



28° SILAE Congress
16th-20th of September, 2019

La Habana, Cuba

ABSTRACTS BOOK



ISSN: 1827-8620

PhOL 2019 - Supplementary Issue - vol. 1, December 30, 2019

Edited by

Maria D'Elia, Serena Rizzo, Luca Rastrelli

abstracts@silae.it, habana2019@silae.it

SILAE

  **PharmacologyOnLine**

Journal of SILAE - Società Italo-LatinoAmericana di Etnomedicina Cibo
e Salute



ISSN: 1827-8620



Craft beer aging fingerprint by using e-tongue

Di Sanzo, R.¹, Carabetta, S.¹, Campone L.¹, Fuda, G.^{1,2}; Crea, G.¹; Russo, Mt.^{1*}

¹*Food Chemistry, Safety and Sensoromic Laboratory (FoCuSS Lab), University of Reggio Calabria, Via dell'Università, 25,*

89124 Reggio Calabria, Italy

²*Wild Orage srl, Vibo valentia, Calabria Italy*

*[*mariateresa.russo@unirc.it](mailto:mariateresa.russo@unirc.it)*

Introduction

With the increasing consume and export of beer, shelf-life problems have become a very important issue for most breweries. Beer, and above all craft beer, is an unstable beverage and during its shelf-life a series of chemical, physical and sensorial transformations occur. Beer aging is a complex phenomenon characterized by a number of complex reactions involving proteins, carbohydrates, polyphenols, metal ions, oxygen, thiols, carbonyls. The extent of these reactions depends on the production process, storage conditions and interaction of pathways. Even if compounds with antioxidant properties such as reducing sugars, Maillard reaction products, vitamins and above all polyphenolic compounds, important antioxidants with mechanisms involving both free radical scavenging and metal chelation, are present in beer, all these compound have a negligible effect on the oxidative stability of beer during storage and, then quality of beer decreases and production of undesirable flavors occur. Furthermore, several studies show that self-oxidation, including the decomposition of iso-a-acids, plays an important role in deterioration of the flavour and aromatic qualities of beer during aging. In particular, the loss of the bitterness of beer may be due to the degradation of iso-a-acids, in particular to the instability of trans-iso-acids.

The aim of this preliminary study was to explore the potential of using potentiometric electronic tongue as a tool for evaluating craft beer shelf-life based on the analysis of taste profile modifications.

Method

The e-tongue analysis were performed with the α -Astree electronic tongue (Alpha MOS company), that consisted of seven different liquid cross-selective potentiometric sensors (JB, BA, BB, HA, ZZ, CA and GA) (Alpha M.O.S.), an Ag/AgCl reference electrode (Metrohm, Ltd). The sensors used are chemically sensitive field-effect transistors (chemFET). Also, the chemical-physical parameters (color, pH, bitterness) were determined. Two different types of craft beers have been studied: blonde red. All the obtained data were analyzed individually and then a data fusion was carried out.

Conclusion



An E-tongue system based on potentiometric chemical sensors was assessed as a rapid tool for studying blond and red craft beer shelf-life. Statistical technique SQC was run on the data matrix of e-tongue sensors response and the results showed that in a few months of storage blonde beers present substantial changes in the taste profile while changes red beers occur in a longer time, after the expiry date shown in label.

For the validation of the developed e-tongue test, specific chemical-physical analyzes were conducted. The changes detected over time in the chemical-physical parameters of the two types of craft beers confirm the potential use of the electronic tongue combined with a robust statistical elaborations as a tool for monitoring craft beer shelf life.

Acknowledgement: This work was financially supported by EU and Italian Ministry of Research - PNR 2015/2020(D.D. 1735 del 13.07.2017) Project ARS01_00582 *e-Brewery* and by Research Infrastructure Saf@med - Food Safety platform (PONA3_00016).

We also thank Wild orange srl

Bibliographic References

Ciosek P., Wróblewski W., 2007. Sensor arrays for liquid sensing - electronic tongue systems. *Analyst*, 132 (10), pp. 963–978

Rudnitskaya A. et al., 2009. Instrumental measurement of beer taste attributes using an electronic tongue. *Analytica Chimica Acta*, 646, pp. 111-118