

**Foods  
2021**

# The 2nd International Electronic Conference on Foods Future Foods and Food Technologies for a Sustainable World

15–30 OCTOBER 2021 | ONLINE

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## Recovery of antioxidant compounds from exhausted olive pomace through microwave-assisted extraction



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1. Introduction

2. Objective

3. Raw material

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6. Conclusions

7. Acknowledgments

# 1. Introduction



In Spain, 2.5 million ha of olives are cultivated

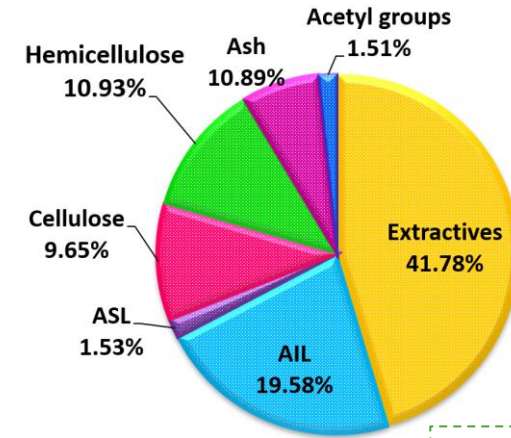


Residue of olive oil industry



1.2 million tons of **exhausted olive pomace (EOP)** are generated every year

Chemical composition



AIL: Acid Insoluble Lignin  
ASL: Acid Soluble Lignin



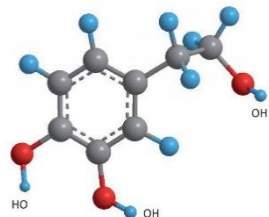
Applications by composition



Bioethanol

Sugars

Structural carbohydrates



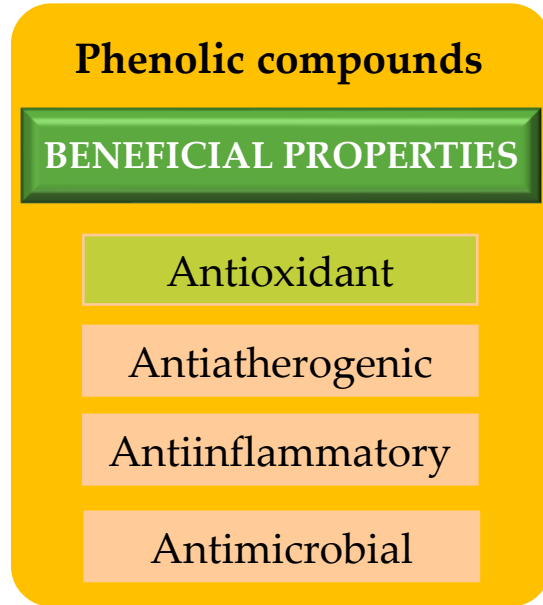
Bioactive compounds

Non-structural components

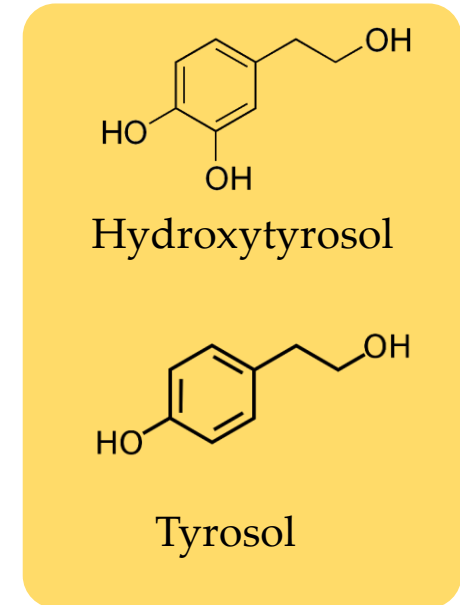
# 1. Introduction



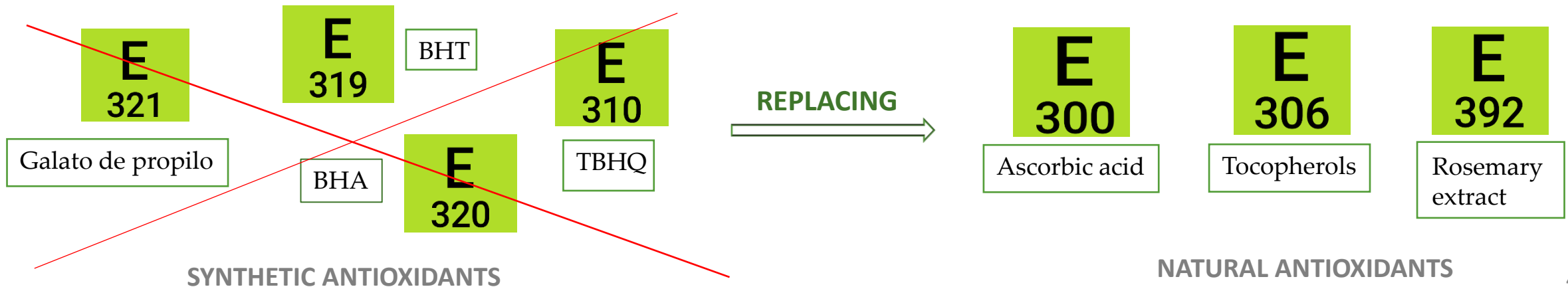
EOP



Main phenolic  
compounds in EOP



★ The food industry is investigating the possibility of replacing synthetic antioxidants with antioxidants of natural origin





## 2. Objective

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The aim of this work was to optimize the extraction of phenolic compounds, mainly hydroxytyrosol, and the antioxidant activity of the extracts obtained from exhausted olive pomace (EOP) by microwave assisted extraction (MAE) using water as solvent.

## 3. Raw material

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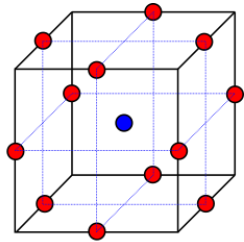
★ Raw material procedence: Olive pomace industry “Spuny SA” (Castellar, Jaén)



# 4. Methods



Box-Behnken design (BBD)



Experimental conditions

17 experiments

Parameters	Conditions
Temperature	40-100 °C
Extraction time	4-40 min
Solid loading	3-15 %, w/v

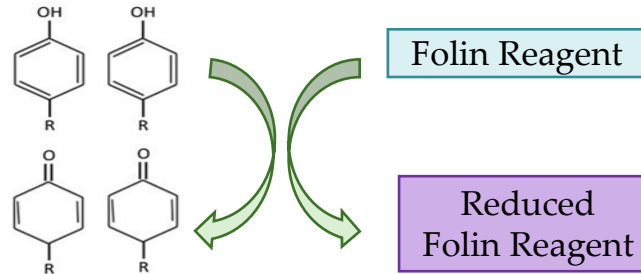


Optimization by response surface methodology (RSM)

Experimental processes



★ Total phenolic content (TPC)

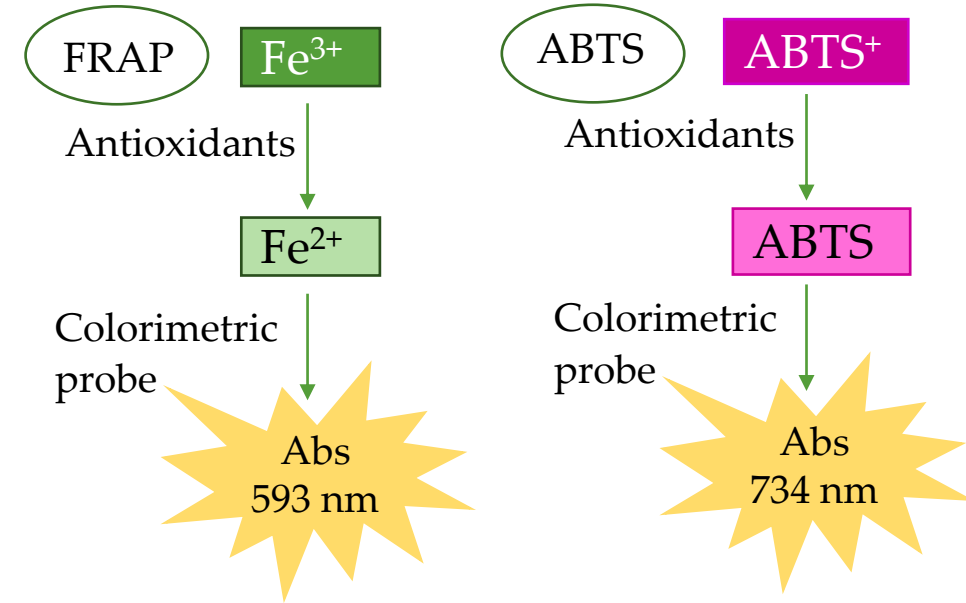


★ Phenolic profile and hydroxytyrosol content



High-performance liquid chromatography (HPLC)

★ Antioxidant activity



## 5. Results

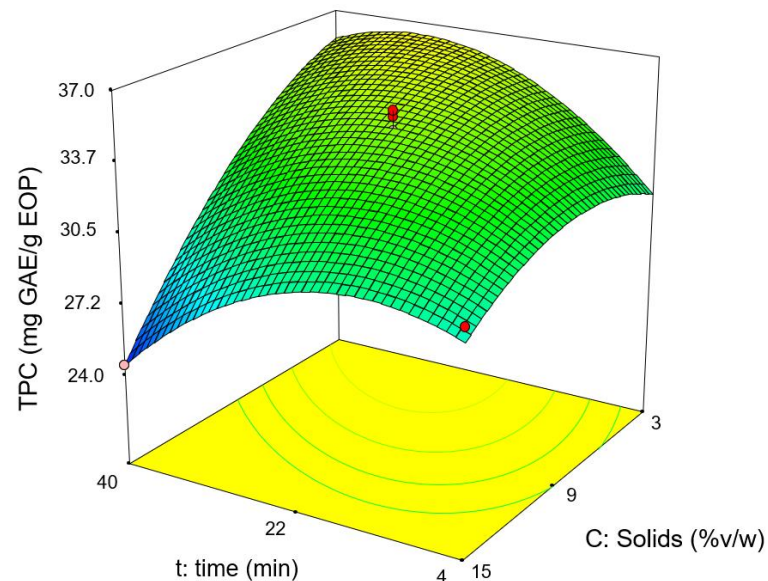
### ★ BBD results

Response	BBD experimental values
TPC	25-41 mg GAE/g EOP
Hydroxytyrosol	4-6 mg/g EOP
FRAP	32-55 mg TE/g EOP
ABTS	25-41 mg GAE/g EOP

GAE: Gallic Acid Equivalent  
TE: Trolox Equivalent

### ★ Response surface methodology (RSM) was employed to evaluate the extraction parameters.

TPC response surface

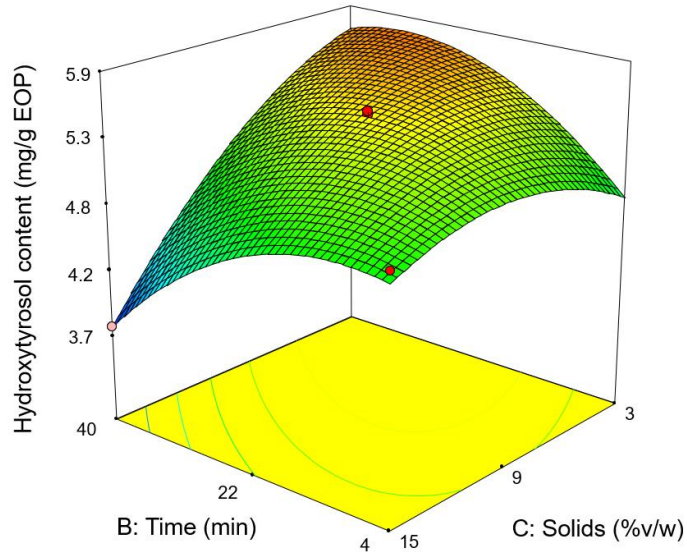


- Extraction time and solid loading have a positive influence until a maximum is reached at which the TPC starts to decrease.
- Temperature affected positively under the conditions tested.

# 5. Results

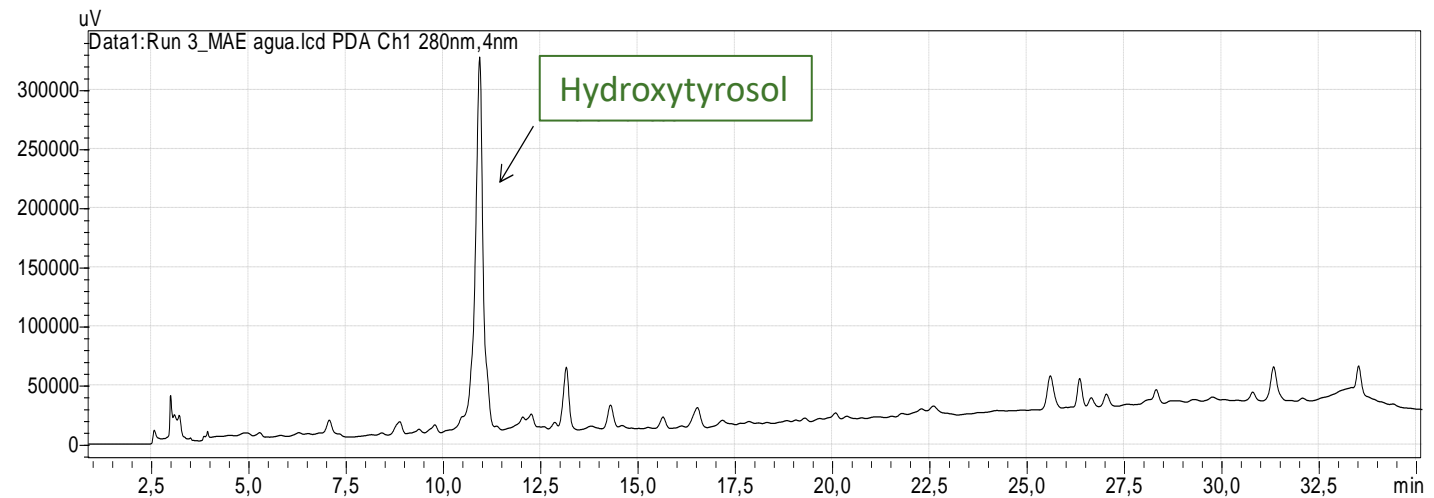


Hydroxytyrosol response surface



- Extraction time and solid loading have a positive influence.
- Hydroxytyrosol content was maximized at 99.7°C, 34.3 min and a solid loading of 3.9% (w/v).

Phenolic profile





## 6. Conclusions

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- ★ **MAE**, using water as a "green" solvent and short extraction times, is an efficient technique for the extraction of hydroxytyrosol from EOP.

## 7. Acknowledgments

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## Thank you for your attention



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