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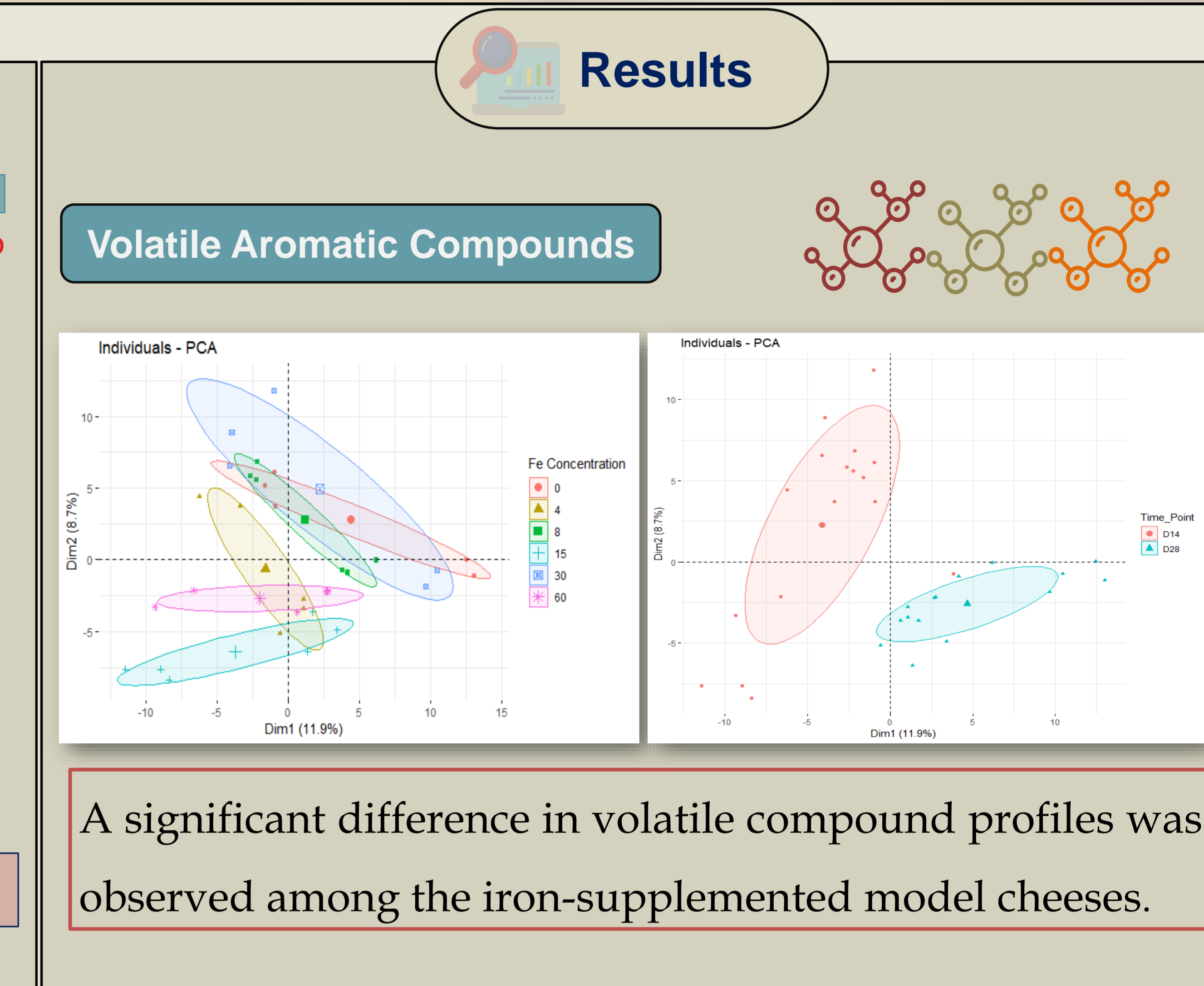
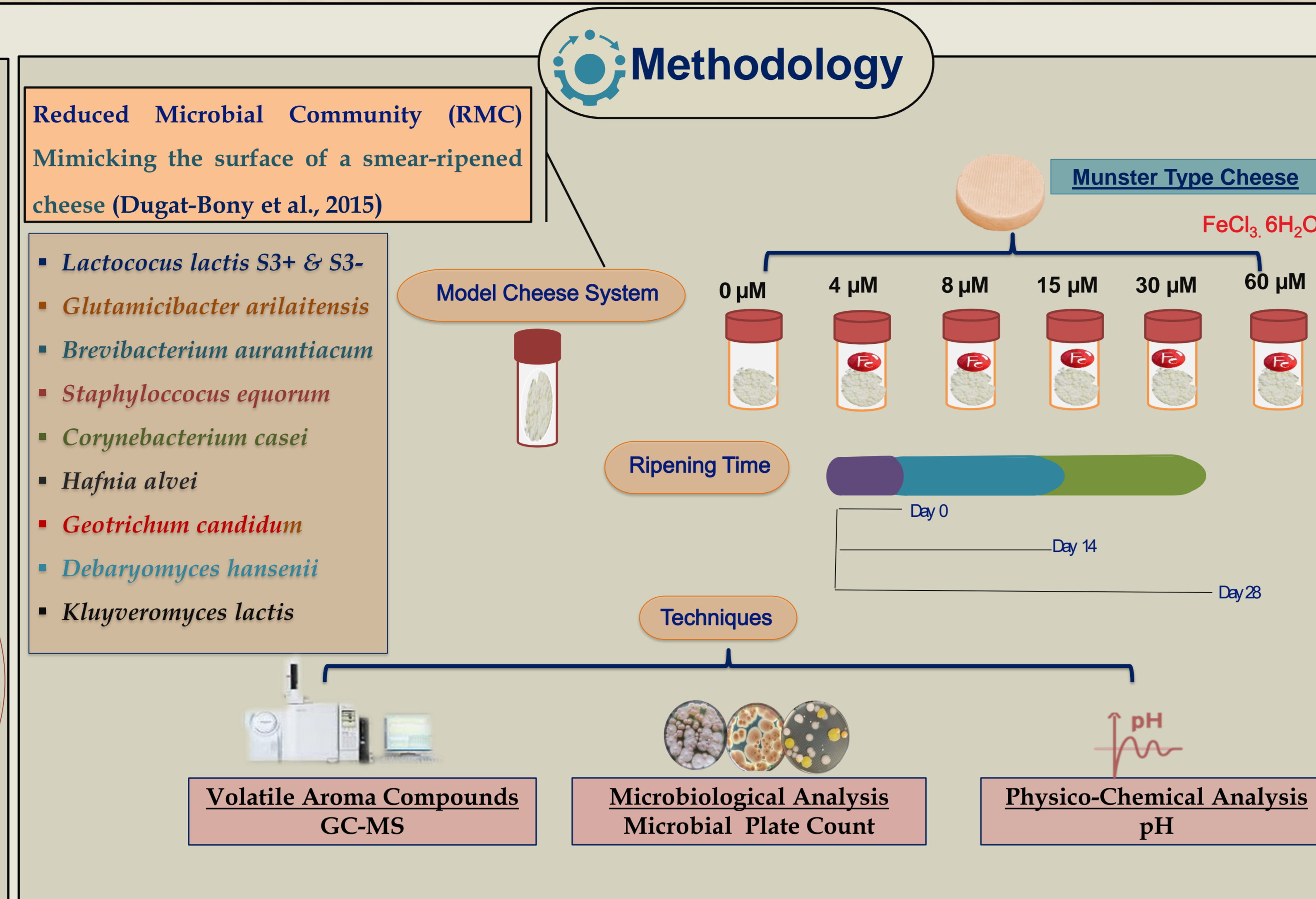
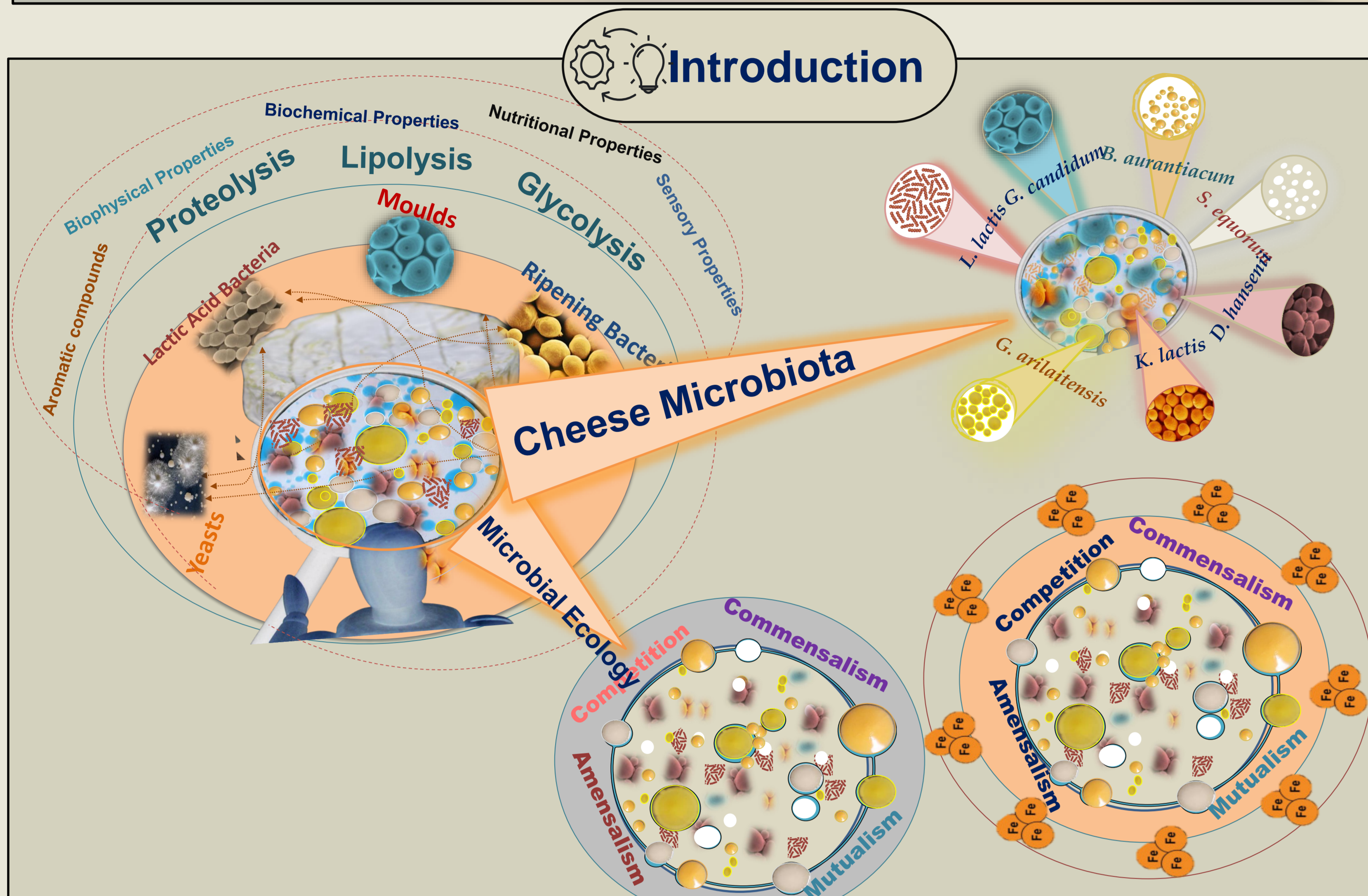


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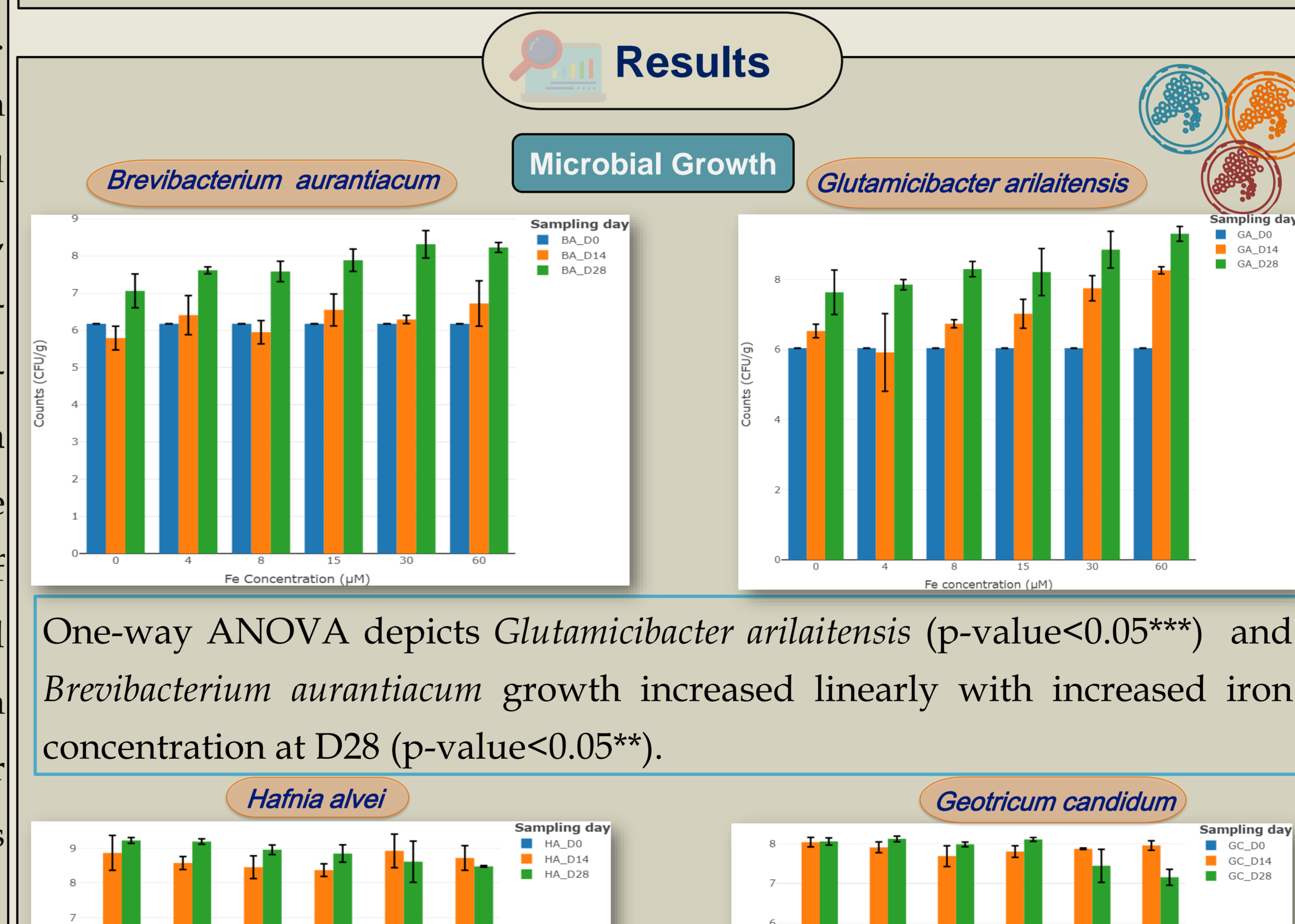
# Impact of iron on structuration & functioning of cheese microbial communities

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Microbial interactions are decisive factors in cheese quality and safety. Microorganisms require certain crucial nutrients for functioning, and iron is on top of the nutrients list. Iron is involved in various metabolic, physiological, and biochemical processes such as respiration, gene regulation, enzyme cofactor, DNA, fatty acids, and amino acids syntheses. However, cheese is a highly iron-restricted habitat (1.24mg/Kg) due to its very low iron quantity, presence of iron-chelating proteins (lactoferrin), and low iron diffusion index. Consequently, **iron competition** is one of the mediators of **microbe-microbe interactions** in cheese rinds. It has been demonstrated that iron is a limiting factor for the growth of many surface ripening bacteria. Cheese ripening microorganisms have adapted strategies to combat the iron-restricted environment like the iron acquisition system. They produce **siderophores** (iron chelators with high Fe<sup>+3</sup> affinity) under iron-starved conditions. Understanding iron's role in cheese ripening microbes is of utmost importance due to its crucial role in various mechanisms.

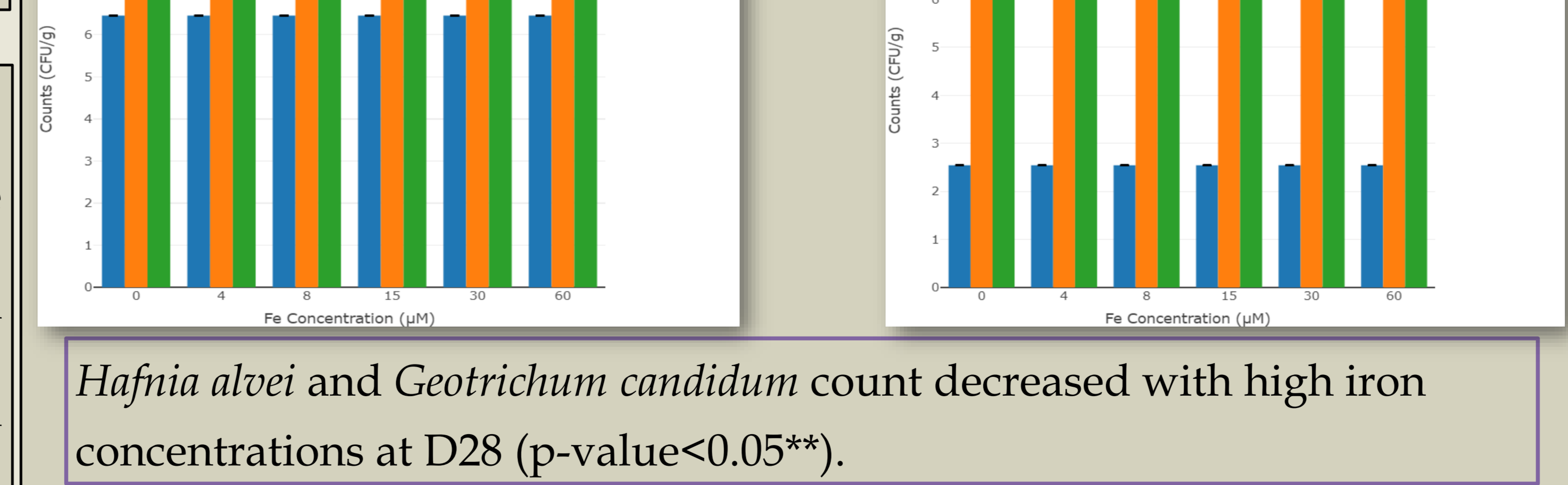


**Conclusion**

- Iron supplementation can significantly modify the growth kinetic of some microorganisms used in the RMC and the volatile compounds profiles.
- Iron has a pronounced effect on microbial communities as it can significantly influence microbial dynamics and interactions.
- **8-15µM Fe** concentration identified as the Fe threshold level to disturb the cheese ecosystem in the tested conditions.

**Objectives**

- The aims of this study were to
- Evaluate the capacity of iron supplementation to disturb the cheese ecosystem.
- Identify the concentration thresholds of iron required to observe such disturbance.
- Investigate the **microbe-microbe interactions** under a sufficient iron environment



**Future Work**

- Investigate **biochemical pathways** involved in **iron homeostasis, oxidative stress, and aroma compounds** production (e.g. sulphur metabolism) to understand the effect of iron on the ecosystem's equilibrium.
- Understand the role of iron in the cheese microbial ecology (e.g. resilience and structuration) by applying **multi-omics techniques**.