

EMEC 1 ∞

CHEMISTRY TOWARDS AN INFINITE ENVIRONMENT

18th European Meeting on Environmental Chemistry

Porto 26-29th November 2017

BOOK OF ABSTRACTS



Venue – Fundação Dr. António Cupertino de Miranda

Avenida da Boavista, 4245, 4150 – 639 Porto; GPS: N 41°9'54" | W 8° 40' 19"

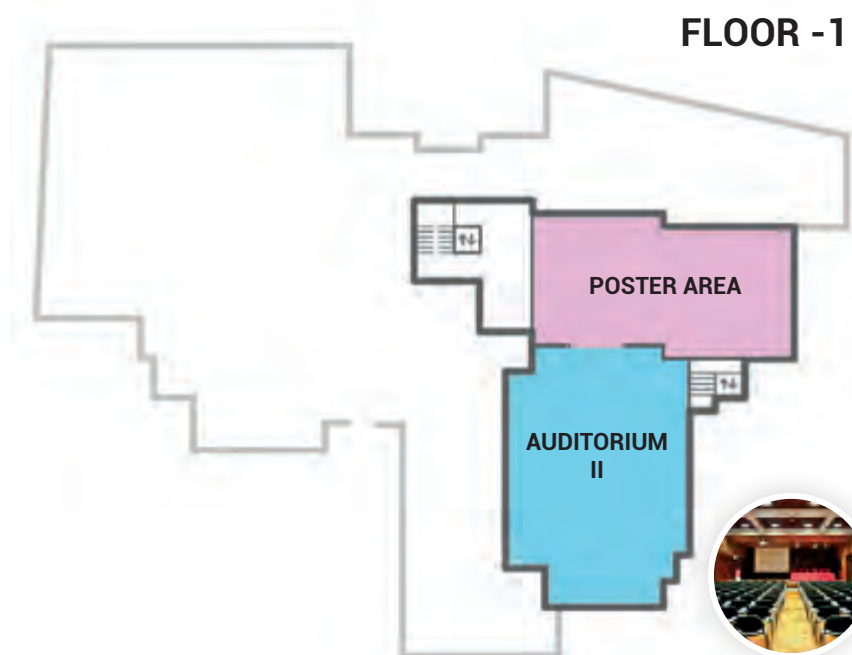
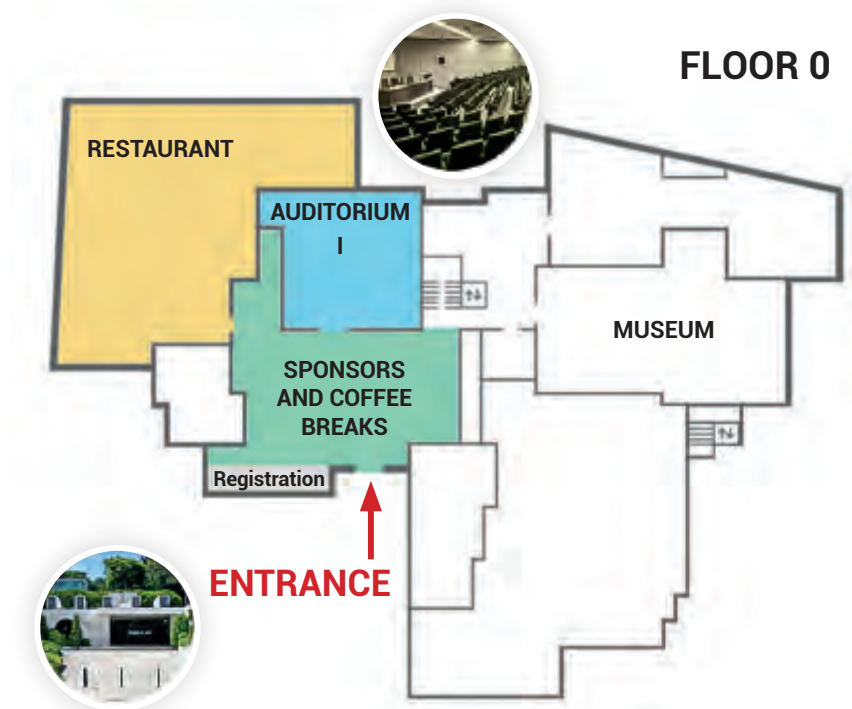


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Titulo

Book of Abstracts of the 18th European Meeting on Environmental Chemistry - EMEC18:
Chemistry Towards an Infinite Environment

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ISBN. 978-972-752-228-6

ISBN: 978-972-752-228-6



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LEPABE Laboratory of Process Engineering, Environment, Biotechnology and Energy
LSRE-LCM Laboratory of Separation and Reaction Engineering - Laboratory of Catalysis and Materials
CEFT Transport Phenomena Research Center

are Research Units at the Department of Chemical Engineering,
Faculdade de Engenharia da Universidade do Porto (FEUP).

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Electrochemical Taste Sensor for Unmasking Extra-Virgin Olive Oils Adulterated with Rancid or Winey-Vinegary Olive Oils

PP AgroFood #20

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Olive oils may be commercially classified, in a decrease order of quality and economic value, as extra-virgin (EVOO), virgin (VOO) or lampante (LOO) olive oils, being quite prone to frauds. Thus legal protection regulations have been approved by the European Union Commission [1,2], being required the fulfilment of several physicochemical and sensory thresholds [3,4]. Unfortunately, the mixture of expensive olive oils with low quality oils aiming fraudulent economic revenue is still a common practice difficult to detect.

In this work, a potentiometric electronic tongue (E-tongue) was used to detect adulteration of an EVOO with different added levels (2.5%, 5%, 10%, 20% and 40%; v/v) of an LOO with an intense sensory defect (rancid or winey-vinegary). Previously, similar electrochemical devices, also comprising lipid polymeric sensor membranes, showed to be able to give qualitative and/or quantitative responses towards basic taste sensations (acid, bitter, salty, sweet, and umami), positive sensory attributes (bitter, fruity, green and pungency) or defects (e.g., butyric, musty, putrid, winey-vinegary and zapateria) [5-8]. The E-tongue coupled with linear discriminant technique (based on the signal profiles of 19 or 20 E-tongue sensors, chosen using a simulated annealing meta-heuristic variable selection algorithm, for rancid and winey-vinegary adulterations, respectively) allowed to semi-quantitatively distinguish olive oils with

different adulteration levels (repeated K-fold cross-validation predictive correct classifications of $84\pm 10\%$ and $94\pm 8\%$ for rancid and winey-vinegary adulterations, respectively). The preliminary results showed the practical potential of the E-tongue as a taste device for the successful detection of EVOOs adulterated with LOO containing organoleptic defects.

Acknowledgements

This work was financially supported by POCI-01-0145-FEDER-006984–Associate Laboratory LSRE-LCM, Project UID/QUI/00616/2013–CQ-VR, Project UID/BIO/04469/2013–CEB and Project UID/AGR/00690/2013–CIMO all funded by FEDER, through COMPETE2020, and by national funds through Nuno Rodrigues thanks FCT, POPH-QREN and FSE for the Ph.D. Grant (SFRH/BD/104038/2014).

References

- [1] EU No 61/2011, *Official Journal of the European Commission*, 23 (2011) 1.
- [2] EU No 1348/2013, *Official Journal of the European Commission*, 338 (2013) 31.
- [3] E. Borràs, J. Ferré, R. Boqué, M. Mestres, L. Aceña, A. Calvo, O. Busto, *Talanta*, 155 (2016) 116.
- [4] M.G. Di Serio, L. Giansante, G. Di Loreto, A. Faberi, L. Ricchetti, L. Di Giacinto, *Food Chemistry*, 219 (2017) 33.
- [5] A.C.A. Veloso, L.G. Dias, N. Rodrigues, J.A. Pereira, A.M. Peres, *Talanta*, 146 (2016) 585.
- [6] Í. Marx, N. Rodrigues, L.G. Dias, A.C.A. Veloso, J.A. Pereira, D.A. Drunkler, A.M. Peres, *Talanta*, 162 (2017) 98.
- [7] Í.M.G. Marx, N. Rodrigues, L.G. Dias, A.C.A. Veloso, J.A. Pereira, D.A. Drunkler, A.M. Peres, *LWT-Food Science and Technology*, 79 (2017) 394.
- [8] S. Slim, N. Rodrigues, L.G. Dias, A.C.A. Veloso, J.A. Pereira, S. Oueslati, A.M. Peres, *European Food Research and Technology*, (2017) DOI: 10.1007/s00217-017-2856-8.