ASSESSING CHICKEN BREAST FILLET QUALITY: A SENSORY - INSTRUMENTAL APPROACH

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Introduction

❖ Chicken breast fillet is highly perishable and sensitive to changes in storage temperature. Appearance is a key factor influencing consumer perception of freshness.

❖ This study evaluates
  ➢ **sensory changes**, including appearance, odour, and overall impression as assessed by untrained panellists,
  ➢ as well as **instrumental colour and texture** analysis.

❖ Integrating sensory and instrumental data is essential for **understanding spoilage from the consumer's perspective** and developing rapid, objective indicators that reflect perceived meat quality.

Materials and Methods

❖ Samples: 6 ± 1 g **vacuum-packed chicken breast fillets**
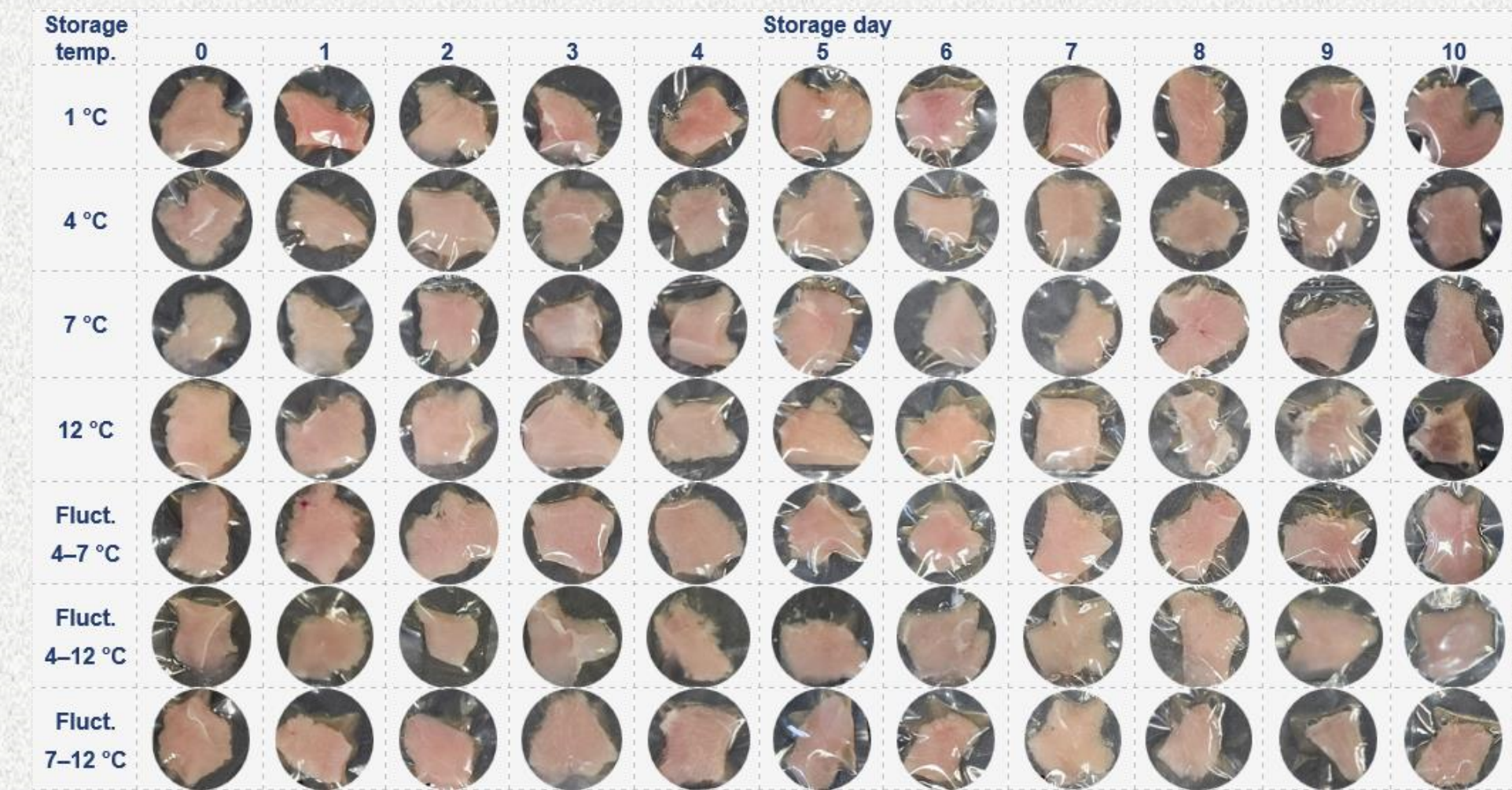❖ Conditions: **1, 4, 7, 12 °C** and **three 48 h fluctuation patterns** (Figure 1)

Figure 1. Storage conditions and sampling overview

❖ Analyses on vacuum-packaged chicken breast fillets.:
  ➢ Sensory: **appearance, odour, overall impression**,
  ➢ Colour: **L*, a*, b*, ΔE*, h(ab)**,
  ➢ Texture: **TPA**,
  ➢ Statistics: **Friedman, Kruskal–Wallis, MANOVA**

Results

❖ Sensory analysis using a three-point categorical scale
  ➢ Friedman test results $(p < 0.001)$ indicated significant effects of storage conditions on all sensory attributes.
    o **Odour was the** most sensitive to deterioration, with the **highest χ^2 values** observed at **4–12 °C**.
    o The most rapid **overall** (Figure 2) quality loss occurred at **12 °C** and **4–12 °C**, while **1 °C best preserved freshness.**
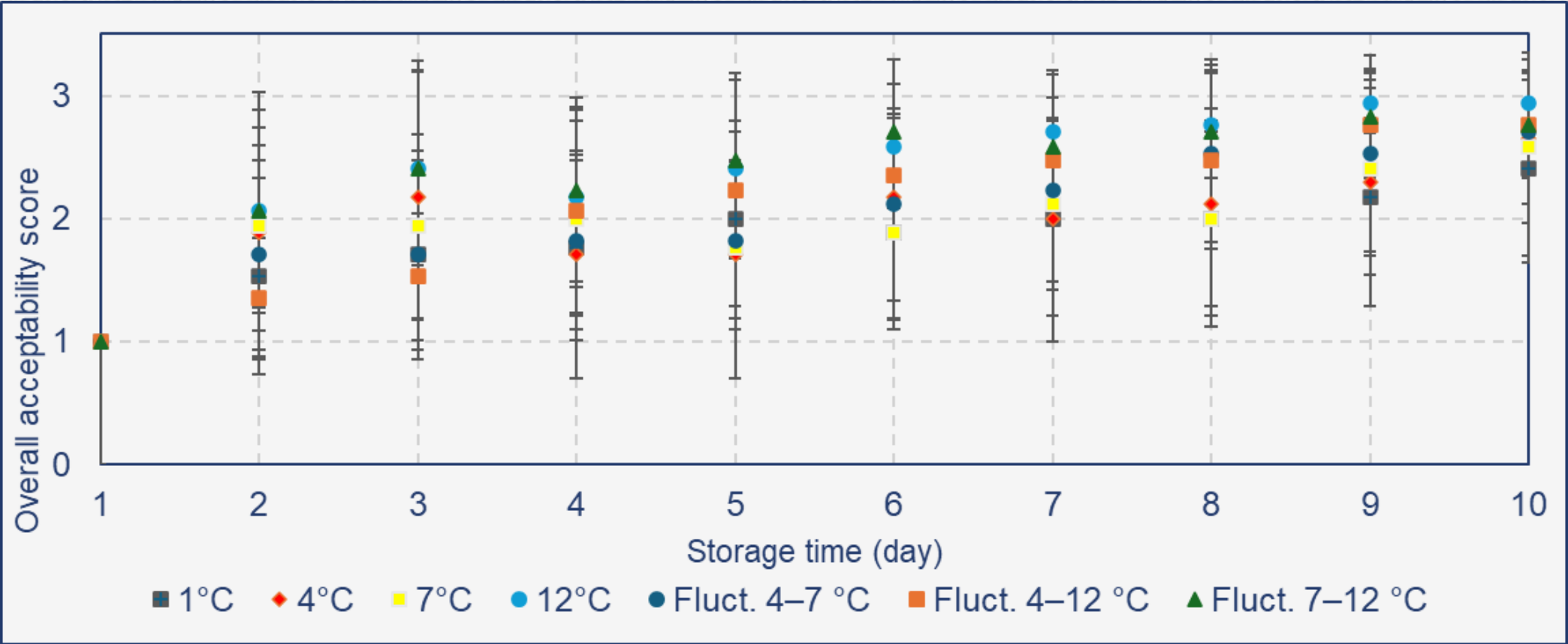

Figure 2. Overall impression scores (Mean ± SD)

➢ Kruskal–Wallis test results $(p < 0.05)$ demonstrated significant effects from day 1 onwards.
    o **Odour elicited significant variation on 9 of 11 days**, with the **highest differences from day 4 to day 10** $(p < 0.001)$.
    o Appearance and overall impression indicated fewer and more time-specific differences.

❖ Colour measurement
  ➢ **Storage temperature had a significant effect** on all colour parameters $(p < 0.001)$.
  ➢ Strongest effects:
    o **a*** (Figures 3&4) **and h(ab) under constant temperatures** ($\eta^2 = 0.37$–0.41)
    o **L*** (Figures 5&6) **under fluctuating temperatures** ($\eta^2 = 0.29$)
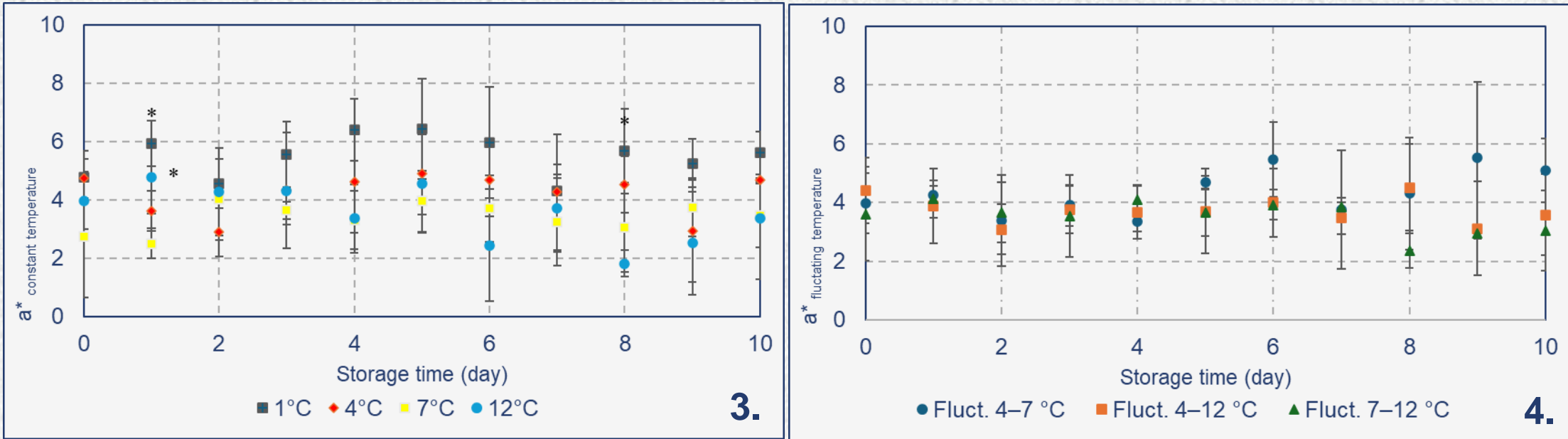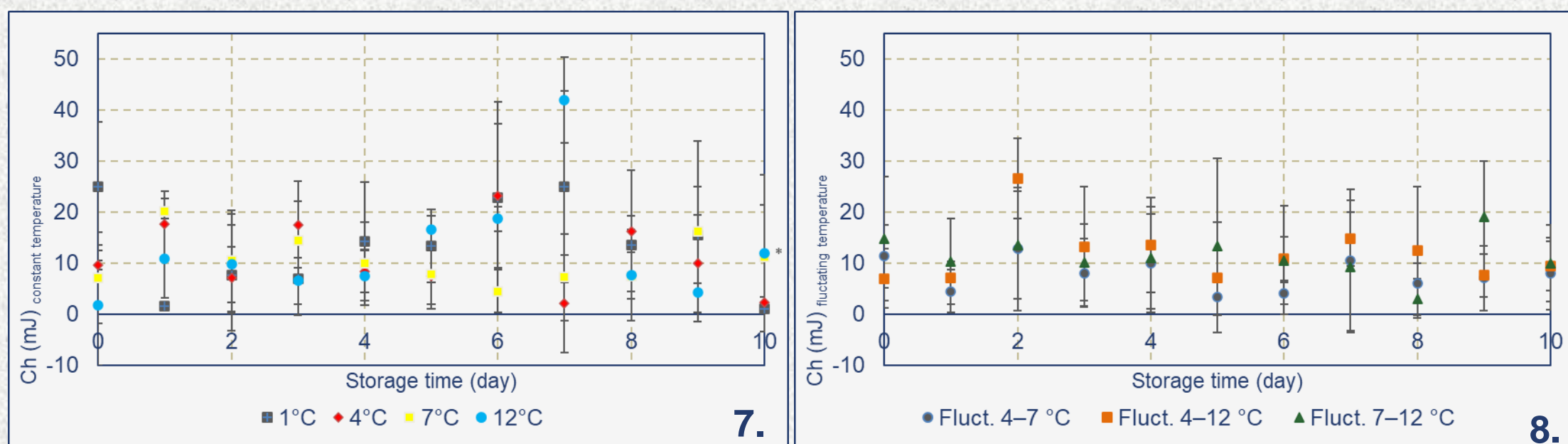

Figures 3 and 4. a* value at constant vs. fluctuating temperatures
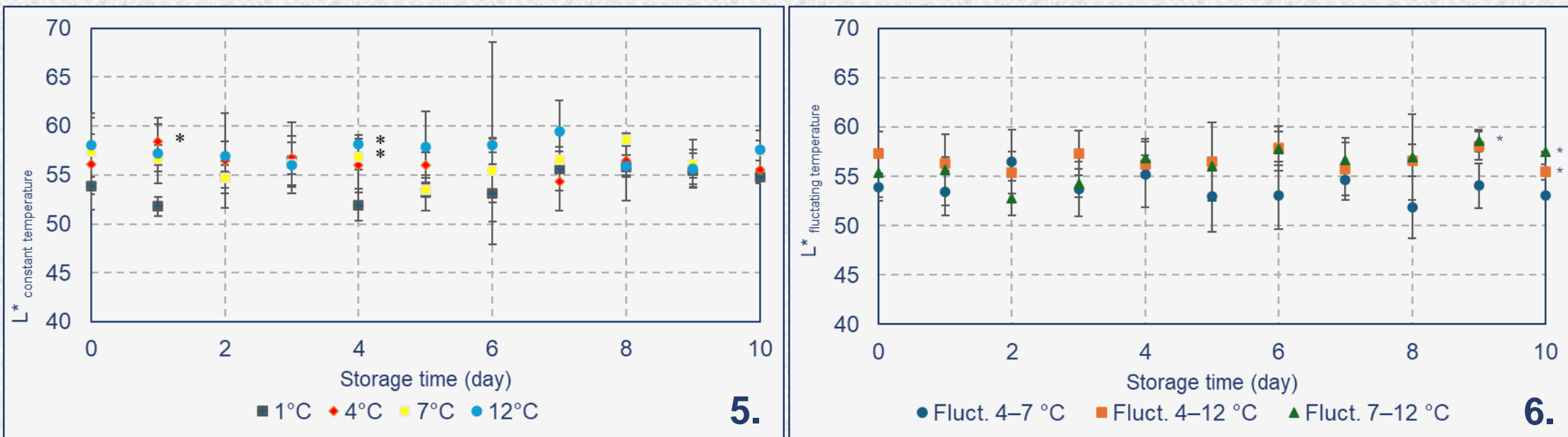
Figures 5 and 6. L* value at constant vs. fluctuating temperatures

❖ Texture analysis
  ➢ **Storage time at constant temperature significantly affected chewiness** $(p < 0.01, \eta^2 = 0.25)$ (Figures 7&8).

Figures 7 and 8. Temperature effect on chewiness

Conclusion

❖ In vacuum-packed chicken breasts, **odour is not a concern before opening**; sensory evaluations and colour data are aligned.
❖ **Instrumental texture measurements have limited correlation with perceived quality**, likely due to packaging effects.
❖ While **instrumental methods** can detect visual spoilage, they **should be paired with sensory evaluation** for accurate freshness monitoring.

* = significant difference between temperatures on the same day ($p < 0.05$).