

CHICKEN BREASTS PACKAGED UNDER DIFFERENT GAS COMPOSITIONS REVEAL DISTINCT MICROBIAL COMMUNITIES AND OLFACTIVE CHARACTERISTICS

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MOTIVATION and OBJETIVE

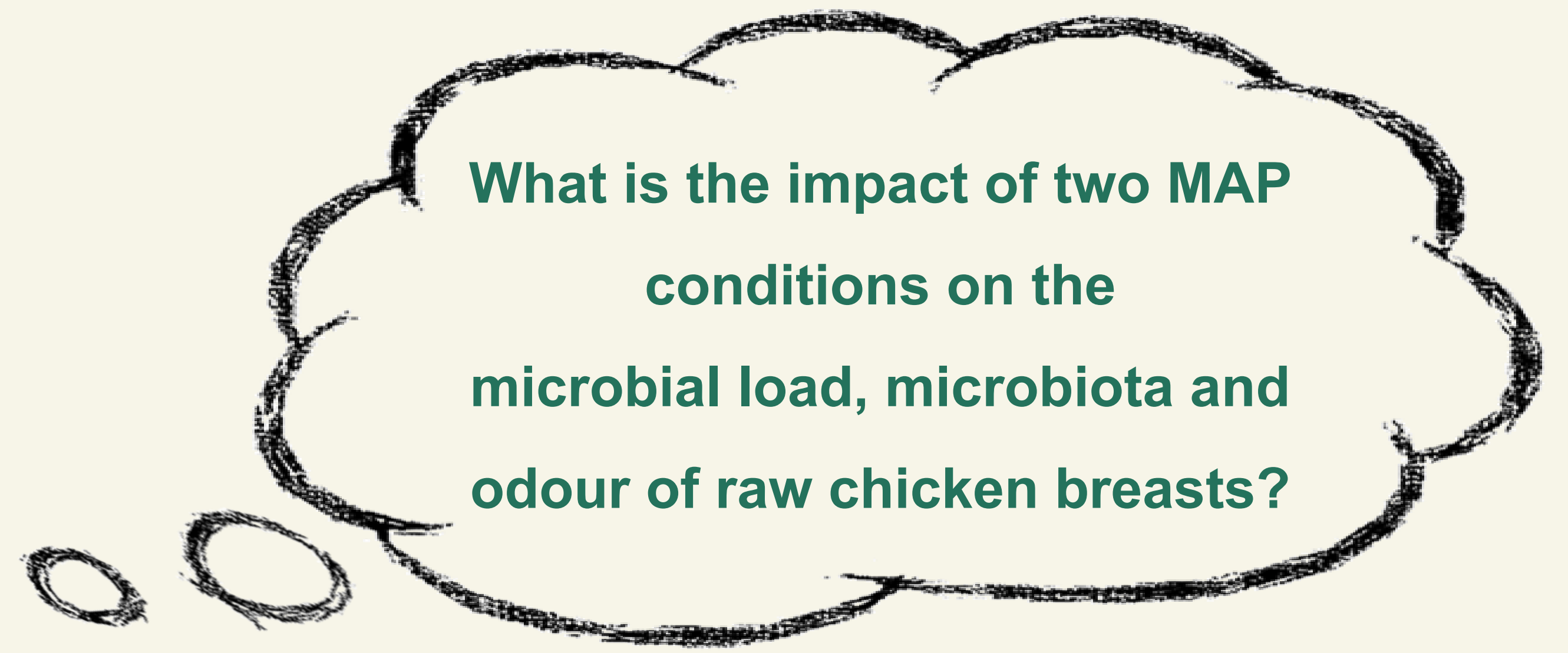
With the appropriate gas composition, modified atmosphere packaging (MAP) can:



• delay the growth of food spoilage organisms



• increase the shelf life of products and reduce food waste



METHODOLOGY



- 55-70% O₂
- 20-30% CO₂

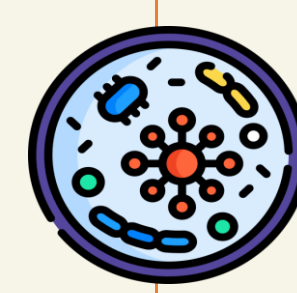
N = 18
6 time points
n = 3



- 0% O₂
- 50-55% CO₂
- 45-50% N₂

N = 27
9 time points
n = 3

Reception of samples and storage at 4 °C until day 15 or day 25



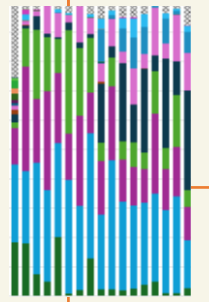
Microbiological analysis

Total viable counts (PCA, 15 °C, 5-7 days)



DNA Extraction

Qiagen DNeasy PowerLyzer Powersoil kit



Microbial community analysis

EMP 16S Illumina Amplicon Protocol V.2

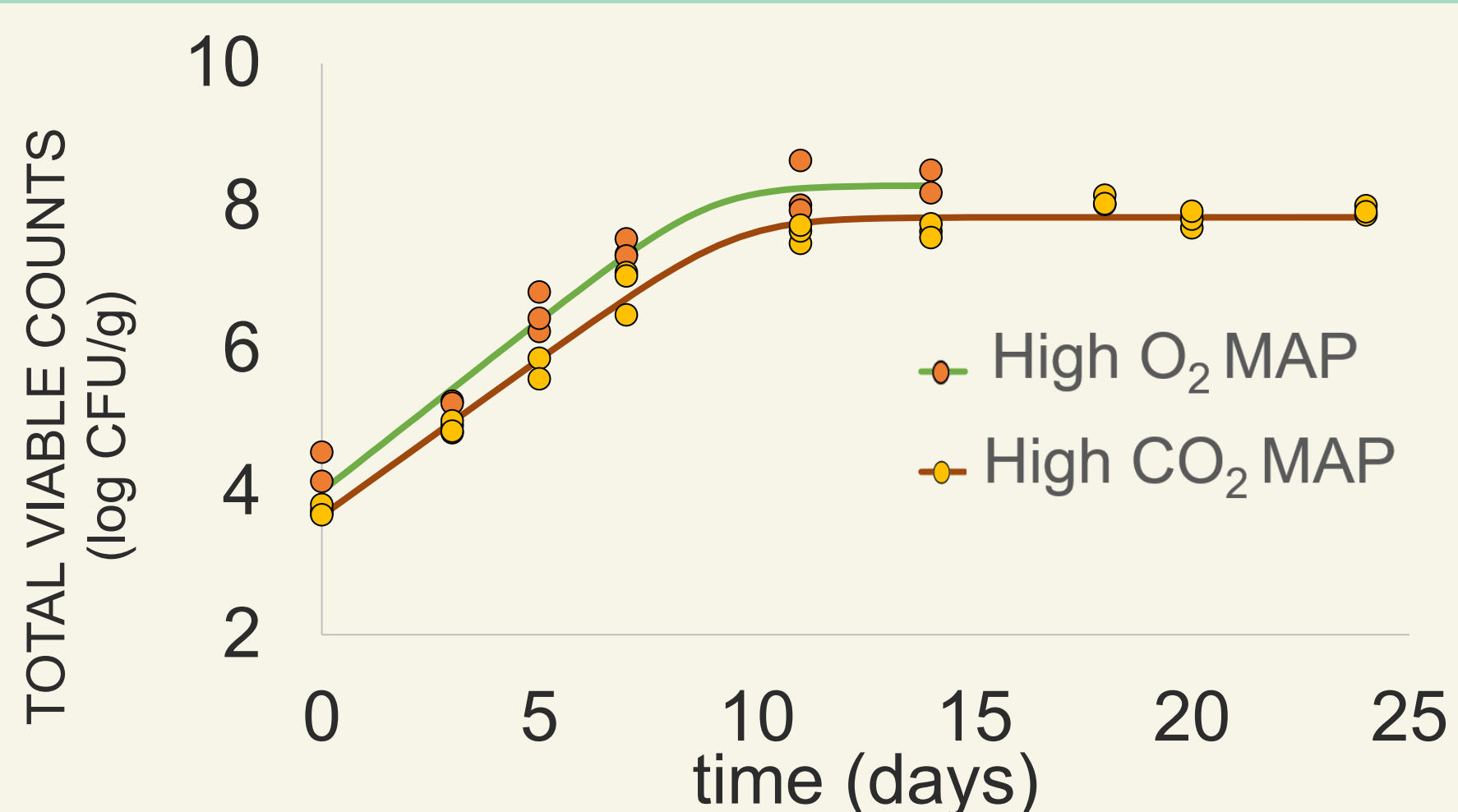


Olfactory analysis with 15 semi-trained panelists

Generalized Procrustes Analysis (GPA)

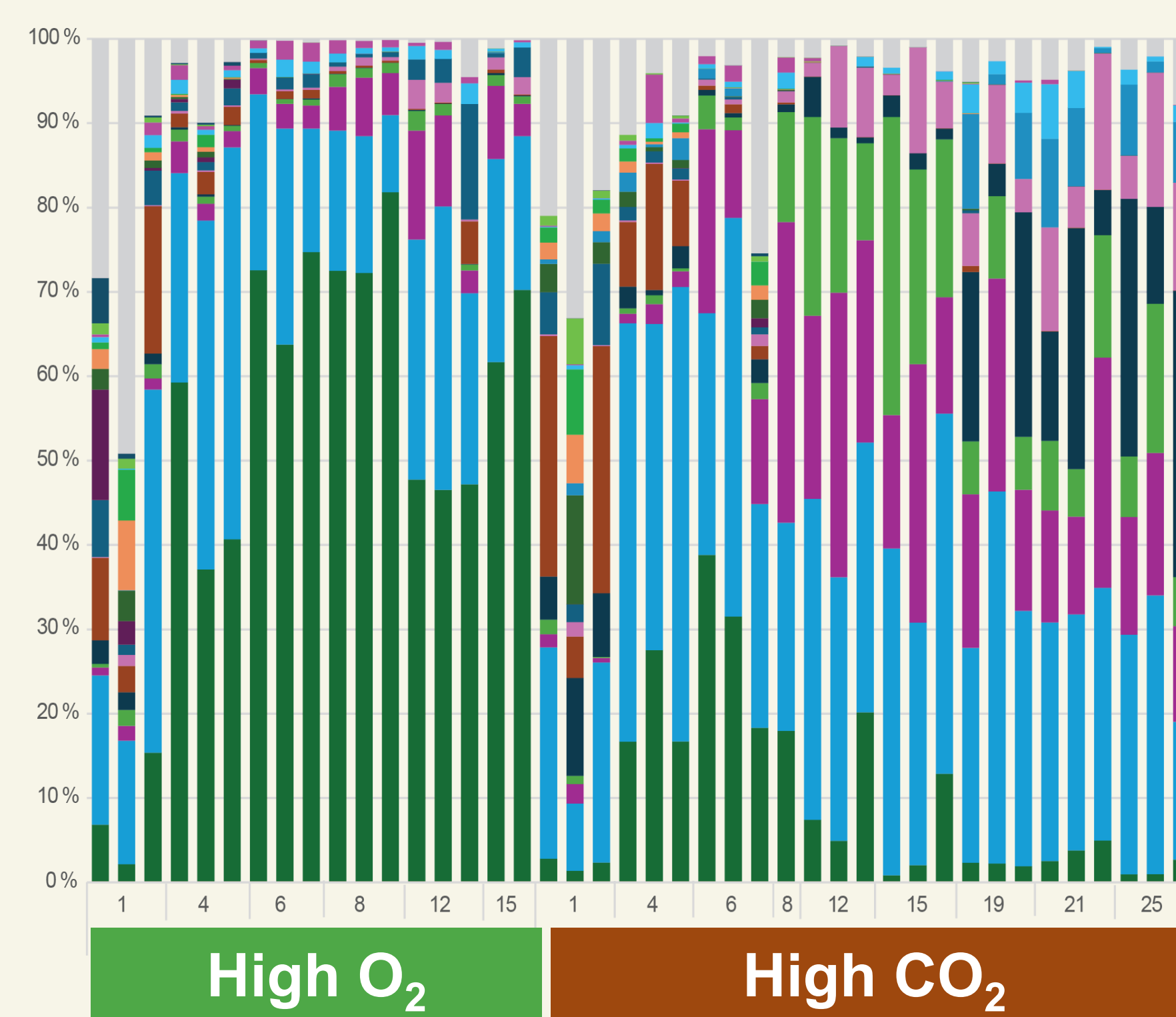
RESULTS

MICROBIOLOGICAL ANALYSIS



Baranyi and Roberts model (ComBase DMFIT)	μ_{max} (log CFU/g day ⁻¹)	N_{max} (log CFU/g)
High O ₂	0.48 ± 0.04	8.29 ± 0.15
High CO ₂	0.44 ± 0.02	7.85 ± 0.05

MICROBIAL COMMUNITY ANALYSIS



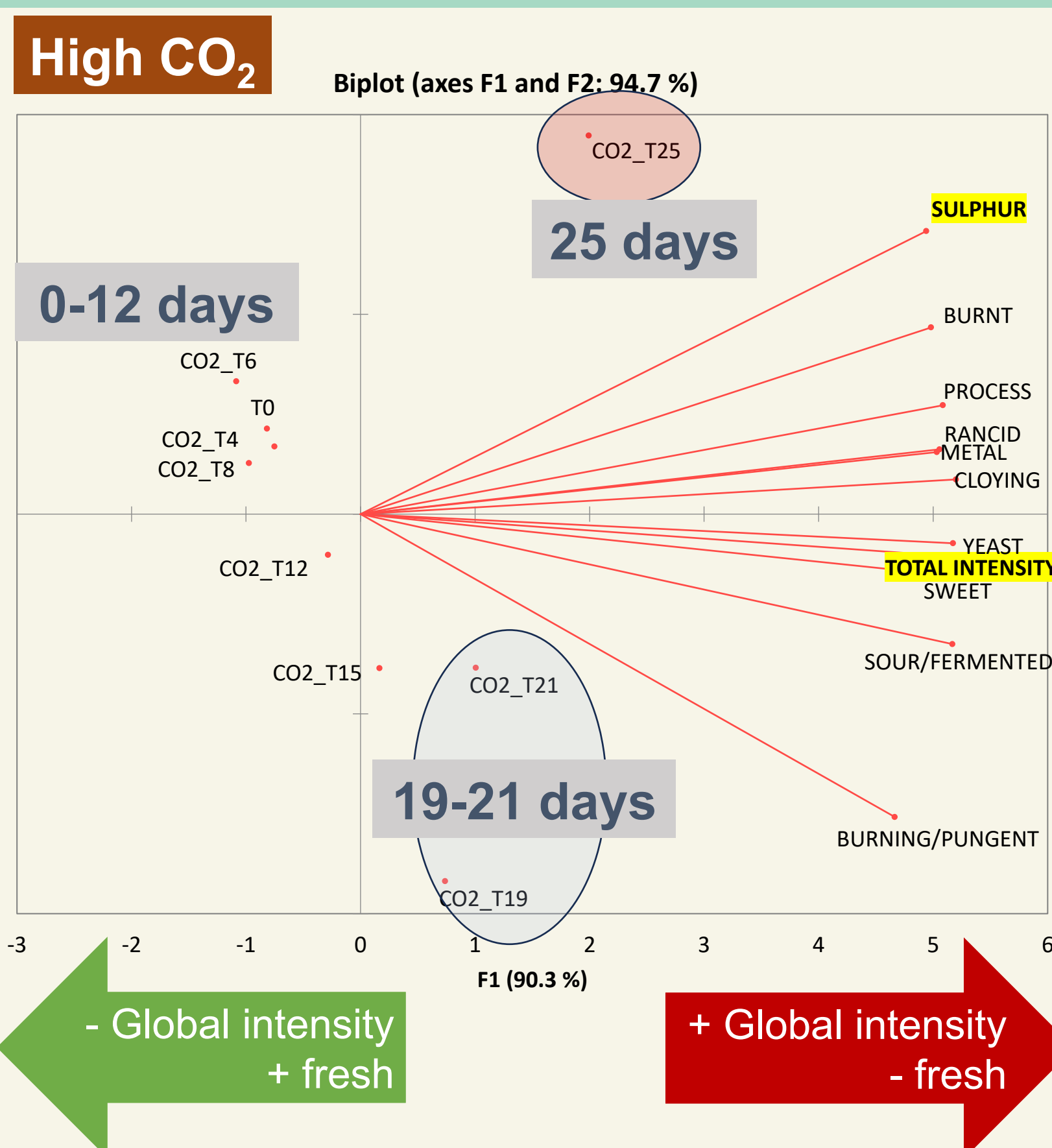
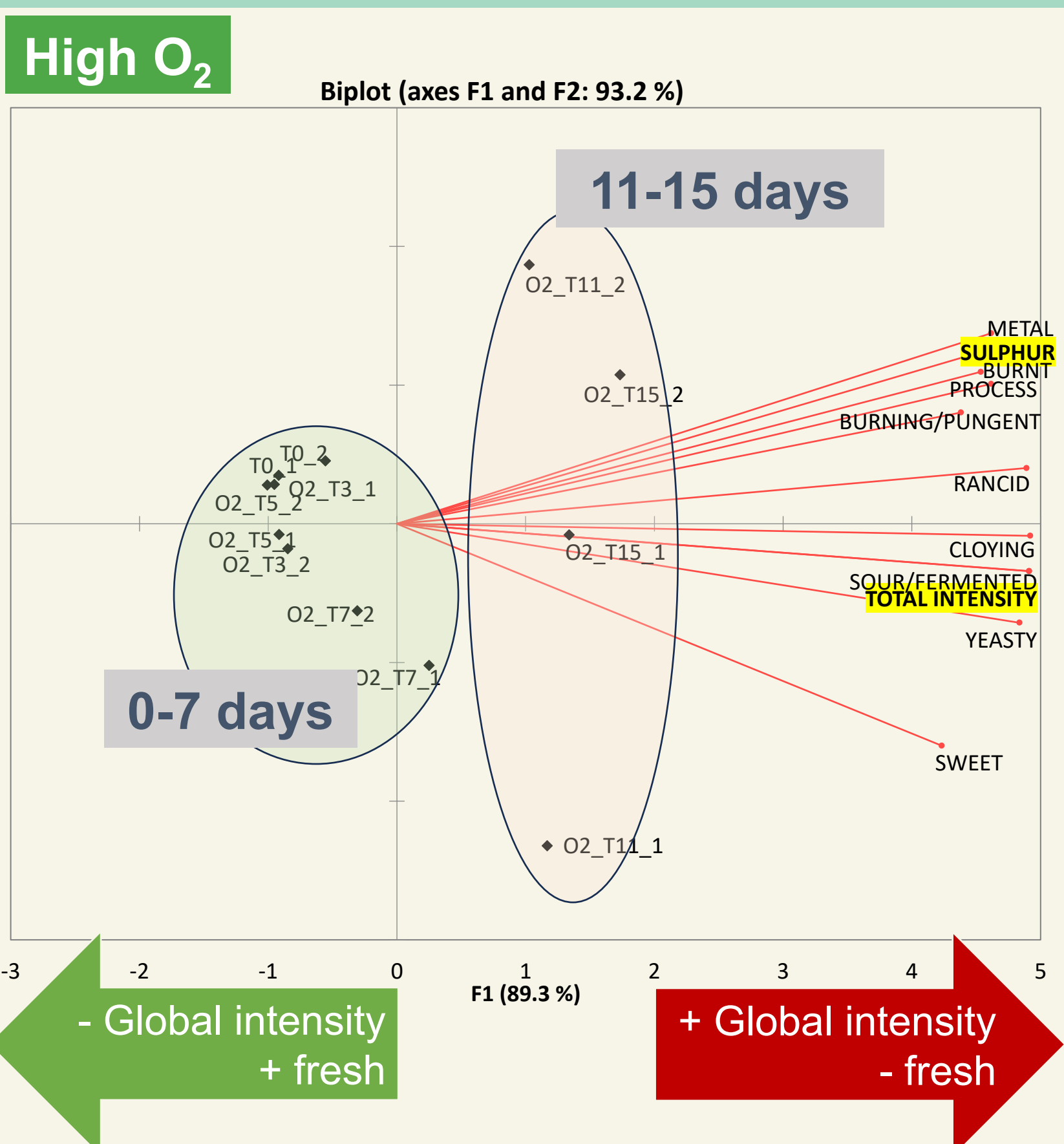
High O₂

- Dominance of *Brochothrix* and *Yersiniaceae* (mostly *S. proteamaculans*)
- Also *Pseudomonas* (day 1, only)

High CO₂

- Dominance of *Yersiniaceae*, *Lactobacillales* (*C. divergens*), *Lactococcus*, *Lactobacillus*
- Also *Pseudomonas* (day 1 and 4)
- Decrease of *Brochothrix*

OLFACTORY ANALYSIS



CONCLUSIONS



There is potential to increase the shelf life of chicken breasts using high CO₂ MAP

- Microbial load is similar in both types of MAP
- MAP greatly impacts the microbial community in raw chicken breasts
- High CO₂: the product is perceived as fresh for a longer period

ACKNOWLEDGMENTS