



# Natural products application: Health, Cosmetic and Food

Provided by nature, adapted scientifically for industry



**Book of abstracts**  
**1st International Online Conference**  
**4th - 5th February 2021**

## Title

1st Natural products application: Health, Cosmetic and Food: book of abstracts

## Editors

<sup>1</sup>Lillian Barros

<sup>1</sup>Bruno Melgar Castañeda

<sup>1</sup>Carlos Seiti Hurtado Shiraishi

## Suport

Eletronic

## Format

PDF

## Edition

Instituto Politécnico de Bragança (IPB)

<http://www.ipb.pt>

5300-253 Bragança, Portugal

Tel. (+351) 273 303 382

## ISBN

978-972-745-286-6

## URL

<http://hdl.handle.net/10198/22068>



## PCF-57

## RESPONSE SURFACE ANALYSIS OF ULTRASOUND AND DYNAMIC MACERATION EXTRACTIONS OF *ARBUTUS UNEDO*

Nabila Derbassi, Mariana C. Pedrosa, Sandrina Heleno, Márcio Carocho\*, Isabel C.F.R. Ferreira, Lillian Barros

Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, Portugal

\*mcaroch@ipb.pt

The use of natural plant extracts in the food industry has been common practice for many decades, but, due to the pursuit of healthier diets by consumers, has gained a new momentum, in which natural food additives, namely preservatives have been extracted from plants. The most prominent example is the use of rosemary extract (E392) as a food preservative throughout the European Union, paving the way for new extracts to be used for the same purpose, possibly with better results. In this work, the extraction of leafy parts of *Arbutus unedo* L. is described both through ultrasound assisted extraction (UAE) and dynamic maceration (DM), following an optimization through Response Surface Methodology (RSM) to optimize the extraction yield. For the DM the factors analyzed were (F1) “Time” which varied between 10 and 60 minutes, (F2) “Temperature” which varied between 30 and 80 °C, and finally (F3) “Solvent” (ethanol) which varied between 0 and 100%. For the UAE, the factors were also (F3) “Solvent” and (F1) “Time”, and although the variation in solvent was the same, the time of extraction only varied between 5 and 30 minutes. Finally, the third factor was ultrasonic (F2) “Power” of the equipment that varied between 50 and 500 watts. The analyzed response for both extractions were the dry residue (Y1) which varied between 3 and 65.3 mg for UAE and 10.4 and 99.9 mg for DM. The RSM analysis rendered a quadratic model with an inverse transformation for DM, and a reduced quadratic model with no transformation for UAE. To optimize the yield of dry residue (Y1), optimization studies were performed and indicated the optimal points at which a higher yield of dry residue can be obtained, and were F1 – 57 minutes, F2 – 46 °C and F3 – 52% of ethanol for the DM extraction. For UAE, the optimal points for the same Y1 response were F1 – 17 minutes, F2 – 380 watts and F3 – 39% of ethanol. In **Figure 1**, it is clear that for DM a longer time of extraction favors the residue yield, as well as a temperature near 60 °C, while for the UAE, time did not seem such an important factor, while the power of the ultrasonic probe was quite important. Overall, due to the lower amount of ethanol needed and the lower extraction time, UAE seems to be the best extraction technique to maximize the yield of dry residue of *A. unedo*, although in terms of mass, DM yielded 99 mg while UAE only 65.3mg. Other responses are currently being studied to determine the best overall extraction technique.

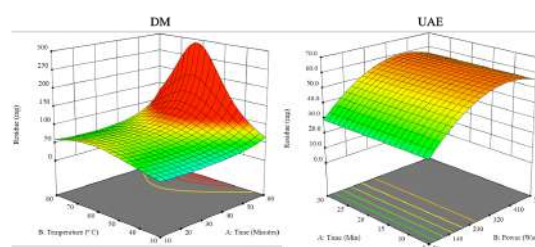


Figure1. Graphical representation of the optimal points for UAE and DM extractions of *A. unedo*

### Acknowledgments

The authors are grateful to the Foundation for Science and Technology (FCT, Portugal) for financial support through national funds FCT/MCTES to CIMO (UIDB/00690/2020). L. Barros thanks FCT – Foundation through the institutional scientific employment program-contract for her contract, while M. Carocho and S. Heleno thank FCT through the individual scientific employment program-contracts (CEECIND/00831/2018 and CEECIND/03040/2017); to FEDER-Interreg España-Portugal program for financial support through the project TRANSCoLAB 0612\_TRANS\_CO\_LAB\_2\_P, BIOMA (POCI\_01\_0247\_FEDER\_046112) and Green Health (Norte-01-0145-FEDER-000042). This work has been supported by the Ministry of Education, Science and Technological Development of Republic of Serbia (451-03-68/2020-14/200007).