

THE SECOND NORTH AND EAST EUROPEAN CONGRESS ON FOOD

# NEEFood - 2013 Kyiv

May 26-29, 2013

Organized by:



National University  
of Food Technologies

and



Association  
«Higher Educational Institutions and  
Enterprises of Food Industry  
UkrUFoST»

## BOOK OF ABSTRACTS

In cooperation with:



NUFT, Kyiv, Ukraine

UDC 664

**The Second** North and East European Congress on Food (NEEFood-2013): Book of Abstracts. — 26-29 May 2013. — K.: NUFT, 2013. — 267 p.

ISBN 978-966-612-141-0

Collection of abstracts by leading scientists, specialists and young researchers in the field of food science, technology, chemistry, economics and management presented to the Congress

The congress addressed the following topics:  
Food expertise and safety

Novel Systems for Food Chain  
Natural Bioactive Compounds, Functional and Traditional Food Products  
Global challenges and competitiveness

Recommended for teaching staff, engineering and technological personnel, managers of food industry

**Published in authors' edition**

*Recommended by the Academic Council of National University of Food Technologies*

*Minutes № 9, 24.04.2013*

ISBN 978-966-612-141-0

UDK 664

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УДК 664

**Другий** північно- та східно-європейський конгрес з харчової науки (NEEFood-2013): Збірник тез доповідей. — 26-29 травня 2013 р. — К.: НУХТ, 2013. — 267 с.

ISBN 978-966-612-141-0

Видання містить тези доповідей провідних вчених, спеціалістів та молодих науковців у галузі харчової науки, техніки, технології, хімії та економіки і управління - учасників Другого північно- та східно-європейського конгресу з харчової науки (NEEFood-2013).

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**Видано в авторській редакції**

*Рекомендовано Вченою радою Національного університету харчових технологій*

*Протокол № 9 від 24.04.2013 р.*

ISBN 978-966-612-141-0

УДК 664

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### EXPRESS METHOD OF FOOD PRODUCTS ANALYSIS USING ELECTRONIC NOSE

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Due to the distribution of low quality products, adulteration, counterfeit on the Ukrainian market, the widening of export-import supplies, it is too important to develop criteria and methods for the identification domestic and exported food products, detection of adulteration, techniques and methods assessing quality and early spoilage screening of food products using modern express methods of analysis.

Such method is an electronic nose system based on chemical sensors, for example, piezoelectric quartz microweighing, combined with complex computer algorithms registration, processing and decision making («artificial intelligence»).

Odor is one of the most significant parameters among the sensory properties of foods. The representative flavor of volatile compounds, so-called fingerprint, may provide knowledge about safety and particular characteristic of food, acting sometimes as an indicator of process mistake as well. Off-flavors may include substances originating from the metabolism of spoilage microorganisms, bacteria and fungi; which may naturally or accidentally contaminate the products during their production.

Electronic noses (EN) are instruments based on an array of semi low selective sensors that are selected on the chemical affinity to individual components of the analyzed gas mix and vapors and pattern recognition methods. ENs have been applied in various food contexts such as process monitoring, freshness evaluation, shelf-life investigation, authenticity determination, and product traceability.

The object of our research is express methods development of identification, estimation of quality and early spoilage screening of dairy and meat products using multisensory electronic nose system based on piezosensors.

The absolute advantages of electronic sensory analyzers are their versatility, portability, ability to automate measurements and interpretation of signals, reproducibility of results.

**KEY WORDS:** analysis, electronic nose, quality, safety, identification

### APPLICATION OF GAMMA AND ELECTRON BEAM IRRADIATION FOR CHESTNUTS CONSERVATION

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The Trás-os-Montes region of Portugal is responsible for 85% of the nation's chestnut production, representing an income of more than 20 M€. Since the EU legislation banned methyl bromide from being used as a fumigant, from March 2010, that alternative treatments have been pursued to overcome the limitations of conventional ones. Gamma and electron beam irradiation have been used as conservation alternatives in various food stuffs including chestnuts, with satisfactory results. Our research group has successfully tested gamma and electron beam irradiations (doses of 0; 0,5; 1; 3; and 6 kGy) and different storage times (0, 30 and 60 days) on chestnuts in the past 2 years. We have assessed the effects on antioxidant and nutritional parameters as well as on organic acids and triacylglycerol profiles. Regarding the nutritional impact of both irradiations we concluded that storage time plays a more significant role on nutritional degradation when compared to the irradiation treatment. Total phenolics were preserved in irradiated samples especially for 1 and 3 kGy doses. The effect of electron beam radiation on organic acids was very slight and, once again, storage time had higher influence on the amounts of specific compounds. Nevertheless, the highest doses of electron beam radiation caused significant differences on triacylglycerol profile when compared with lower doses and non-irradiated samples. Overall, irradiation might be a suitable technique for post-harvest chestnuts preservation.

#### Acknowledgements

Financial support of ON.2/QREN/EU Project no.13198/2010, Fundação para a Ciência e a Tecnologia (FCT, Portugal) and COMPETE/QREN/EU (CIMO strategic project PESt-OE/AGR/UI0690/2011). A.L. Antonio, L. Barros and J.C.M. Barreira also thank to FCT, POPH-QREN and FSE for their grants (SFRH/PROTEC/67398/2010, SFRH/BPD/4609/2008 and SFRH/BPD/72802/2010, respectively).

**KEY WORDS:** chestnuts, conservation, food irradiation, gamma, electron beam