

**Preliminary communication**

**JRU METROFOOD-MK AS A PART OF THE EUROPEAN RESEARCH INFRASTRUCTURE FOR PROMOTING METROLOGY IN FOOD AND NUTRITION**

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**ABSTRACT**

The METROFOOD-RI is European research infrastructure for promoting metrology in food and nutrition. This infrastructure is aimed to promote scientific excellence in the field of food quality and safety. JRU METROFOOD-MK is Joint Research Unit i.e. Macedonian Node which belongs to METROFOOD-MK infrastructure and consisted of two institutions, Institute of Public Health (IJZRSM) and Faculty of Agricultural Sciences and Food - Skopje (FASF). The METROFOOD-RI includes physical infrastructure (P-RI) and electronic infrastructure (*e*-RI). The P-RI covers facilities for realization of different analyses related to food quality and safety such as: contaminants and ecotoxicology, food quality control, trace elements analysis, chemical analysis of primary agricultural and processed products. The *e*-RI represents a state of the art web platform enabling sharing and integrating information and data on availability of metrological tools for food analysis. METROFOOD-RI will be of great scientific importance for following user categories: researchers, policy makers, food inspection and control experts and organizations, food business operators and citizens.

**INTRODUCTION**

METROFOOD-RI is Infrastructure for Promoting Metrology in Food and Nutrition which is going to be built on a Hub and Node model constituted by a Central Hub in Italy and networked with 18 countries. The Macedonian Node as a part of this Infrastructure comprises of two institutions: Institute of Public Health (IJZRSM) and Faculty of Agricultural Sciences and Food - Skopje (FASF), recognized as Joint Research Unit (JRU) - METROFOOD-MK. METROFOOD-RI aimed to promote scientific excellence in the field of food quality and safety. The Infrastructure includes both physical (P-RI) and electronic (*e*-RI) infrastructure. Concerning the P-RI, the facilities include plants and laboratories for Reference Materials (RMs), analytical laboratories, experimental fields/farms for food production, facilities for food processing, storage and preparation. The following activities are planned to be performed: characterization of new RMs, organization and management of interlaboratory tests, development and validation of new analytical methods and devices. Regarding the agri-food sector in particular, the identification of chemical and biological markers of origin, food quality and safety, the conduction of experimental studies for evaluating nutritional value and contaminant contents of food produced in different geographic regions, the evaluation of exposure through diet and risks related to the application of new technologies in food production and packaging giving emphasis to nanotechnologies are planned to be performed as well. The existing capacities of the IJZRSM and FASF are going to be particularly exploited in terms of characterization of RMs and performing analysis of food quality and safety.

## JRU METROFOOD-MK

The main focus of the Joint Research Unit METROFOOD-MK is going to be characterization of Reference Materials and food quality and safety analysis. During the METROFOOD project preparatory phase, funded by the European Union's Horizon 2020 research and innovation programme, under grant agreement 871083, the necessary facilities for implementing the METROFOOD-RI were determined. In this context, JRU METROFOOD-MK as a national research unit, is going to be utilised the facilities for analyses of Contaminants and Ecotoxicology, Food Quality Control, Trace Elements Analysis, belonging to the Institute of Public Health as well as the facilities for carrying out chemical analysis of primary agricultural and processed products, as capacities provided by the Faculty of Agricultural Sciences and Food - Skopje. Furthermore, the Department for Contaminants and Ecotoxicology is going to be contributed to the infrastructure by providing Gas Chromatograph with different kind of detectors (Mass Spectrometry (MS), (Nitrogen-Phosphorus Detector (NPD), Electron Capture Detector (ECD), Flame-ionization detector (FID)), while the Department for food quality control with the Liquid chromatograph equipped with different detectors (Diode-array detector (DAD), Ultraviolet/Visible (UV/VIS), Refractive index (RI)), Gas Chromatography with Flame-ionization detection (GC-FID) and Spectrophotometer. The trace elements analysis is going to be performed on Graphite furnace atomic absorption spectroscopy (GFAAS), Flame Atomic Absorption spectroscopy (FAAS), Cold vapor (flow injection mercury system) with the previous microwave digestion. Additionally, determination of biological and morphological characteristics, as well as yield components will be implemented by FASF on experimental field and greenhouse trials, representing the agri-food sector. Some of the research capacities employed for the METROFOOD-RI purposes are presented in Figures 1 and 2.

All provided services are in compliance with the quality standards and in accordance with the Food Safety and Consumer Protection act as determined with European Union and the national legal frameworks. Regarding the food safety analyses, the METROFOOD-MK team is going to provide services for determination of pesticide residues, mycotoxins, trace elements, allergens and additives. Furthermore, the food quality analyses are going to be refer to nutritional value, physico-chemical analysis, bioactive compounds and adulteration. Additionally, vitamins, carbohydrates, fatty acids, proteins, water, minerals and others components are going to be analyzed as important nutrition parameters.



Figure 1. METROFOOD-MK equipment



Figure 2. Greenhouse Trials

The *e*-RI will provide a new useful and free access web platform for sharing and integrating information and data on availability of metrological tools for food analysis. This infrastructure will integrate the existing food databases, focusing on emerging needs and collection of data on food composition, nutritional contents and levels of contaminants in food produced in different geographic regions and by applying different technologies. The *e*-RI will enable data sharing regarding the RMs, official and reference methods, reference laboratories, vocabularies, guidelines and procedures, proficiency testing providers, food contaminants and composition in relation to production conditions and technologies. Through this platform it will be possible to find out in a single web-site starting from the analyte (measurand) and the matrix all the available information and data for standardization and harmonization of food analyses (reference materials, official methods, reference values, reference laboratories, proficiency testing providers, quality assurance strategies). Additionally, this electronic tool will enable dissemination of information and training on appropriate terminology, metrological tools, principles, and procedure on one side, but also different countries needs assessment in context of metrology for food and nutrition, and collection data on food composition, nutritional contents and levels of contaminants and emerging concerns in food produced in different geographic areas.

### **What is the product of METROFOOD-RI?**

The primary product of METROFOOD-RI will be an array of food metrology services.

Four user categories has been identified and they are:

1. Researchers.
2. Policy makers, food inspection and control experts and organizations.
3. Food business operators.
4. Citizens.

The METROFOOD-RI has great scientific importance and exceptionally contributes to the research society. The use of top equipment will enable better working conditions. An important aspect is the enhancement of an interdisciplinary research due to the integration of different disciplines (chemistry, biology, microbiology, agriculture and economics) and promotion of science by its dissemination activities, and integration with the international professional and leading institutions in Europe. For the Industry, METROFOOD-RI will supplement the research and development capabilities of the industrial partners, for instance cheaper

production of crop and livestock inputs for producing new agricultural products. The domestic producers will be able to obtain information on the food products origin and their quality and safety. It will enhance scientific excellence in the field of food quality and safety, thus enabling an increase in opportunities for market analyses to be carried out by the laboratories. The development of new methodology for food analysis will reduce the costs of monitoring and thereby increase the possibilities for the control of food quality. The enforcement of the Metrological Infrastructure and the improvement of the quality of chemical measurements will significantly benefit the Society in a whole, and the economy, in particular. Specifically, for the Citizens as final consumers, the food traceability system, enabling tracking the food from producer to the final consumer will be developed, but also the monitoring of environmental conditions, and the system for determining the food geographical origin will provide a comprehensive system that will fulfil the citizens' expectations and needs.

More detailed information is available on the following links:

[www.metrofood.eu](http://www.metrofood.eu)

www.metrofood.mk

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