

**AGENDA POINT 4**

**Advanced solutions for assuring the overall authenticity**

**and quality of olive oil**

**OLEUM Databank**

**Introduction**

The European Union is the first producer, exporter and consumer of olive oil in the world. However, due to its high economic value compared to other food products, olive oil is considered at high risk of non-compliances and fraud. The EU framework for conformity checks effectively contributed to improve the quality of the products on the market and to reduce the prevalence of fraudulent practices. Those are among the key findings of the ‘Study on the implementation of conformity checks in the olive oil sector throughout the EU’ (Areté, 2019)[[1]](#footnote-1).

However, the study also highlights gaps and problems in the current conformity check system. Among those, the most prominent technical issue across the Member States concerns the organisation and the performance of organoleptic assessment on extra virgin and virgin olive oils. Moreover according to the study, the most common infringements are the marketing of virgin olive oil as extra virgin olive oil, or the marketing as “olive oils” of blends of other vegetable oils (sunflower, corn, palm, rapeseed, etc.) with olive oil.

The combination of increasing competiveness, expanding markets, significant markets in non-olive oil producing countries and a lack of a centralised databank of validated methods to reliably detect specific fraudulent practises has led to significant weaknesses that can be exploited by counterfeiters.

In this context, a EU-funded research project “OLEUM” has been initiated in September 2016 under Horizon2020, for four years.

**Aims and Objectives**

The overall objective of OLEUM is to better guarantee olive oil quality and authenticity empowering the detection and fostering the prevention of olive oil fraud. This comprehensive objective is composed by three strategic purposes which can be summarized as follow:

* Develop new/improved methods for assuring the quality and authenticity of olive oils.
* Realize an integrated quality assurance infrastructure for analytical methods (e.g. reference materials, downloadable library of analytical methods and compositions) collected in an OLEUM databank.
* Build up and support a worldwide community of analytical laboratories and other stakeholders involved in the analysis of olive oil.

With this aim the consortium has identified four main gap levels that need to be addressed through research and development in the olive oil sector: i) Legislative and regulatory; ii) Analytical; iii) Harmonisation and coordination; and iv) Consumer and market confidence.

**OLEUM Databank**

A web access platform (Databank) was built to store i) the information generated by the OLEUM consortium as well as ii) the validated data of some analytical methods that demonstrated their fit-of-purpose to ensure the quality and authenticity of olive oils. The data resulting from the selected analytical methods are managed within a database that allows to gather, query, retrieve and export the data in a standard format, which is lacking among laboratories in charge of the conformity checks of oils in the European Community.

The database is able to store large amounts of data, annotate and analyse them from different domains and technical platforms and finally to export them in an appropriate format to specific statistical packages for their analyses and interpretation.

Respecting the data FAIR principles[[2]](#footnote-2), the consortium put efforts in selecting appropriate metadata in order to ensure the re-use of experimental results that will be stored in the database. Given the vast array of parameters that can be recorded as metadata, a common format of recording names reporting values or "Minimum Information for Reporting” has been implemented. The databank system can be used by a registered partner to upload raw data and organize metadata. The user-friendly interface is organized into six different sections, 1) Manage Roles, 2) Grant Permissions, 3) Manage Samples, 4) Manage Techniques, 5) Manage Analysis, and 6) Search. In order to avoid that a user has to type several times the same information, the "Manage Samples" section provides an export functionality to create reporting templates including metadata of samples and techniques and an import functionality to read-in sample information.

The current version of the Database is able to store data of seven analytical methods validated or under a validation process, which are:

* A method (SPME/GC-FID and SPME-GC-MS) based on the quantification of 18 volatile markers, selected within the OLEUM project as relevant with respect to the most common defects and the fruitiness. These markers could potentially represent per se, when limits and ranges will be established, quality parameters for virgin olive oils, as well as being useful when disputes concerning the sensory characteristics occurs.
* An UHPLC-DAD procedure quantifying hydroxytyrosol and its derivatives (e.g. oleuropein complex and tyrosol) in the olive oil polar fraction fit-for-purpose of the olive oil health-claim introduced by the European Commission (EC) Regulation No 432/2012 addressing olive oil quality issues and aiming to increase consumer’s confidence on olive oil health properties. Now no official method is available to check conformity of an olive oil with the particular health claim.
* SPE/GC-FID to evaluate the content of fatty acid ethyl esters which permit to define whether a certain olive oil can be classified as extra virgin or not and to detect fraudulent mixtures of EVOOs with some lower quality oils (e.g. soft-deodorised olive oils). Both revised methods are faster alternatives and consume fewer solvents than the official analytical method (Commission Regulation (EU) No 61/2011).
* SPE/GC-FID to determine both free and esterified sterols shortening the preparative step instead of measuring the total composition of sterols as currently performed with the official method (Commission Regulation (EEC) No 2568/91). In different vegetable oils, sterols can be differently distributed between these two forms. This revised method should improve the detection of illegal blends of olive oils with other vegetable oils.
* HPLC-RID and GC-FID to determine the triacylglycerols composition and the fatty acid methyl esters composition, respectively. According to the Commission Implementing Regulation (EU) No 29/2012, extra virgin and virgin olive oils must bear a designation of origin on the labelling. An official method is not available to verify the compliance with the geographical origin that, up to now, can be verified only by documented traceability. Both analytical methods are already mandatory in the Commission Regulation (EEC) No 2568/91 for the control of the purity of EVOOs and VOOs; its new application to identify the geographical origin of olive oils should help increasing consumer’s confidence.

**Purpose of the meeting**

After a presentation on the functionalities of the current version of the databank, OLEUM partners would like to know:

* if the databank is relevant for the national control authorities;
* if they will adopt, use, and feed the databank and under which conditions (e.g. importance to feed the OLEUM databank in the future with new results obtained by analysing authentic oils and full traceable adulterated oils);
* if some of them already have a national database for the management of metadata and analytical results of methods applied to authenticate olive oils;
* how they foresee a strategy to ensure the maintenance of the OLEUM Databank in the long term as well as its availability to authorised bodies through the European Community.

1. <https://op.europa.eu/en/publication-detail/-/publication/606555af-46ff-11ea-b81b-01aa75ed71a1> [↑](#footnote-ref-1)
2. <https://www.go-fair.org/fair-principles/> [↑](#footnote-ref-2)