

Circular valorization of cheese whey and spent coffee grounds for the development of edible films

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Introduction

Spent coffee grounds (SCG), the main by-product of coffee brewing process, is considered an unexploited source of valuable compounds. The oil content of SCG is about 11-15% (w/w) and is currently utilized mostly for biodiesel production. Nevertheless, the significant content of SCG oil in unsaturated fatty acids (about 49%) suggests its potential utilization in food applications.

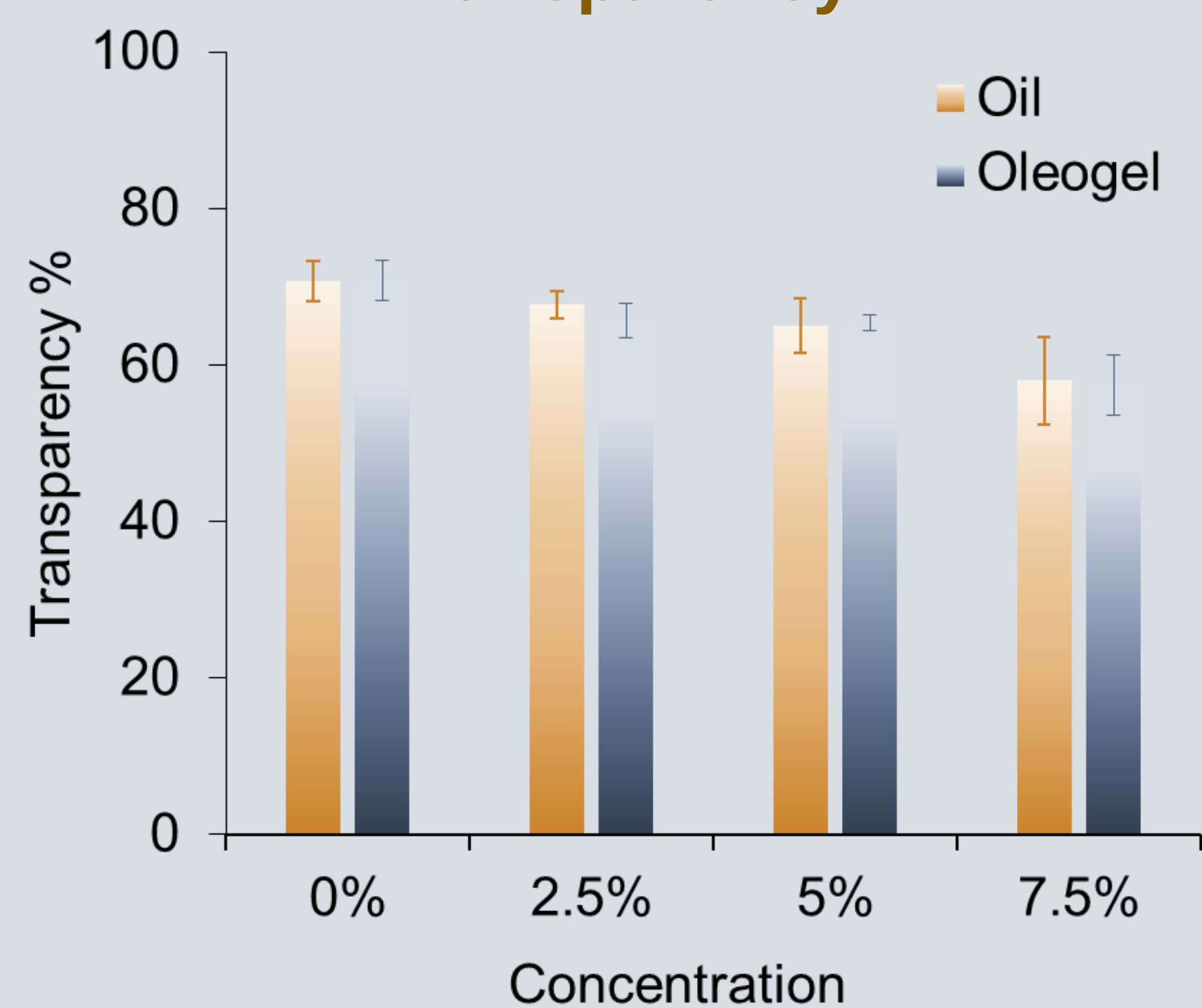
Therefore, this study targeted the development of whey protein (WP) edible films, enriched with unsaturated fatty acids. From a technological viewpoint, oil enrichment could induce the hydrophobic character of the produced films. The film enrichment was performed using two techniques: i) SCG oil addition and ii) SCG oleogel addition.

Materials & Methods

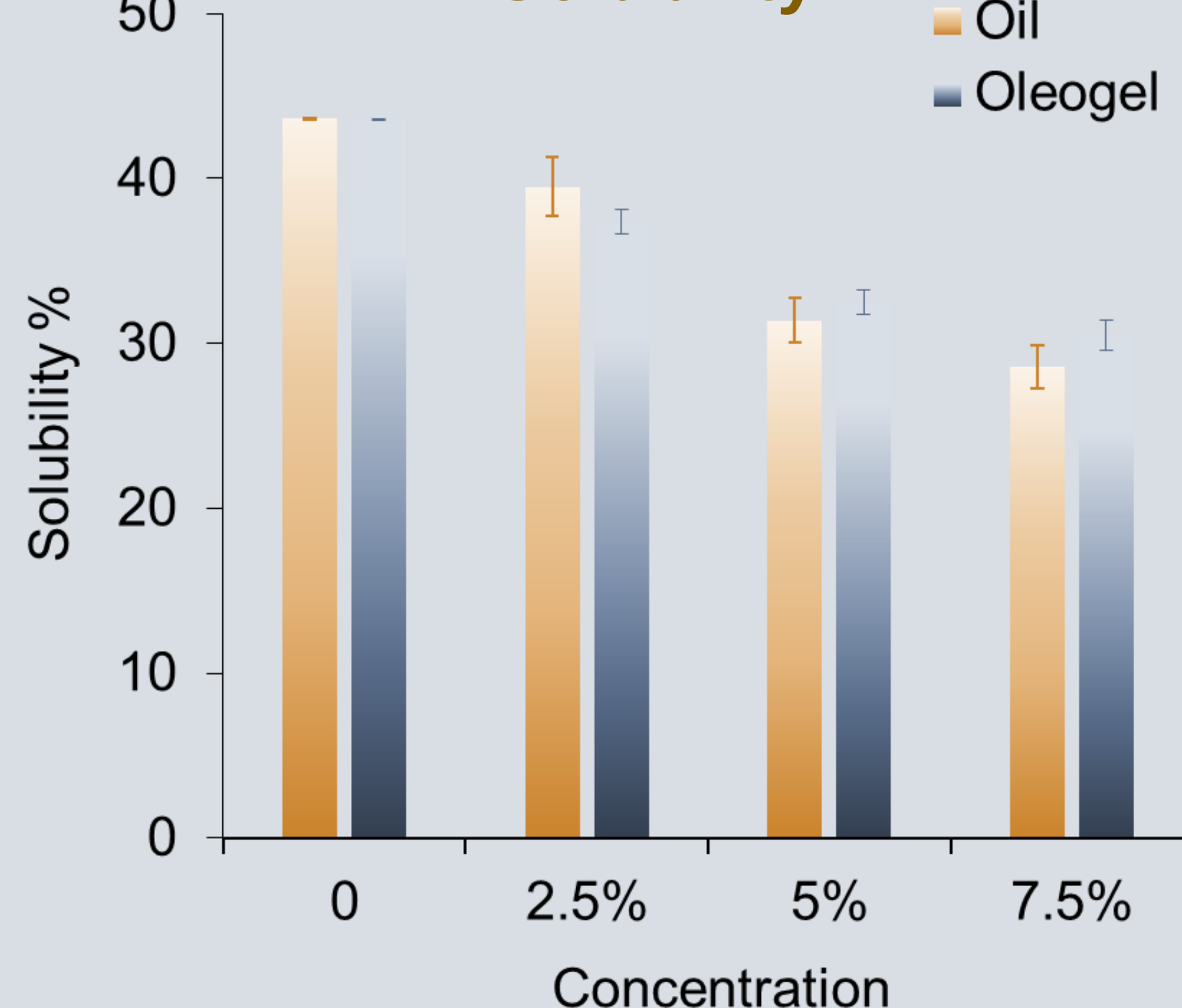


Results & Discussion

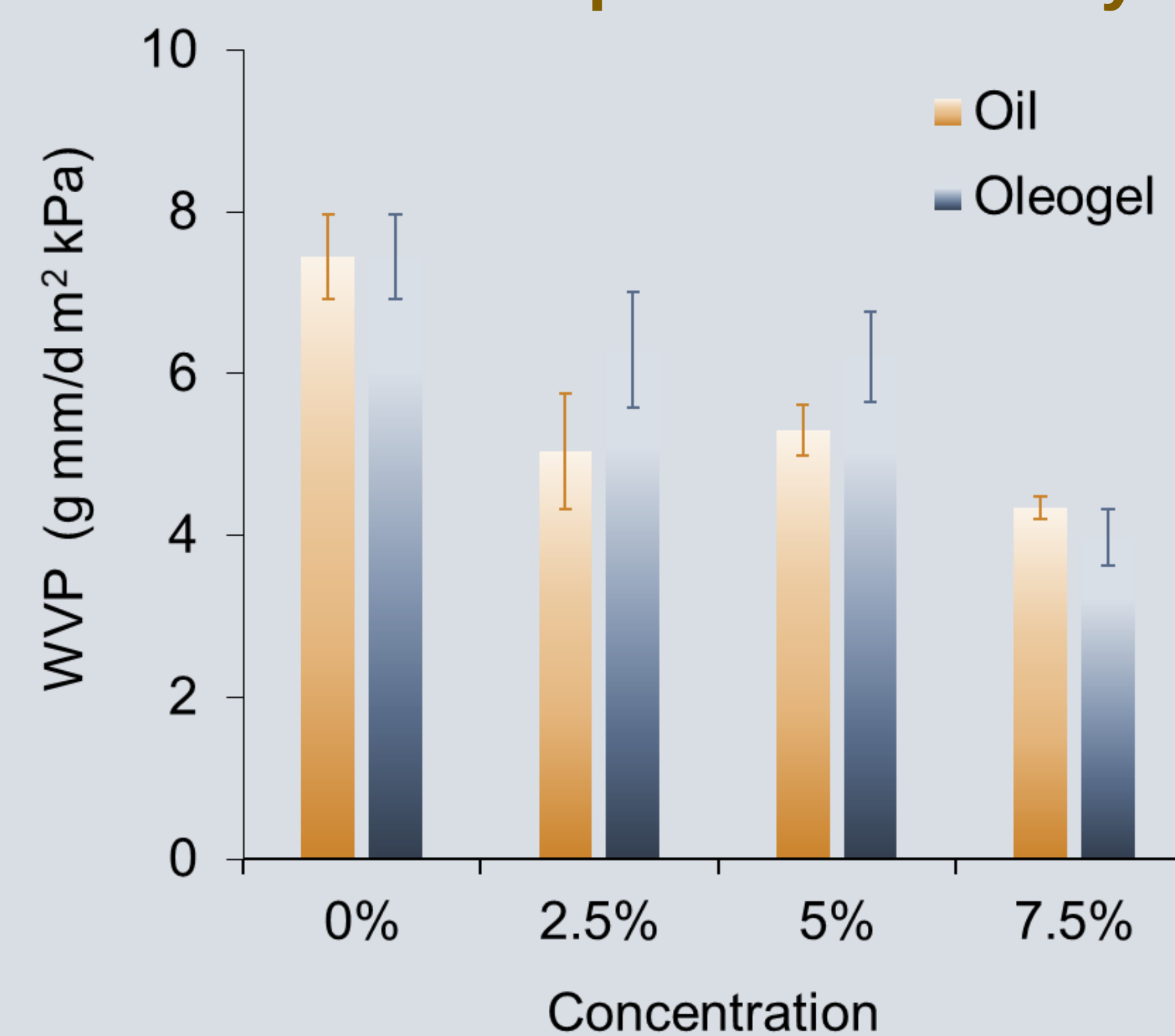
Transparency



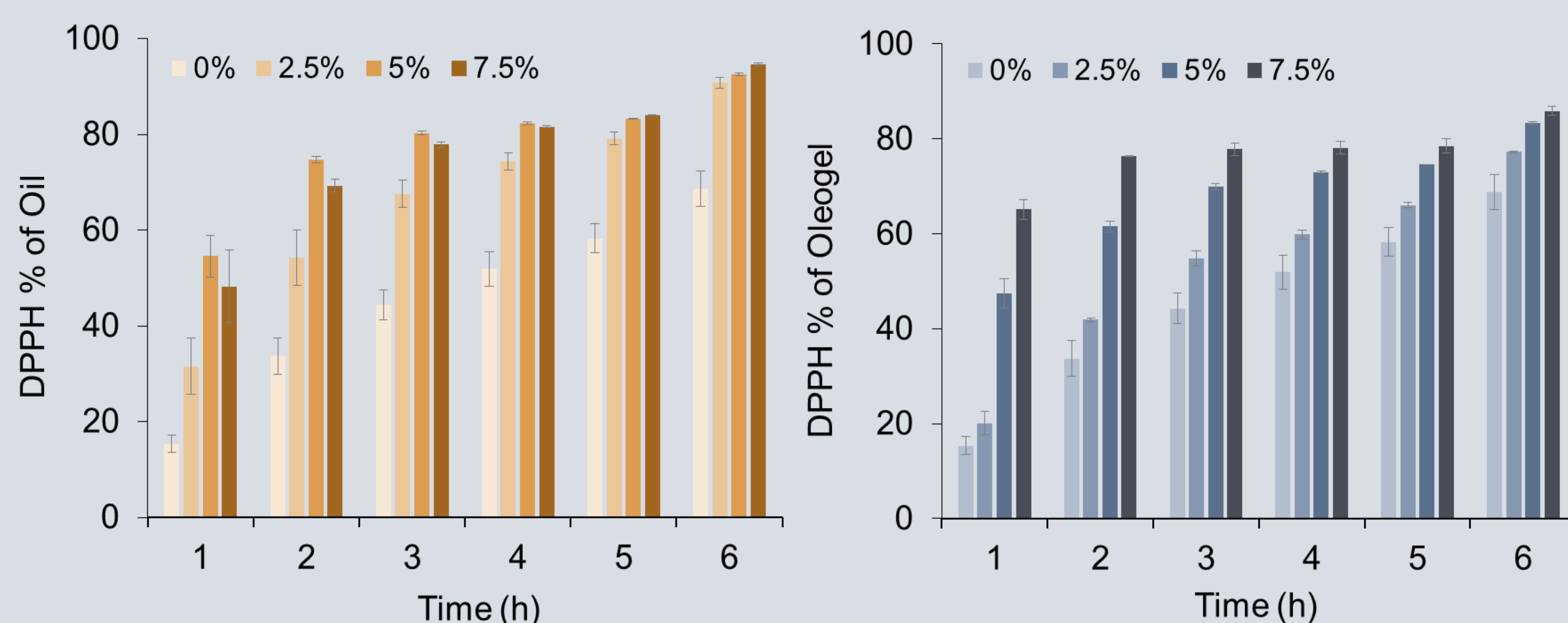
Solubility



Water Vapor Permeability



Antioxidant activity



Conclusions

- Addition of oil or oleogel resulted in films with similar physical properties.
- Edible films with lower solubility and water vapor permeability were produced, still light transmittance was > 60%.
- Addition of oil or oleogel resulted in films with higher antioxidant activity (high percentage inhibition of DPPH).
- This study presents the perspective to increase hydrophobicity and antioxidant properties of edible films through the simultaneous valorization of cheese whey and spent coffee grounds.

Acknowledgements

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