

Introduction

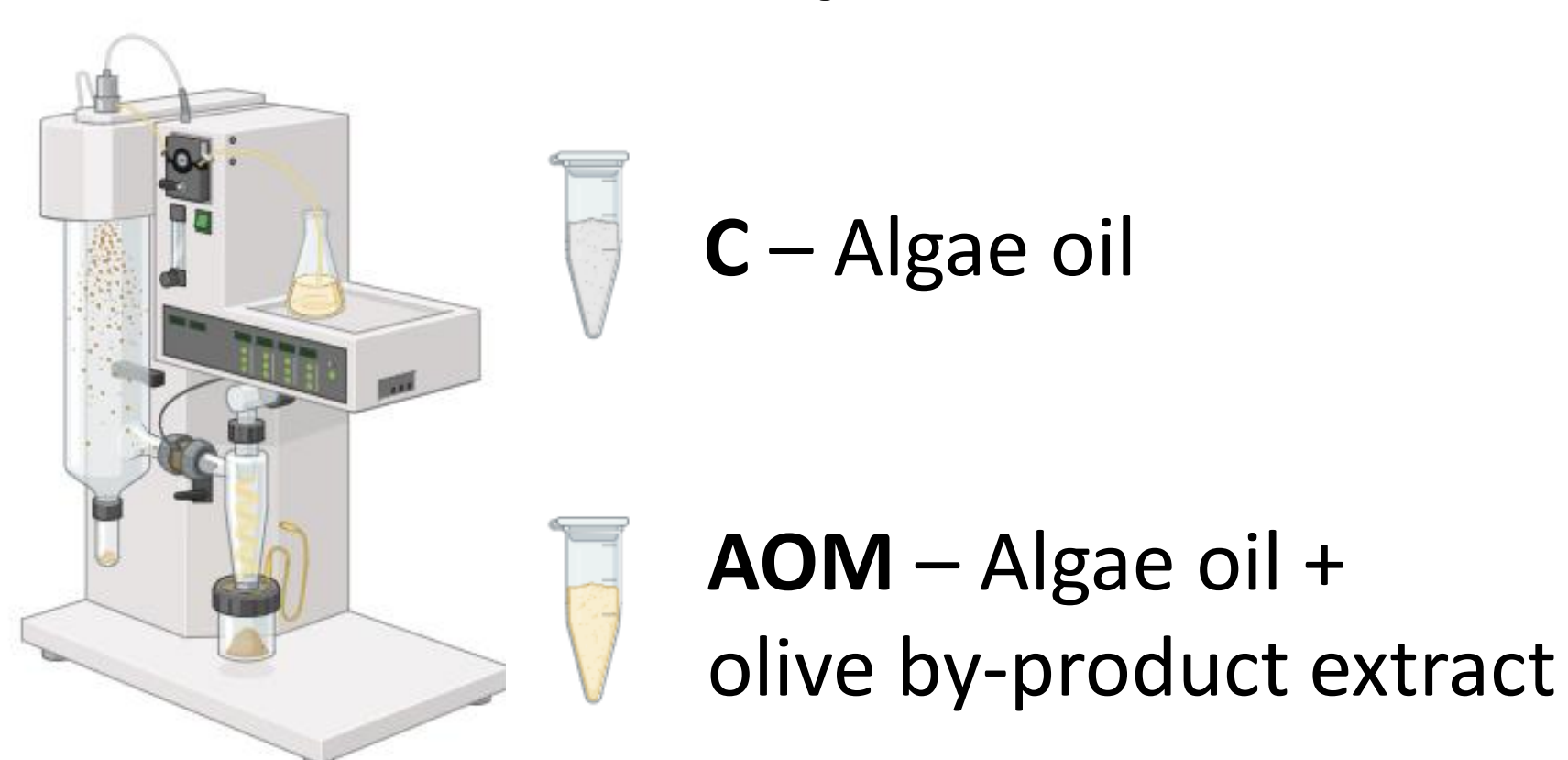
In recent years, there has been an increasing consumer interest in health-promoting and sustainable products. In this regard, algae oil has emerged as a more sustainable alternative to fish oil as a source of omega-3, while by-products from the olive industry have been valorised as a source of polyphenols with antioxidant activity ¹. However, the simultaneous incorporation of these lipophilic and hydrophilic compounds poses significant formulation challenges due to their different physicochemical characteristics and susceptibility to oxidation and degradation.

Objective

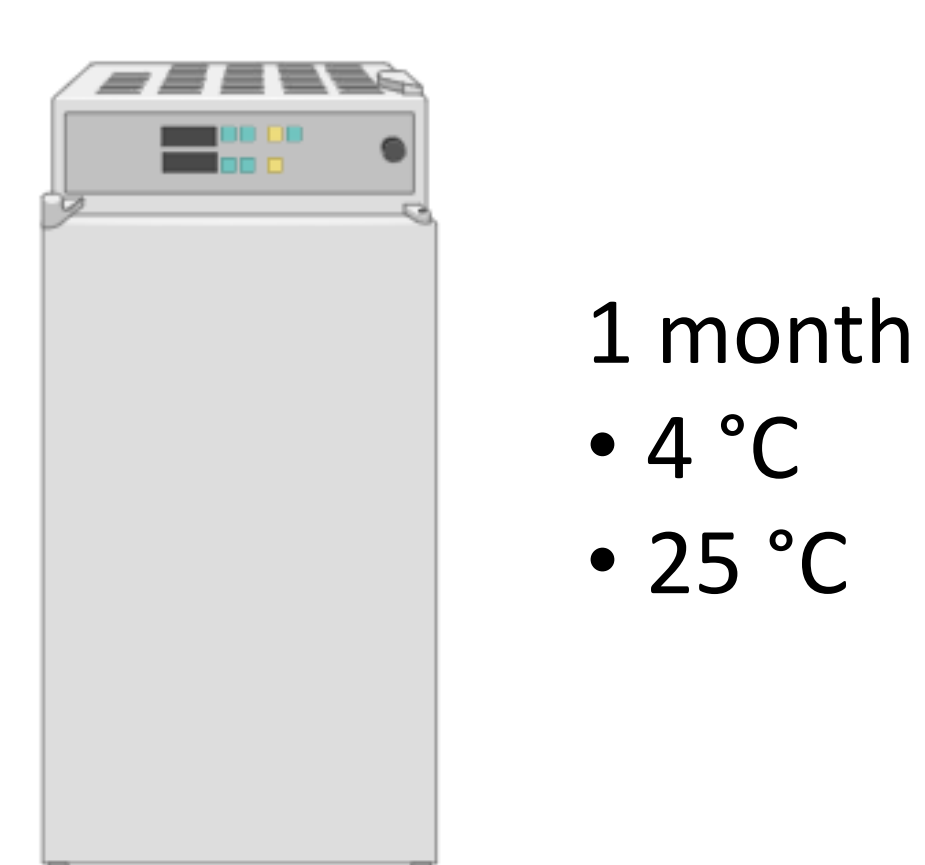
The present study aims to evaluate the oxidative stability of spray-dried microcapsules produced from W/O/W double emulsions co-encapsulating olive by-products extract and algae oil.

Methods

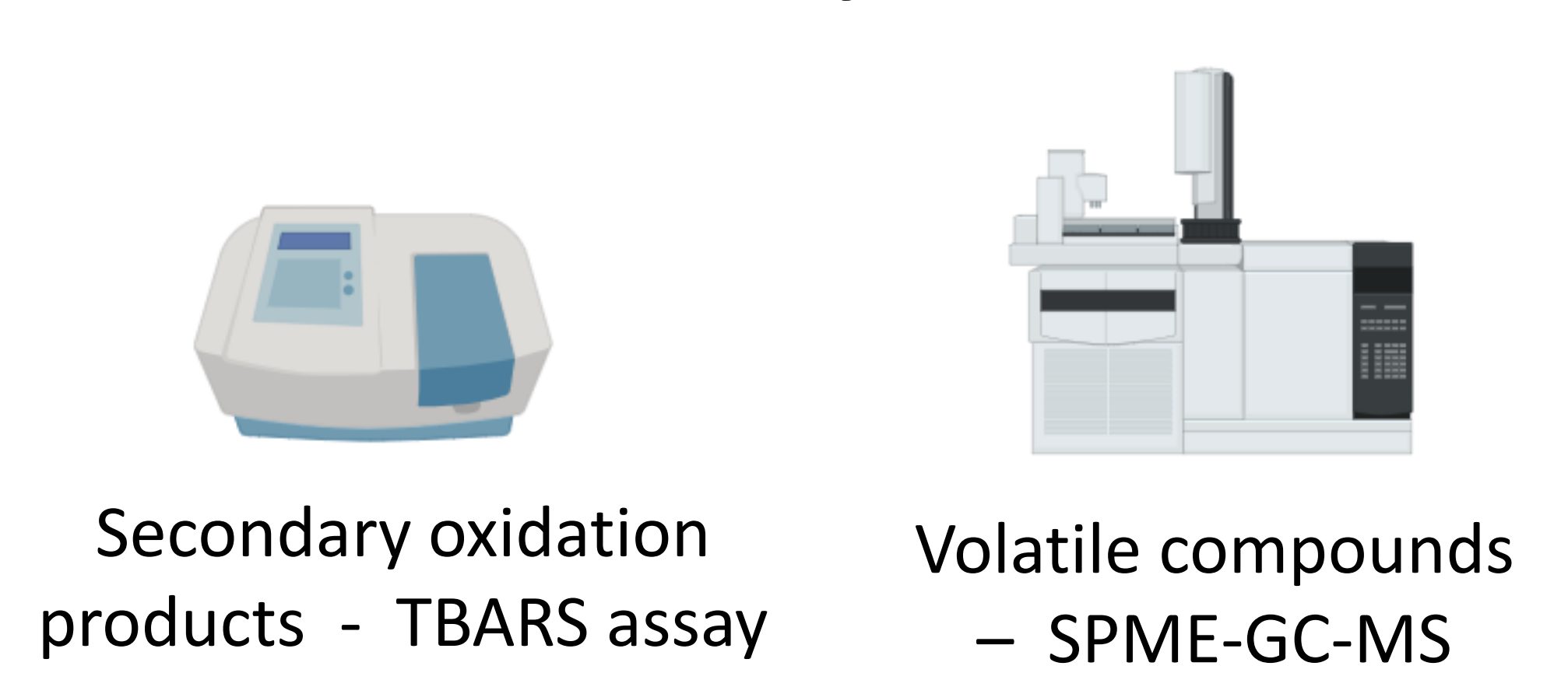
1 - Microencapsulation



2 - Storage



3 - Analysis



Results

The AOM batch exhibited significantly reduced oxidation levels compared to the C one, especially at room temperature (Figure 1). This discrepancy was also evident for most of the volatile compounds associated with lipid oxidation such as hexanal or nonanal ² (Figure 2).

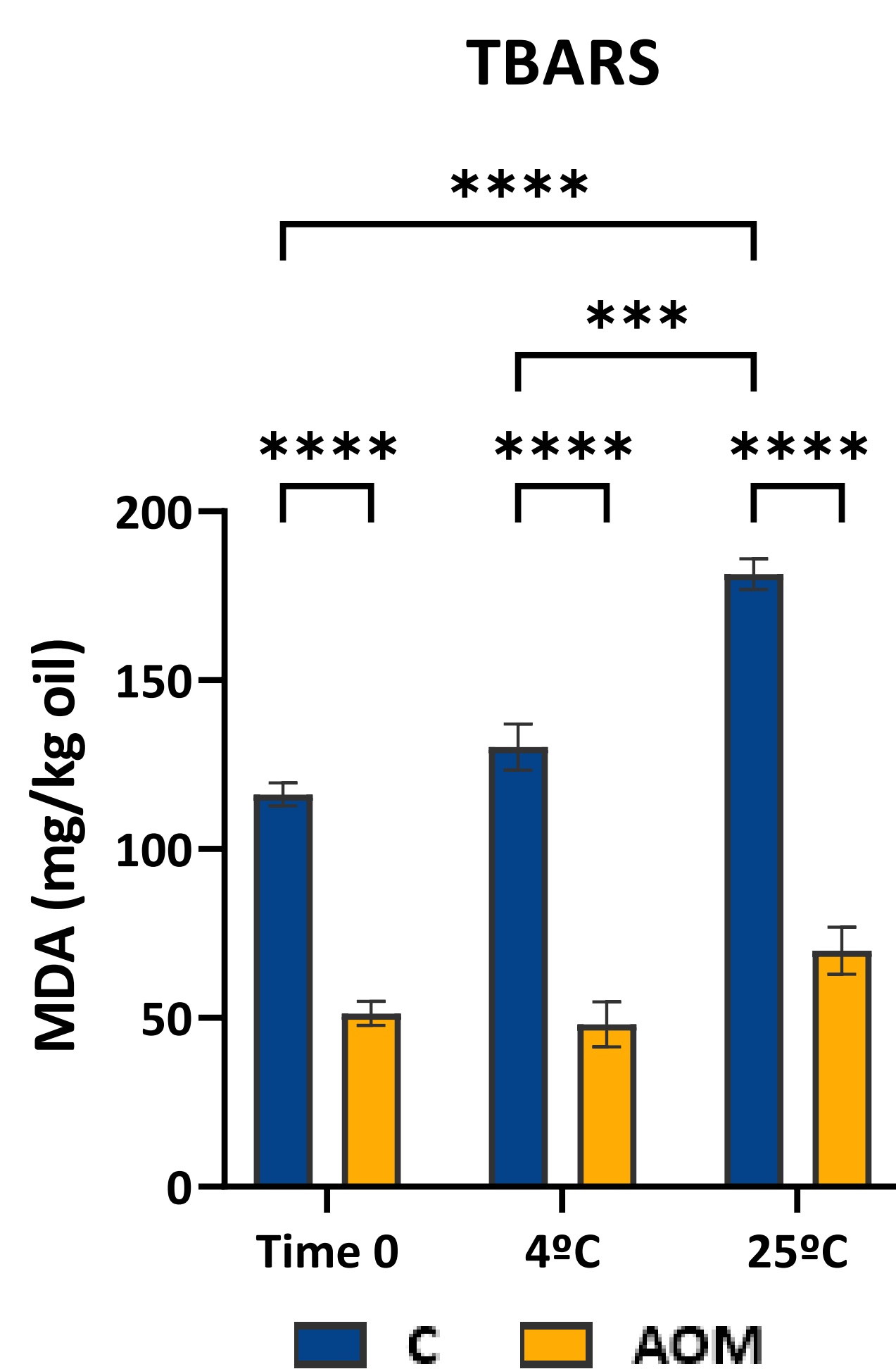


Figure 1. MDA values of microcapsules containing (AOM) and not containing olive by-product extract (C) before and after storage at 4 °C and 25 °C. Significant differences are indicated by *, **, *** or **** ($p < 0.05$, $p < 0.01$, $p < 0.001$ or $p < 0.0001$, respectively).

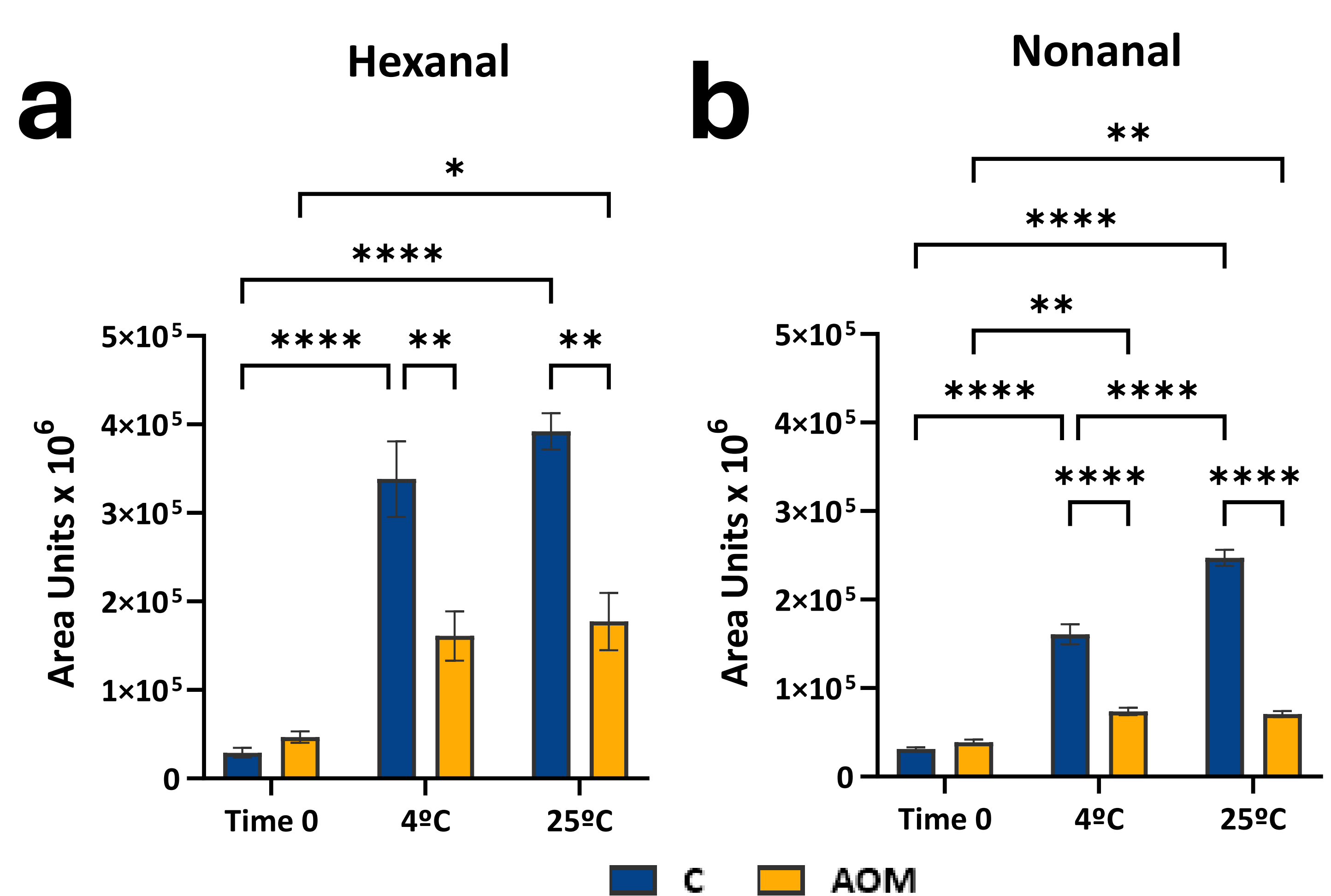


Figure 2. Abundance of volatile compounds: (a) hexanal and (b) nonanal of microcapsules containing (AOM) and not containing olive by-product extract (C) before and after storage at 4 °C and 25 °C. Significant differences are indicated by *, **, *** or **** ($p < 0.05$, $p < 0.01$, $p < 0.001$ or $p < 0.0001$, respectively).

Conclusion

Olive oil by-products extract exerts a protective effect on algae oil, supporting their combined use in the development of functional foods not only as bioactive ingredients but also as technological agents to improve oxidative stability.

Bibliography

- Piracci, G., Casini, L., Contini, C., Stancu, C. M. & Lähteenmäki, L. Identifying key attributes in sustainable food choices: An analysis using the food values framework. *J Clean Prod* 416, 137924 (2023).
- Domínguez, R. *et al.* A Comprehensive Review on Lipid Oxidation in Meat and Meat Products. *Antioxidants* 8, 429 (2019).

Acknowledgments