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Estelle Fischer, Rémy Cachon, Nathalie Cayot

► **To cite this version:**

Estelle Fischer, Rémy Cachon, Nathalie Cayot. Impact of ageing on pea protein volatile compounds and correlation with odor. XVI Weurman symposium, May 2021, Online, France. 2021. hal-03687387

HAL Id: hal-03687387

<https://institut-agro-dijon.hal.science/hal-03687387v1>

Submitted on 3 Jun 2022

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



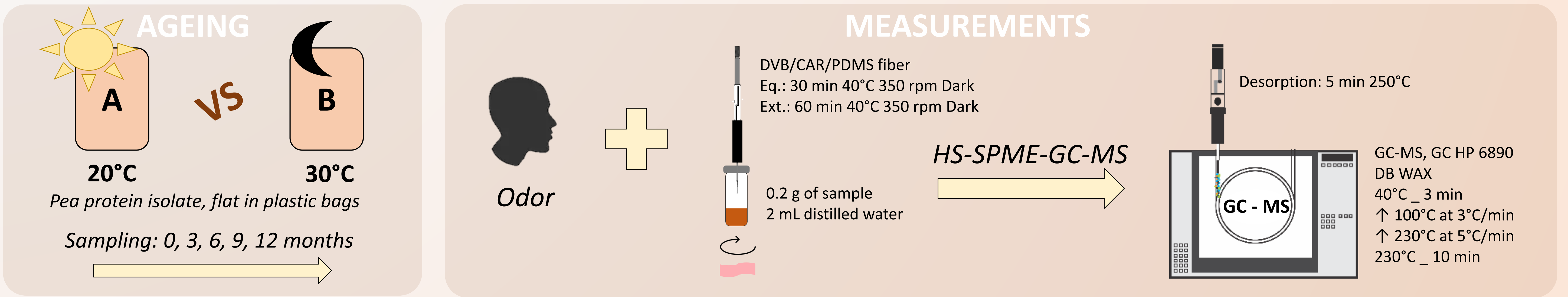
Estelle FISCHER, Rémy CACHON, Nathalie CAYOT

UMR PAM ; estelle.fischer@agrosupdijon.fr

OBJECTIVE

Plant-based protein consumption → positive effects. Disadvantages: beany off-flavors¹. Evolution of off-flavor during ageing not well-known².
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	Beany	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)². ↑ aldehydes, ↑ benzaldehyde, ↑ furans.

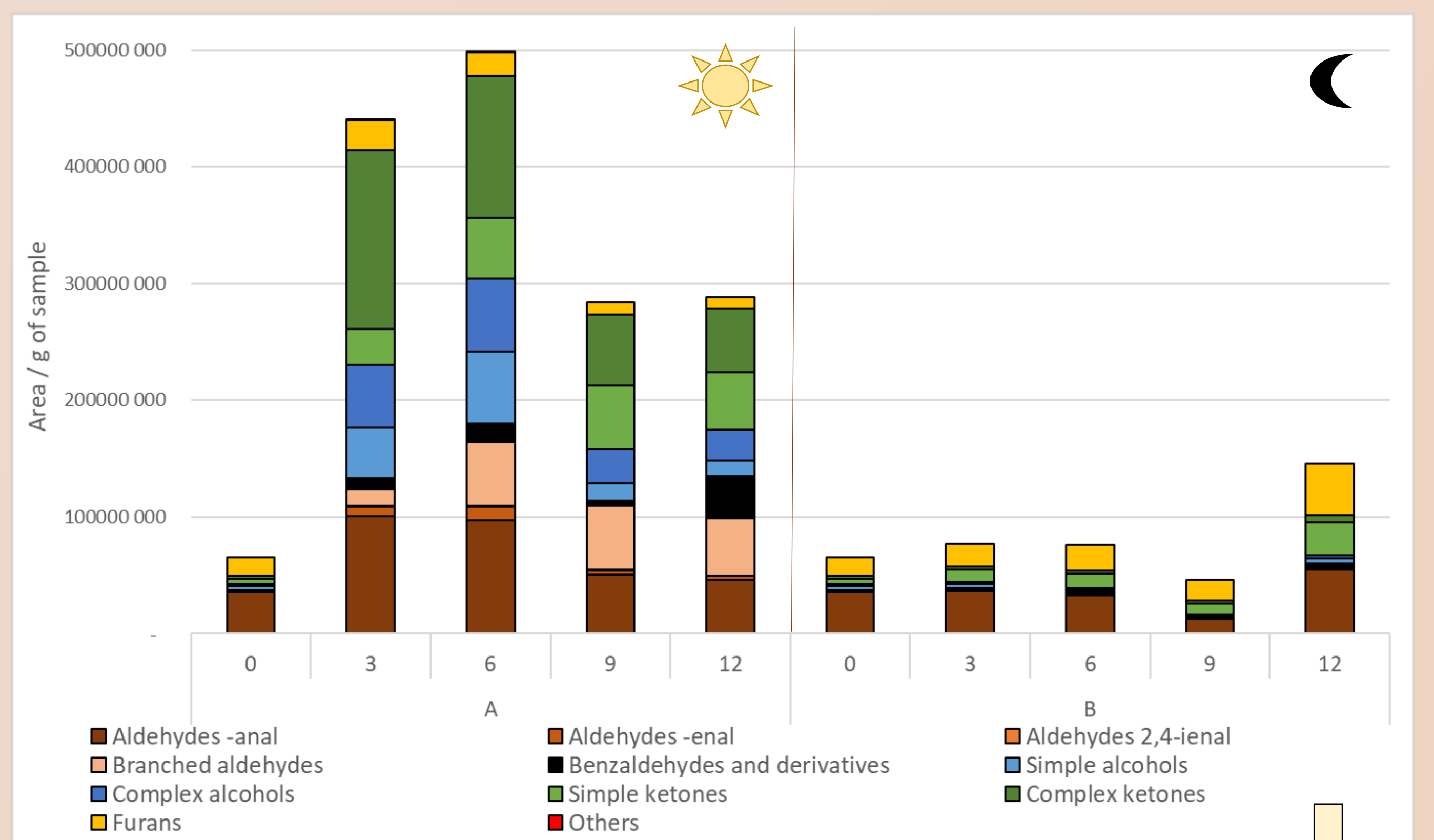


Fig. 1: Profile of volatile compounds by chemical family during the ageing

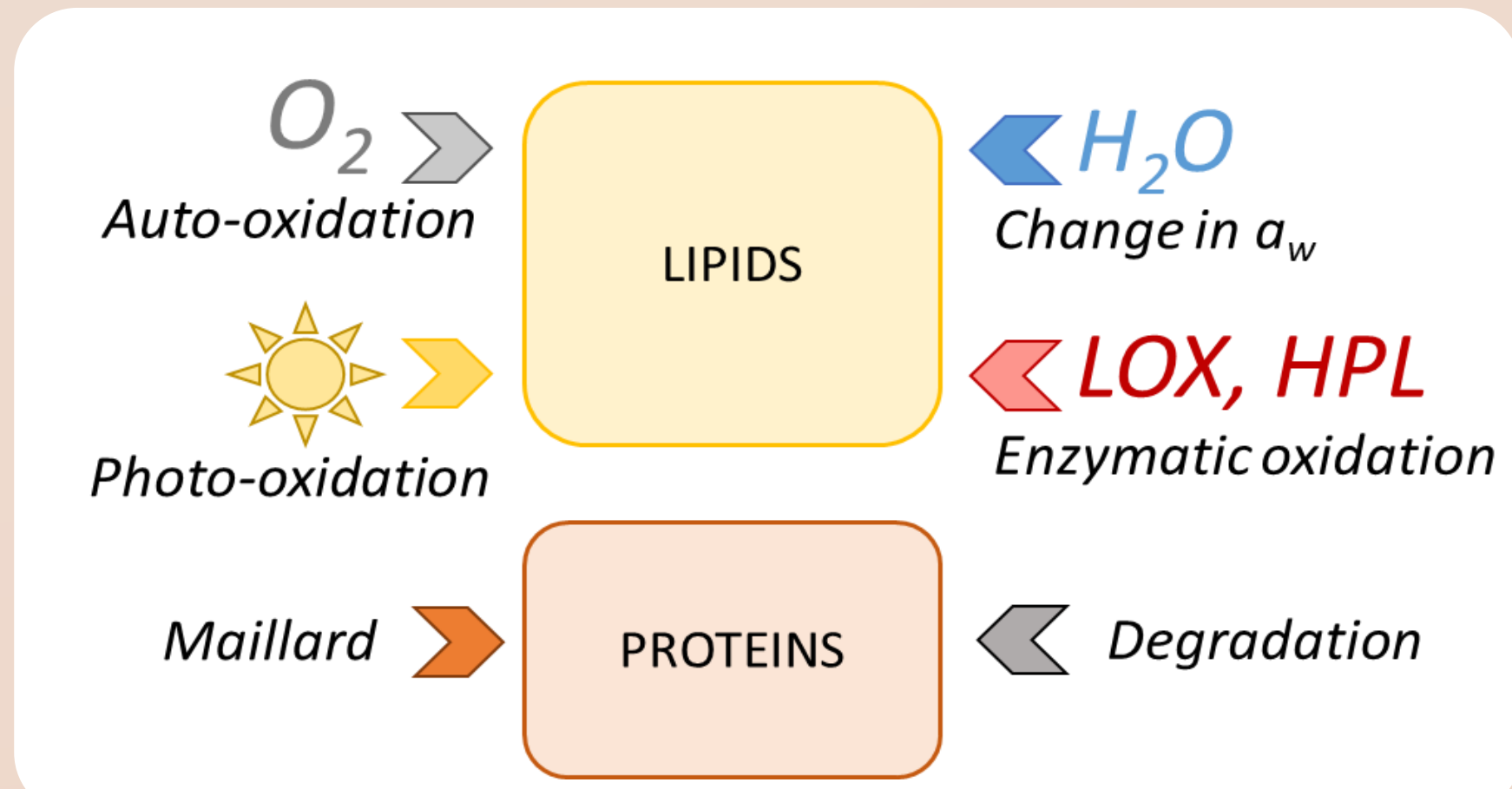


Fig. 2: Reactions involved during the ageing^{3,4,5,6}

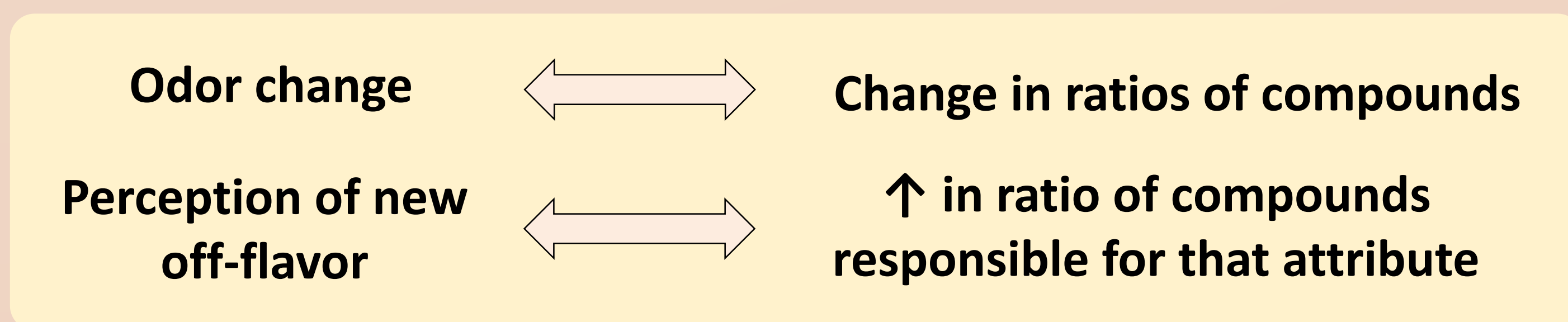
IMPACT
 Light >> T°C

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

INTERPRETATIONS

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

CORRELATIONS

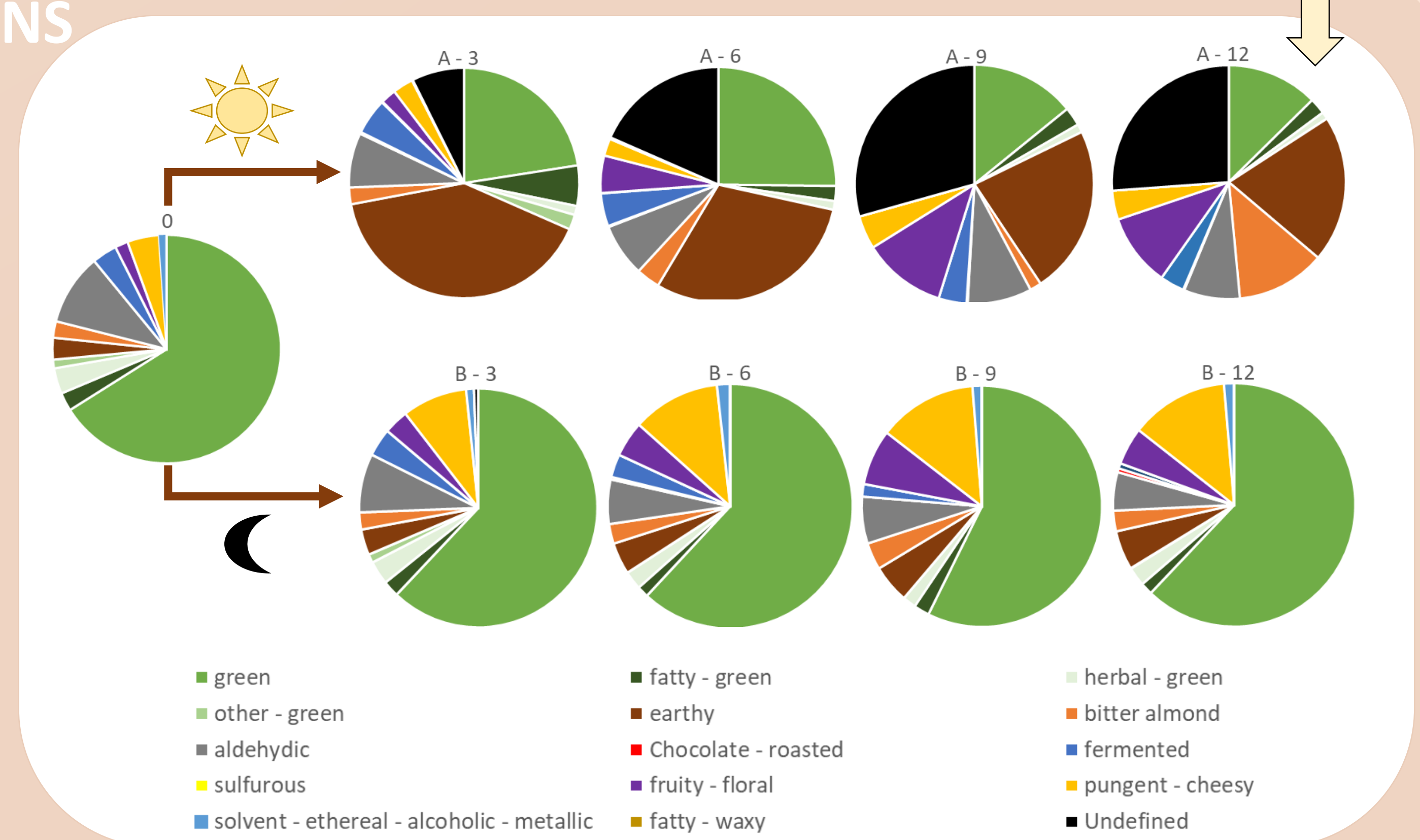


Fig. 3: Profile of volatile compounds by sensory descriptors during the ageing (in ratios)

CONCLUSIONS

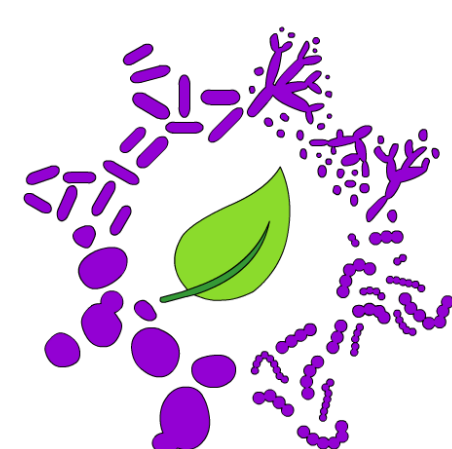
Storage conditions = strong impact on volatile compounds and odor. Evolution and deterioration of odor during time. Light has the biggest impact.

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



XVI WEURMAN SYMPOSIUM, 04-06 May, 2021, Online
 Unité Procédés Alimentaires et Microbiologiques, UMR A 02. 102, AgroSup DIJON/Université de Bourgogne
 1 esplanade Erasme, F-21000 Dijon, France

