

RECOVERY OF BIOACTIVE COMPOUNDS FROM OLIVE WASTES BY OPTIMIZATION OF THE HEAT-ASSISTED EXTRACTION

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INTRODUCTION

The large quantities of wastes generated by OLIVE OIL INDUSTRY contain a variety of phenolic compounds (hydroxytyrosol and tyrosol, secoiridoids derivatives, phenolic acids and flavonoids) [1] that can be considered recalcitrant for the environment. Nevertheless, these compounds can be a suitable alternative to the use of synthetic antioxidants for the food industry in order to improve the quality of foods.

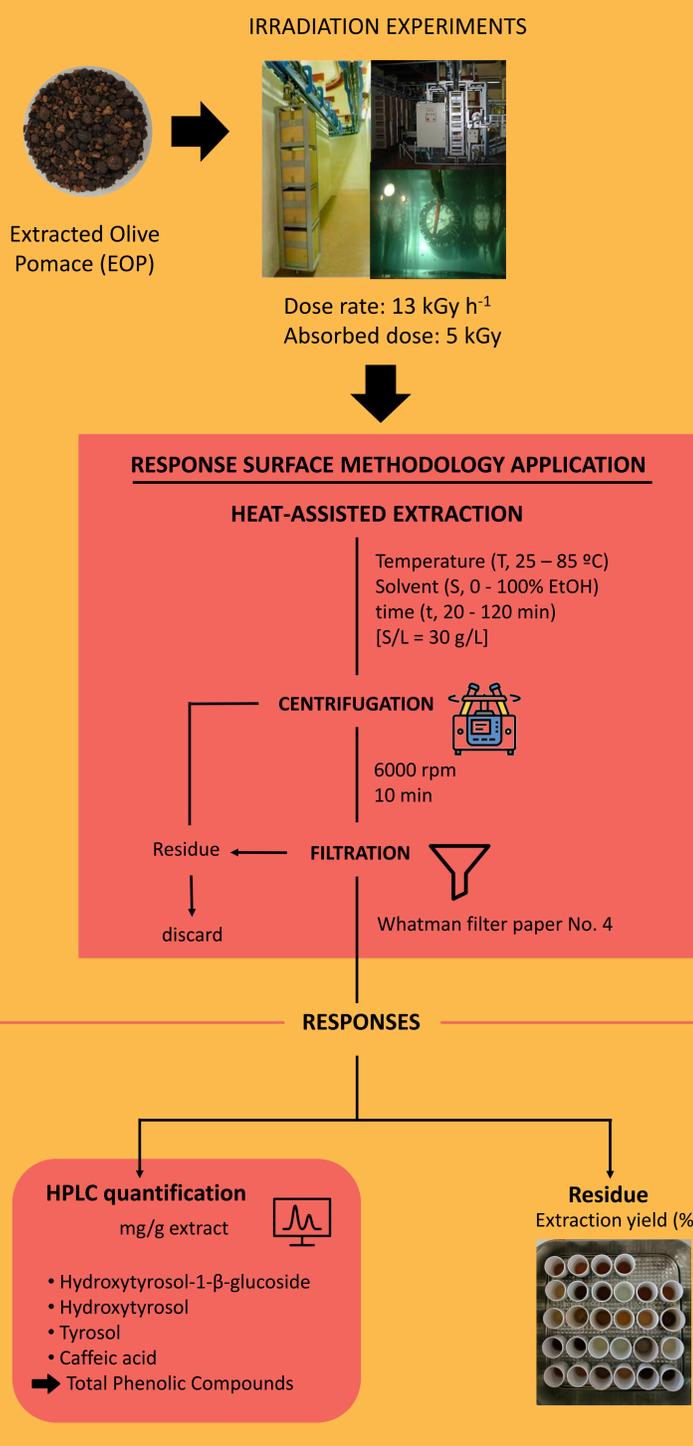
GAMMA RADIATION is a clean and environmental friendly technology which is capable of improving phenolic extraction and antioxidant activity of numerous matrices, such as fresh fruits [2], aromatic and medicinal plants [3] and industrial wastewaters [4]. Our previous studies indicated that ionizing radiation at a dose of 5 kGy could be applied to improve the extractability of phenolic compounds from olive pomace (>2.4 fold compared to non-irradiated samples) [1].



OBJECTIVE

To utilize Heat-Assisted Extraction (HAE) to optimize the phenolic compounds recovery from 5 kGy irradiated olive pomace, using Response Surface Methodology (RSM)

METHODOLOGIES



RESULTS

OPTIMAL CONDITIONS OF HEAT-ASSISTED EXTRACTION PROCESS

Factor	Hyd-1-β-glucoside	Hyd	Tyr	Caf acid	Total Phenolic Compounds	Yield (%)	Global
Time (min)	120	120	120	120	120	66	120
Temperature (°C)	81.19	84.94	84.94	84.87	84.87	84.94	84.94
Solvent (%)	35	100	100	100	100	28	76
Single Opt Value	30.65	127.46	28.23	2.27	174.86	20	
Global Opt Value (mg/g extract)	25.09 ± 2.45	100.77 ± 7.19	21.19 ± 1.61	1.83 ± 0.12	148.88 ± 8.73	13.70 ± 1.90	

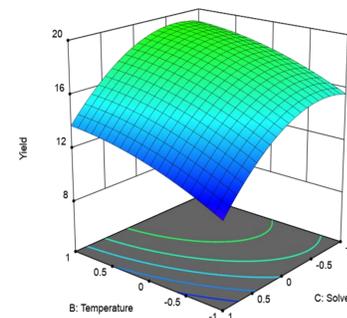
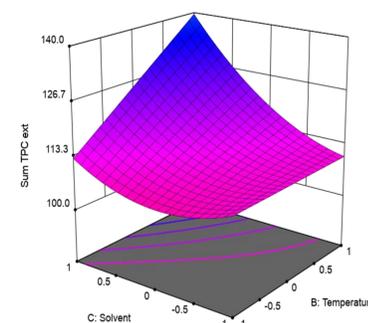
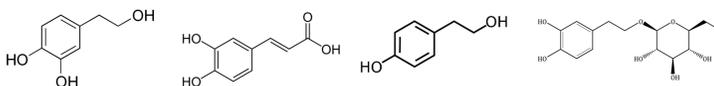
The OPTIMAL CONDITIONS to maximize the responses were:

- t = 120 min
- T = 85 °C
- S = 76 % EtOH

148.88 ± 8.73 mg/g extract

Yield = 13.7%

- Hydroxytyrosol-1-β-glucoside: 25.09 ± 2.45 mg/g ext
- Hydroxytyrosol: 100.77 ± 7.19 mg/g ext
- Tyrosol: 21.19 ± 1.61 mg/g ext
- Caffeic acid: 1.83 ± 0.12 mg/g ext



CONCLUSIONS

- Higher extraction of phenolic compounds at high temperatures (85 °C) and long times (120 min). Recover amount : 148.88 ± 8.73 mg/g extract; Yield = 13.7%
- Olive pomace is an important source of valuable bioactive compounds to produce ingredients that can be used by the food industry.
- Gamma radiation enhances the extraction of phenolic compounds, being a suitable technology for the valorization of olive oil by-products.

REFERENCES

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