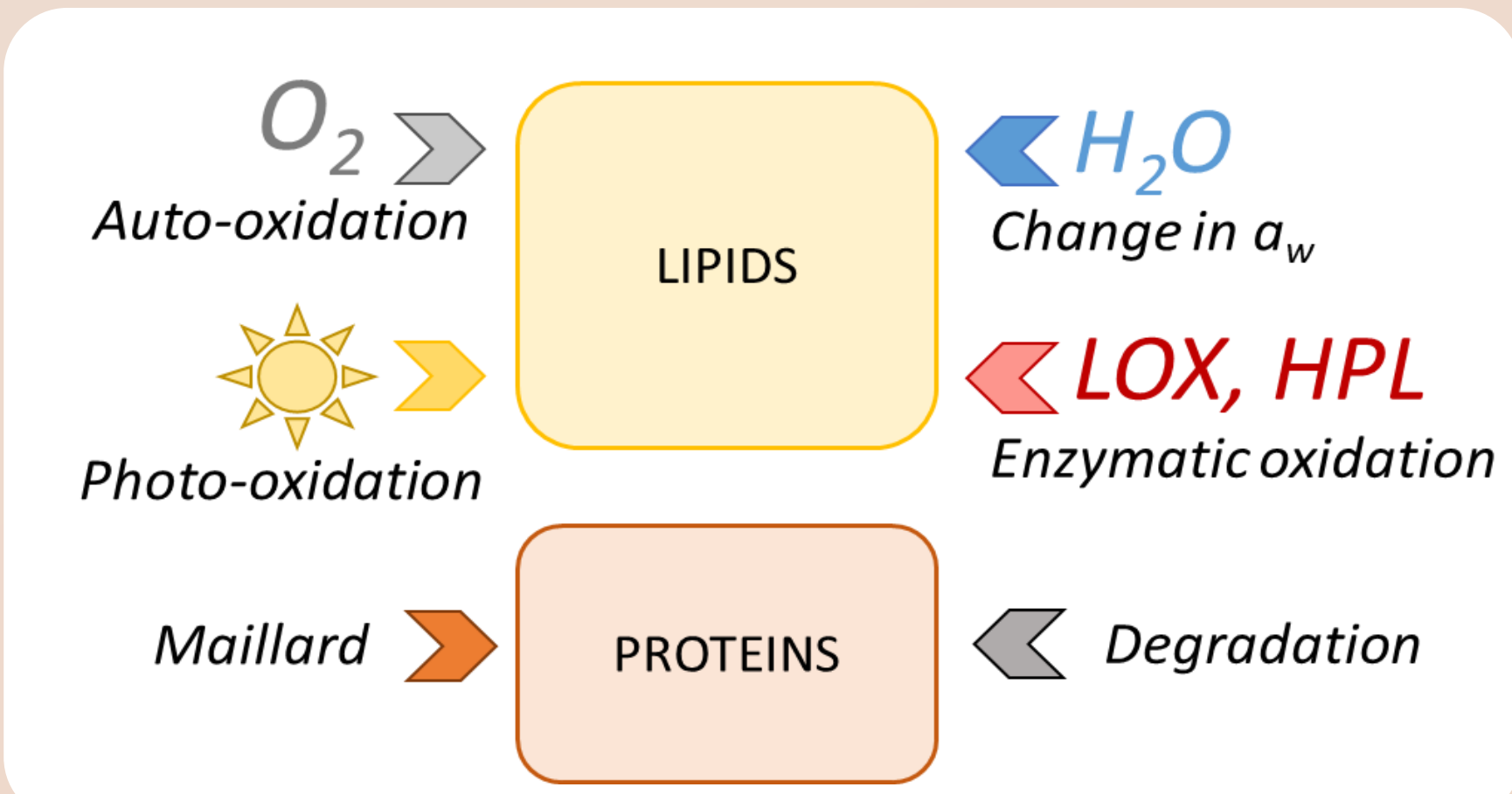


Fig. 2: Reactions involved during the ageing<sup>3,4,5,6</sup>

**IMPACT**  
 Light >> T°C

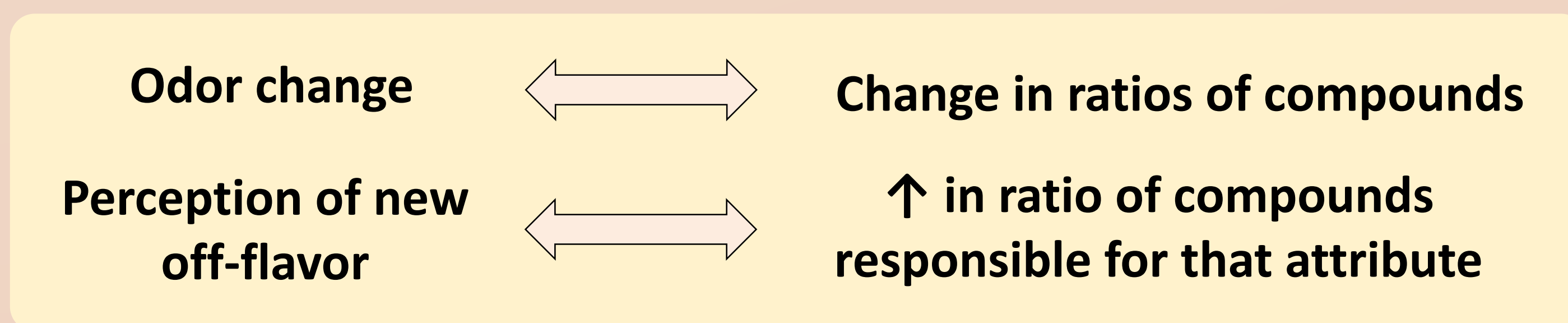
**Evolution of odor linked to increase in volatiles.**  
**Possible to predict the odor ?**

INTERPRETATIONS

## CORRELATIONS

Possible correlation if specific presentation of the results (Fig. 3). Examples :

- A-3 months, earthy off-flavor (Tab. 1), ↑ proportion of volatile responsible for earthy notes (Fig. 3).
- B-3-6 months, slight change in odor, no big changes in ratios of compounds responsible for off-flavor.



Not sufficient to describe the global sensory profile  
 Not working with all attributes

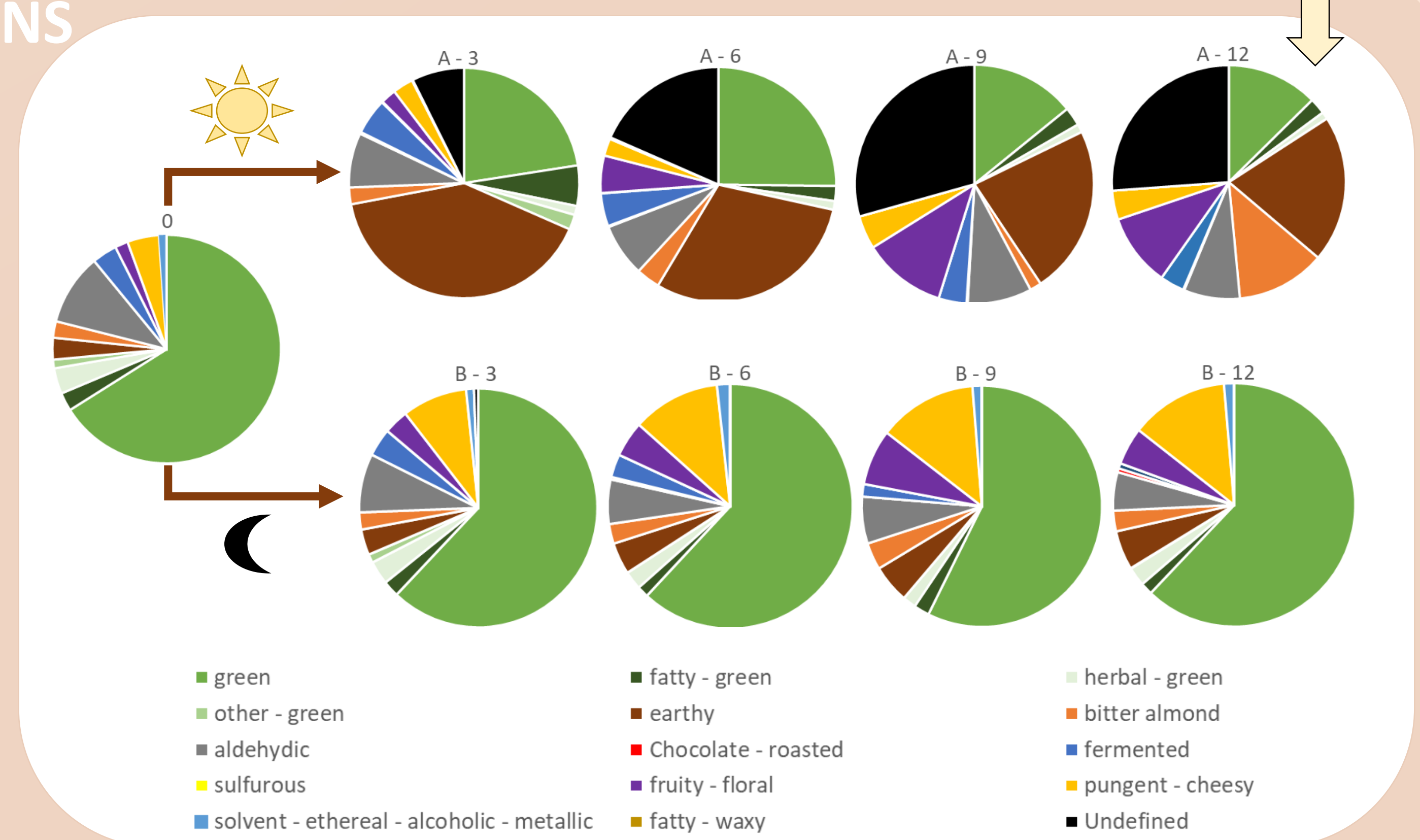


Fig. 3: Profile of volatile compounds by sensory descriptors during the ageing (in ratios)

CONCLUSIONS

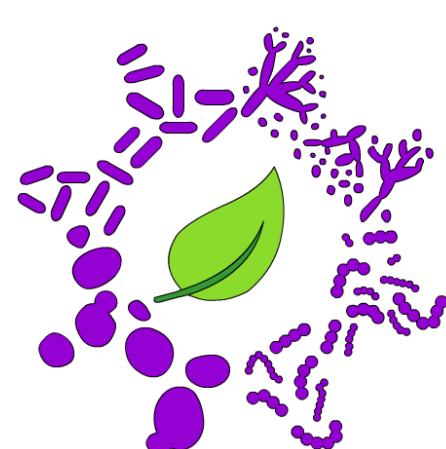
Storage conditions = strong impact on volatile compounds and odor. Evolution and deterioration of odor during time. Light has the biggest impact.

**Data, presented by sensory descriptors, enable to predict how compounds responsible for the different attributes are evolving. ⚠ Different from the overall odor perception.**

Need to choose/trace compounds that are correlated with off-flavor/attribute of interest.

## REFERENCES

- 1: Rackis, J. J. et al. (1979). *JAACS*, 56, 262-271
- 2: Schindler, S. et al. (2012). *Food Biotechnol*, 26(1):58-74
- 3: Labuza, T. P. & Dugan, L. R. (1971). *C R C Crit Rev Food Technol*, 2(3):355-405
- 4: Pripis-Nicolau, L. et al. (2000). *J Agric Food Chem*, 48(9):3761-3766
- 5: Limacher, A. et al. (2008). *J Agric Food Chem*, 56(10):3639-3647
- 6: Marilley, L. & Casey, M. G. (2004). *Int J Food Microbiol*, 90(2):139-159



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