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ANTIOXIDANTS AND COFFEE OIL FROM SPENT COFFEE GROUNDS AS POTENTIAL COSMETIC INGREDIENTS

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COFFEE WASTE REINVENTED

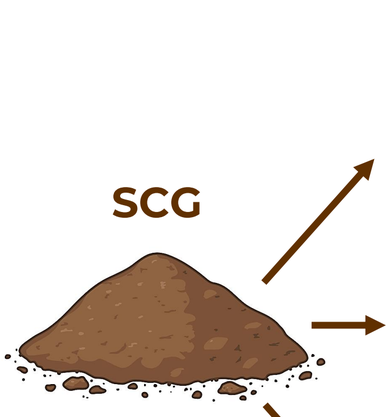
INTRODUCTION

- **Coffee** is one of the **most popular beverages in the world.**
- Around **7 mln tons of spent coffee grounds (SCG)** are produced **annually worldwide**.
- SCG are being discarded in the landfills causing **a threat to the environmental**.
- Despite the brewing process **SCG** contain many valuable compounds e.g. **lipids** and **antioxidants** that due to their **antioxidant activity** have **positive effect on the skin** and can find **application in cosmetic industry.**

OBJECTIVE

The aim of this study is to assess the feasibility of using **SCG-derived antioxidant extracts** and **coffee oil** as base and active ingredients in **cosmetic emulsions.**

METHODS

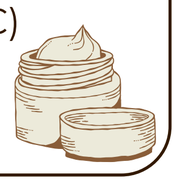


coffee oil (CO)

aqueous antioxidant extract (A)

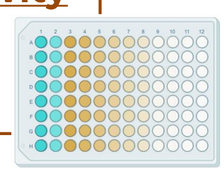
ethanolic antioxidant extract (E)

Incorporation into emulsions
- O/W emulsions
- hot emulsification method (85°C)
- CO concentrations: 0-5%
- A & E concentrations: 0-10%

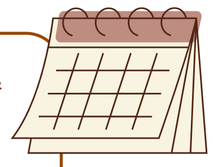


Heating to emulsification temperature
- 1 h
- 40 – 90°C

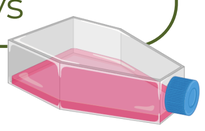
Antioxidant activity measurement
- CUPRAC assay



Accelerated ageing test
- 30 days
- switched temperature conditions (4°C / 42°C)

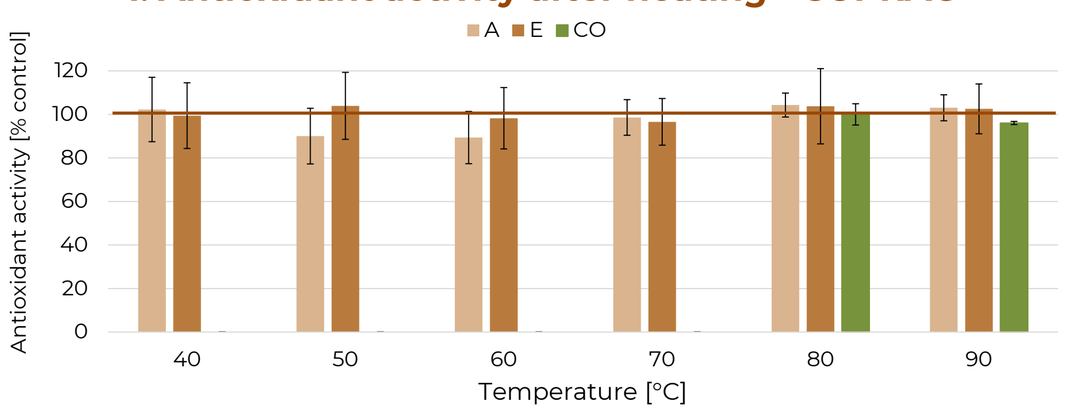


Cytotoxicity assessment
- 2D culture
- HaCaT keratinocyte cell line
- 24 h incubation, 37°C, 5% CO_2
- FDA/PI and MTT assays

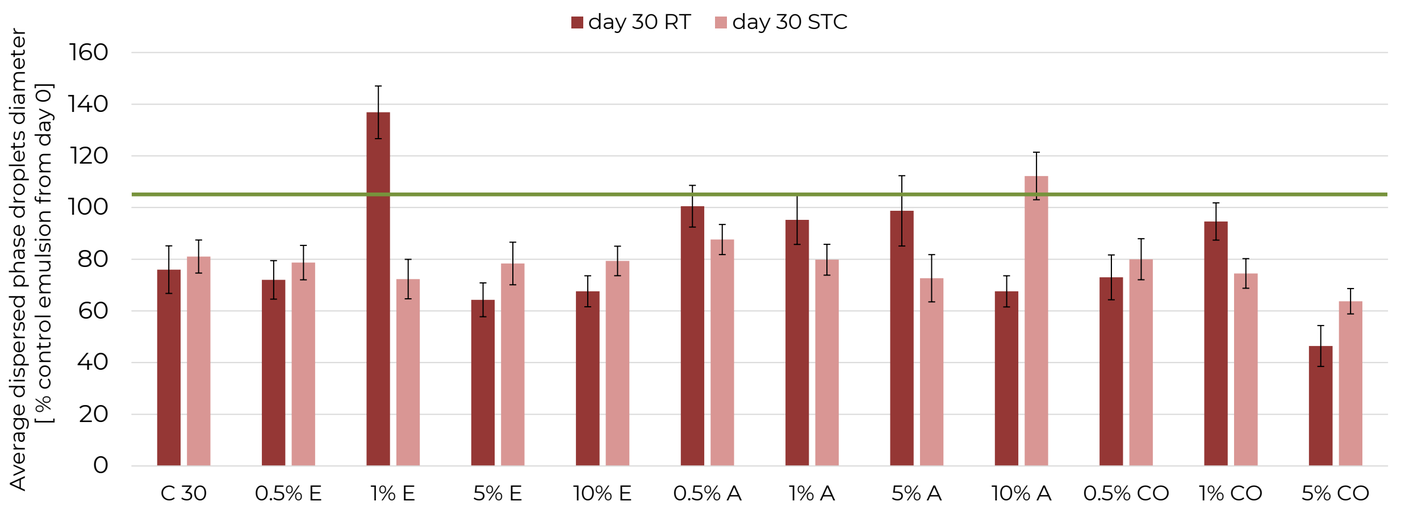


RESULTS

1. Antioxidant activity after heating - CUPRAC

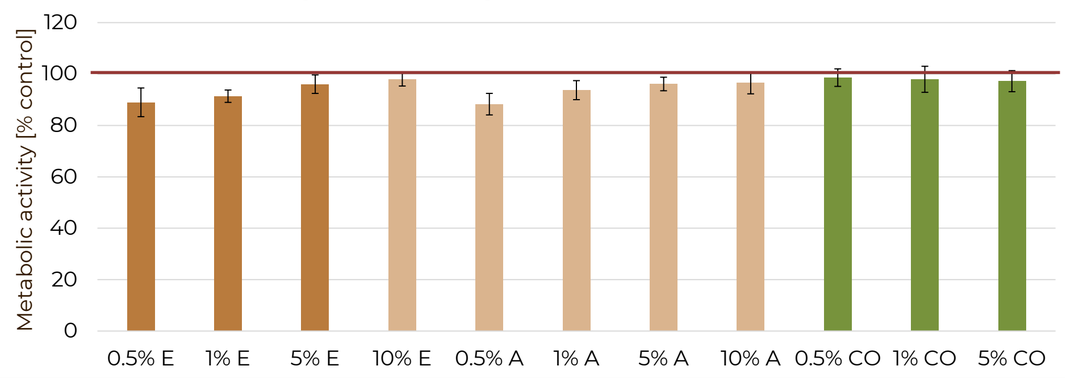


2. Accelerated ageing test – dispersed phase droplets size

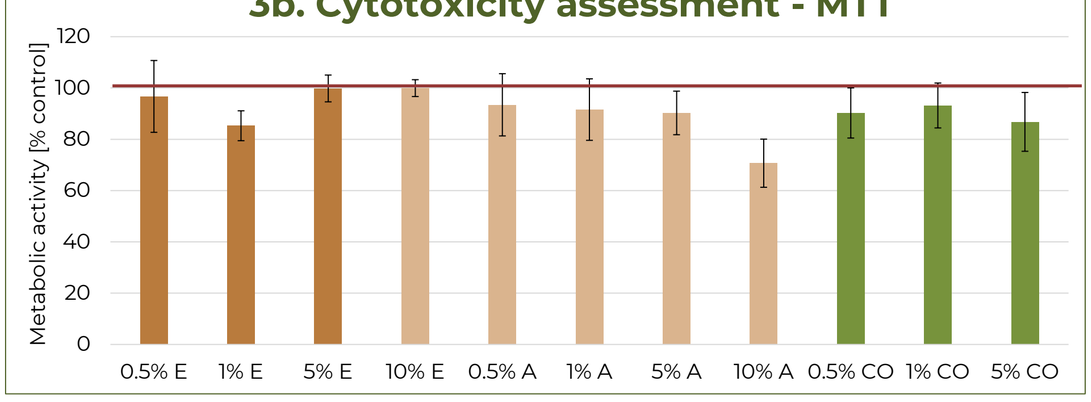


RT – room temperature; STC – switched temperature conditions

3a. Cytotoxicity assessment - FDA



3b. Cytotoxicity assessment - MTT



CONCLUSION

- **Antioxidant activity** of coffee oil and both antioxidant extracts have been proven to be **temperature-stable up to 90°C** (Graph 1) which makes them **suitable cosmetic ingredients** for **hot emulsification processing.**
- After **accelerated ageing test** there was **no change** in **color**, **smell**, **pH** or **consistency** of the emulsions in comparison to day 0 and to the control.
- Accelerated ageing test results show **no signs of emulsion delamination** except for 1% E stored in RT (Graph 2).
- **Emulsions** containing different concentrations of coffee oil and antioxidant extracts **did not cause cytotoxic effect** towards **human keratinocytes** (Graphs 3a and 3b).

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