Can avocado oil enriched fresh cheese modulate the obesity-related metabolism?

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CATÓLICA FACULTY OF BIOTECHNOLOGY PORTO

XVI ENCONTRO DE QUÍMICA DOS ALIMENTOS

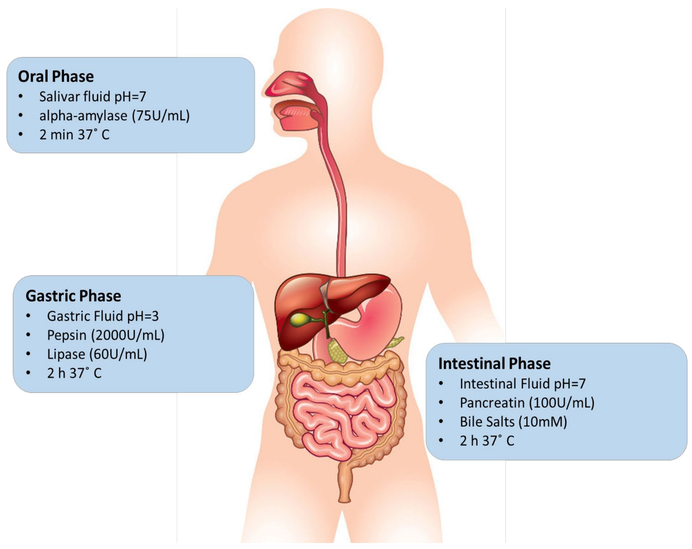
Abstract

Currently, obesity is one of the most important public health problems. Strategies for its prevention involve modifications in the diet, and in this way, functional foods have an important contribution. In this regard, virgin avocado oils present an interesting nutritional profile due to the presence of high levels of oleic acid and other bioactive compounds, such as alpha-tocopherol and beta-sitosterol. This composition enables them to be used as a functional ingredient in the management of several health conditions such as hypercholesterolemia, diabetes, and fatty liver disease. In this work avocado oil structured as a bigel was used to develop a fresh cheese rich in oleic acid. After gastrointestinal tract simulation, the oleic acid permeability was evaluated using the intestinal Caco-2/HT29-MTX co-culture model. The impact of permeated fatty acid in obesity-related metabolism was evaluated in terms of hepatic lipid accumulation, adipolysis, and adipokines secretion. In addition, inflammation biomarkers were monitored in 3T3-L1 and RAW cell lines.

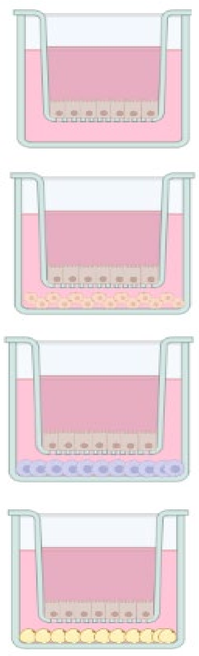
Methods

Cheese production

In vitro simulation of the GIT



Biological Properties



Permeability assay

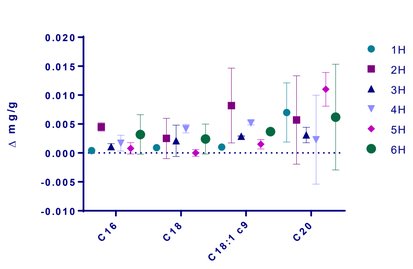
Hepatic lipid accumulation

Immunomodulation assay

Modulation of adipocytes metabolism

Results and Conclusions

Permeability

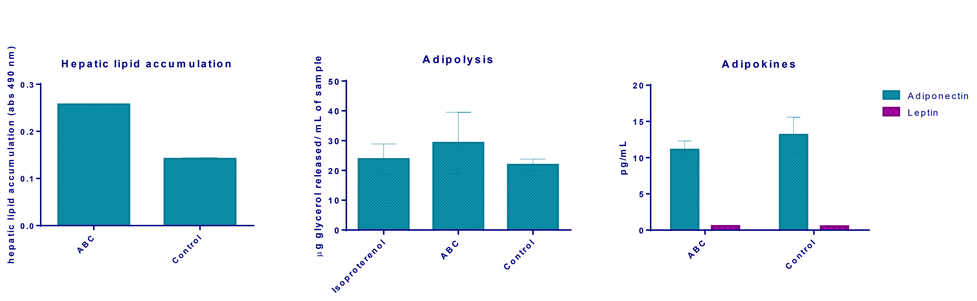


	Initial	Apical	Membrane	Bioavailable
C18:1 *c*9 mg/g	0.1634	0.00492	0.03459	0.0189

✓ **Only 11 % of total amount of oleic acid was bioavailable**

✓ **21 % was retained in Caco-2/HT29-MTX membranes**

Obesity-related Metabolism

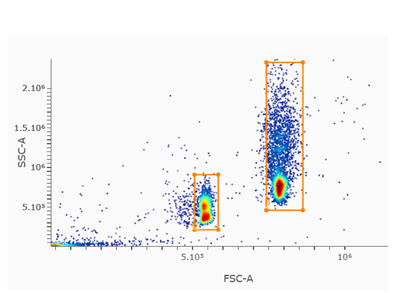


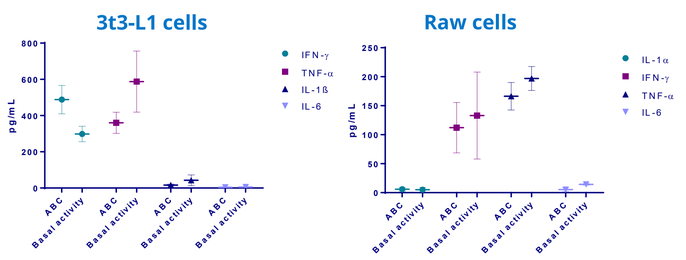
✓ **Cheese reduce by 22% the accumulation of triglycerides in differentiated adipocytes**

✓ **Reduce 15 % the adiponectin secretion**

✓ **Increase 5 % the leptin secretion**

Anti-inflammatory Potential





✓ **Avocado oil enriched cheese reduced the pro-inflammatory cytokines secretion**

Acknowledgements

This work was supported by National Funds from FCT - Fundação para a Ciência e a Tecnologia through project UIDB/50016/2020. Manuela Machado is grateful for the financial support from FCT through the Doctoral grant reference SFRH/BD/136701/2018

FCT Fundação para a Ciência e a Tecnologia