Polyphenol extraction from olive pomace of Montenegrin olive variety Žutica as the initial step in waste-valorization strategy

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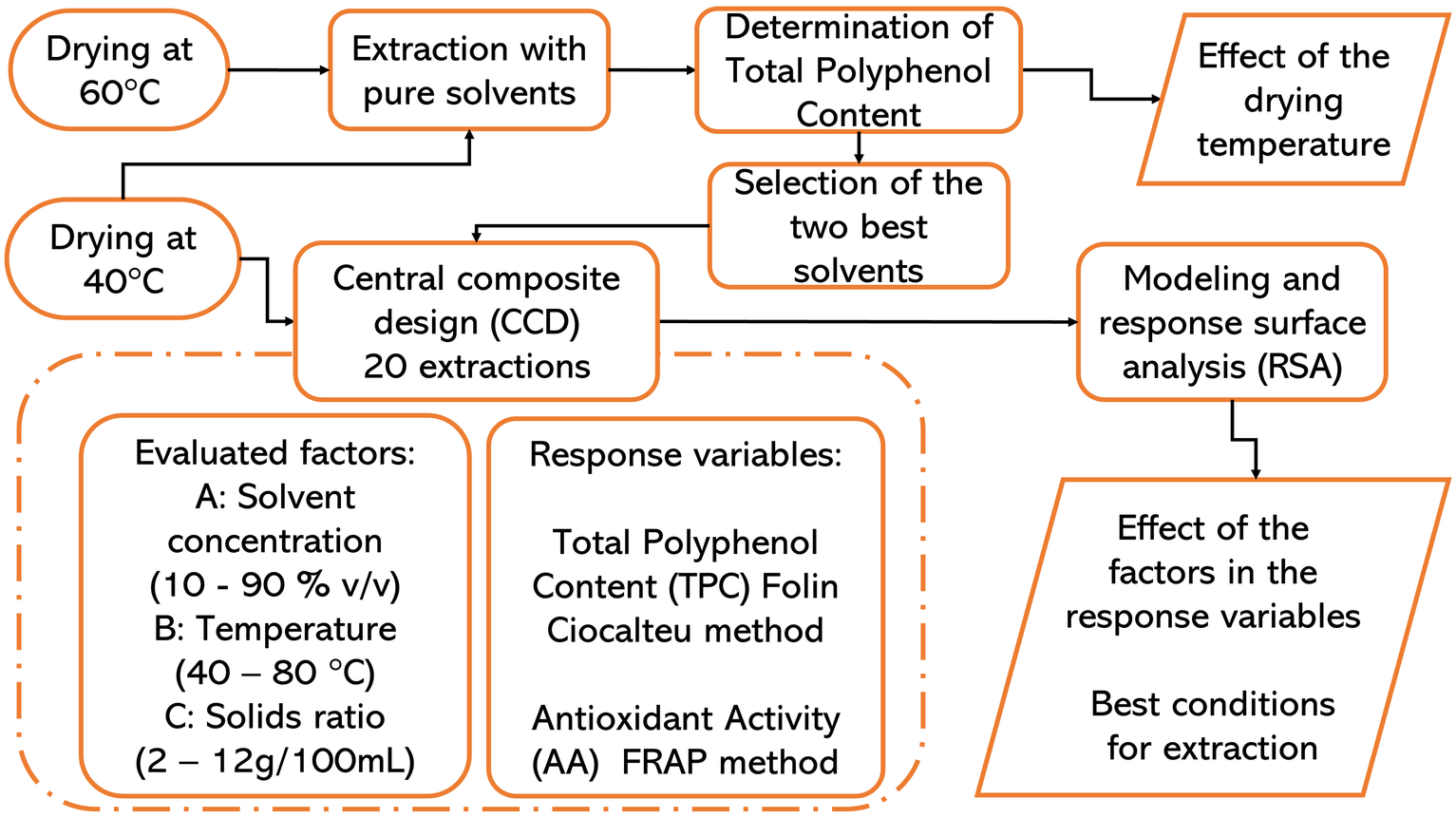
Introduction

- 20 million tons per year of olive pomace are produced as waste in the production of olive oil.
- It contains polyphenols which are contaminants for the soil and water bodies and difficult further valorization techniques.
- Solvent polyphenol extraction was performed as they can be used in food and cosmetic industries and the remaining pomace can be used for further valorization techniques.

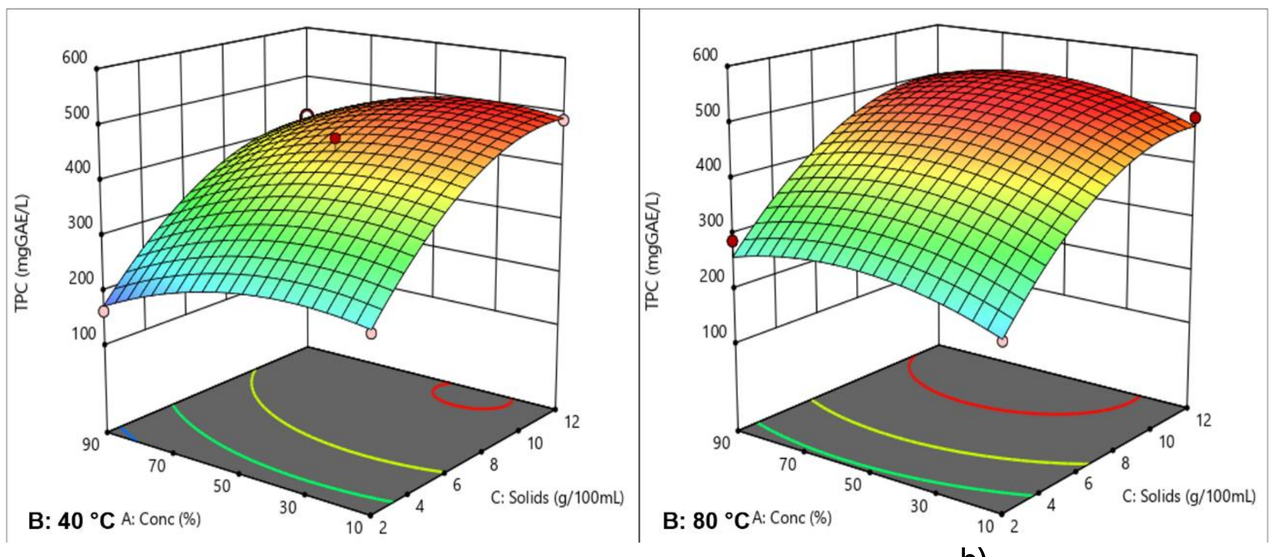
Aim

- To evaluate the effect of different factors on the quality and quantity of polyphenols extracted by solvent extraction from the olive pomace Žutica variety.

Methodology



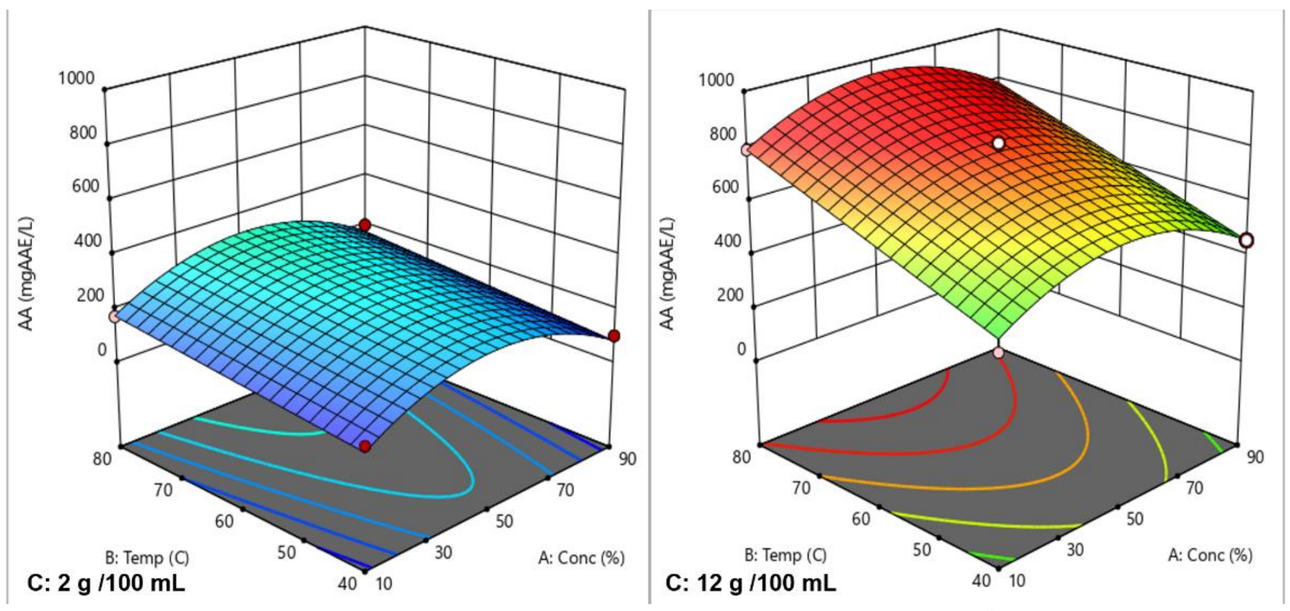
Results & Analysis



a) b)

Fig 1. Response surface modeling for TPC at extreme values of temperature. a) 40°C and b) 80°C.

- Maximum TPC of 503.62 mg of gallic acid equivalent per liter (mg GAE/L) at 50 v/v% ethanol, 60 °C and 12 g/ 100 mL



a) b)

Fig 2. Response surface modeling for AA at the extreme values of solids ratio. a) 2g/100 mL and b) 2g/100 mL

- Maximum AA 815.96 mg of ascorbic acid equivalent per liter (mg AAE/L) at 50 v/v% ethanol, 60 °C and a solids ratio of 12 g/ 100 mL
- Optimization of both response variables: 529.42 mg GAE/L and 946.46 mg AAE/L at 52.7 v/v% ethanol, 80 °C and 12 g pomace/ 100 mL

Key Findings

- Water and ethanol showed better extraction of polyphenols from the olive pomace than isopropanol.
- Changing the drying temperature from 60 °C to 40°C increased three times the TPC in the extracts using ethanol and water as pure solvents.
- All the evaluated factors affected more the AA than the TPC. They produced relative changes between 20-185% for the AA, while the relative change in TPC was in the range of 7-84%.
- Solid ratio was the most relevant factor for both response variables. The model suggest a maximum value for the TPC and a significative interaction of this factor with the solvent concentration for the AA.
- Positive correlation between TPC and AA was founded with a correlation coefficient r=0.984.
- The quality of Žutica olive pomace is similar to other varieties.

References

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