Report on the outcomes of a Virtual Mobility[1]

Action number: CA19110

Grantee name: Silvia Tappi

Virtual Mobility Details

Title: Plasma effect on safety and quality of foods

Start and end date: 08/08/2023 to 20/10/2023

Description of the work carried out during the VM

Description of the virtual collaboration and activities carried out during the VM, with focus on the work carried out by the grantee. Any deviations from the initial working plan shall also be described in this section.

(max. 500 words)

The main objective of the VM is to conduct a literature review aimed at investigating the main effects of plasma treatments on foods. Since the use of plasma in the food sector has shown promising results as an alternative to traditional processing, it is important to assess all possible consequences of the treatment on various aspects. This VM has the purpose of identifying the main food categories (e.g., fresh fruit and vegetables, fish products, dairy etc.) subjected to plasma treatments and, for each, the related quality and safety aspects investigated in the literature.

During the VM three main activities were carried out. First of all, a computerized bibliometric analysis from the year 2001 to 2022, using the Scopus research engine was performed. All data were extracted through to a query that was composed by a combination of terms linked by Boolean operators to encompass all related bibliographic records but still provide adequate selectivity in data search and limit extraction to only records connected with our aim.

We chose to limit the language of the document to the English language only and to limit the type of documents to scientific journals and reviews.

In the definitions of the query, we included all terms that led to the improvement of search results in order to identify all publications related to this field, considering the time frame >2000; <2023, was applied:

Relevance of records was assessed on the basis of several requirements (exclusion of records based on packaging application, on model systems where no food was considered, on the use of thermal or

[1] This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the GH for payment of the Grant.

low-pressure plasmas) and all records were manually checked for compliance analysing title and abstract. Reviews were considered separately and included in the analysis only if they were exclusively focusing on plasma and not on several technologies, e.g., on all non-thermal technologies. A record was deemed relevant if relevance requirements were satisfied.

At the end of this first step, a list of articles was obtained. Starting from this final list, each bibliographic record was analysed individually in order to extract data in relation to the type of food, the main intended application and the type of safety and quality analysis. For the identification of food categories, the COST community was involved by sending a survey to ask members which categories should be extracted from the articles and which articles they suggest should be included in the search. Unfortunately, only few COST sent a feedback, and only 3 contributions received were utilised.

The received inputs were taken into consideration for the classification of features to extract. This procedure resulted in the creation of a table containing all the features extracted from the articles of the list. Finally, the obtained table was analysed, the results of the analysis were critically commented in a report focused on the safety and quality aspects of plasma-treated foods.

No deviations from the initial workplan were deemed necessary.

Description of the VM main achievements and planned follow-up activities

Description and assessment of whether the VM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the VM. Agreed plans for future follow-up collaborations shall also be described in this section.

(max. 500 words)

The main achievements of the VM are the development of a table that contains data extracted from the selected articles and a report that critically analyse the data in the table, focusing on the safety and quality aspects investigated for each type of foods. The report provides an overview of the food aspects investigated in the literature over the last 20 years (2001-2022). All the data were analysed and in order to highlight the most investigated and the emerging applications of plasma in the food sector, and, for each, identify the food parameters investigated. The critical analysis allowed to obtain some useful information related to the safety and quality assessment of plasma-treated foods.

Both expected outputs are in line with what is stated in the ‘Technical roadmap - key food applications and standardized procedures’, a document prepared by the European community working on cold atmospheric plasma food processing in the context of the European project CA19110 Plagri (Plasma applications for smart and sustainable agriculture). This report will be be shared with the COST community and used for the deliverable 5.3: Identification of the fundamental mechanisms and evaluation of safety/quality aspects.