31st October 2016
Ref.: 9960

Workshop on Thursday 15th September 2016
-Report-

COPA-COGECA (Room « A »)
Rue de Trèves 61
BE-1040 Brussels

Welcoming words - Jean-Luc Mériaux, UECBV Secretary General, Partner organising the event

Mr Mériaux, UECBV Secretary General, welcomed the participants giving the background on such an event. This is what the workshop will look at, good work!

Do you know what the CPSs (Cyber Physical Systems) are? Our life by 2050 will be influenced by a complex network made of sensors and tools able to support our choices and to improve the level of efficiency of human activities. Today, robots are more and more in our daily life, such as in our car. They help meet the civil society's concerns. We are nearly sure that CPSs will have long- and short-term technical implications. Regarding the short-term implication, the sensors will be able to assess the freshness of meat and to enhance the safety of the products.

This is the aim of ToxDtect. In that project almost 10 partners are involved, it is a new technology strengthening food safety and able to reduce food waste, it is a clear evidence of the efficiency of the food sector, as many other CPSs, ToxDtect will need discussions, clarification, legal implementation. We are only at the beginning of the process. It is the aim of the workshop, gathering the different partners (meat producers, scientists, consumers, retailers, meat packaging industry, national and EU authorities) for interactive discussions!

Opening the meeting - Silvia Garcia Ruiz, ASINCAR, Project coordinator

The ToxDtect project aims to develop an innovative packaging solution for meat products with improved sensing capabilities able to determine the quality of fresh beef and predict its remaining shelf-life using an external reader containing an intelligent decision system.

ToxDtect is a three-year project co-financed by the European Commission and it is about to end. The interdisciplinary partnership allowed a wide range of expertise to meet around meat research (printing electronics and packaging materials). SME associations in the meat and in the film packaging industry have been involved as well. The biggest challenge was to assess the needs and the objectives of the stakeholders, so bringing the science close to the market. Our interest is now also to exchange some views with the EC.

Objectives and main results of the ToxDtect project - Silvia Garcia Ruiz, Project coordinator, ASINCAR

The expected benefits are:

- A better stock management for retailers and reduction of meat waste;
- A clear labelling system. Increased consumer satisfaction by getting information about the accurate shelf-life of the product they are purchasing;
- Potential extension of “best before” date estimated by meat producers, according to the measurements of the sensors from the meat product;
- Development of sensor embedment technology on flexible substrates and intelligent packaging systems.

The goal of ToxDtect is to reduce meat waste through real information about the chemical state of the meat.
The system will consist of an array of passive sensors embedded in the film of the package that will measure the presence and concentration of different Volatile Organic Compounds (VOCs) highly representative of the quality of meat.
The package has been developed by targeting at the beginning the metabolites generated during the first stage of the meat degradation, than it has been necessary to develop the electro chemical sensors. The sensors are powered by a device able to detect and to predict the remaining shelf-life through software.
In parallel, the group had to develop a low-cost multilayer film where a sensor array has been implemented in order to detect the Volatile Organic Compounds. The integration of the sensors is complying with the food packaging Regulation EN 1186, EN13130 and EU 2002/72.
The aim is to develop soon the application also for other food products. The application is supposed to work only for modified atmosphere packaging.
The project is focused only on fresh beef in order to target specific needs, but the idea is to target also other species of meat although it will not be done within the framework of that project.
Link to the PPT

Main challenges for the RTDs - Dulce Munoz, co-project coordinator, INSPIRALIA

The confusion over food expiration dates ("used by" and "best before") and the lack in giving information about real freshness of the food inside the packaging has pushed us to find a solution to that cause of food waste.

Technologically, ToxDtect is a moisture control system constituted by absorbent pads and trays. It was designed over active packaging (incorporation of additive agents e.g., oxygen scavengers, antimicrobial agents) having a modified atmosphere packaging (MAP).

There are already other examples of smart packaging applications i.e. FreshPax, Smart Label, SensorQ, OnVu.

In bibliography, VOCs are already threated and they are very different from meat to meat, there is obviously a relation with microbial growth and the concentration of particular compounds.

The product was experimented on 2 cuts of meat Outside (Meat 1) and Top Loin (Meat 2) of a weight of 400 g. The two meat types were MAP packaged in mixture: 70 % O_2; 30% CO_2 (MAP1) and 80 % O2; 20% CO2 (MAP2).

The pre-screening of volatile biomarkers was conducted by taking into account the biologic activities of the following microbes (spoilage bacteria): *Mesophilic aerobic bacteria, Molds and yeasts, Enterobacteria*, *Pseudomona spp*, *Brochothrix thermosphacta.*

The research was difficult also for the architecture of the packaging, indeed the outer layer must have very low VOCs, oxygen permeability, high stiffness, and heat resistance (sealing). On the other hand, the inner layer must have very low water vapor permeability, high VOCs permeability, good seal ability on PP-trays, food safe.

The selection of the materials was based on these requirements and also on the industrial production and cost factor.

We performed the necessary tests to ensure compliance with food packaging EU Regulations; indeed, we achieved expert opinion of recipe for food legislation (sensors, silver ink, materials) according to Regulation (EC) No. 1935/2004.

In general, at this stage (no industrial produced end product) we can only say that the used substances and materials of the film could be in principle used for food contact.

The film is supposed to cost around €19/cent per packaging.

Link to the PPT

How to deal with packaging in the PEF context (Product Environmental Footprint)? - An De Schryver, EU Commission (DG ENVI) - Eco-innovation and circular economy

The EC has decided to carry on a project in order to assess the Environmental Footprint of a wide range of products using a common method based on Life Cycle Assessment (LCA) based on multiple environmental indicators. It should be interpreted as a common tool for internal market, identifying environmental hotspots and able to produce credible information to be shared among consumers.

The pilot started in 2013 and the test for the development of PEFCRs (Product Environmental Footprint Category Rules) and OEFSRs (Organisation environmental footprint sector rules). Till now different approaches for verification systems are being considered; at the same time, the EC and the project partners are studying the communication vehicles.

With this we aim for high quality, allow economic profitability and reducing costs in calculating environmental footprints.

To guarantee quality, we request more than 50% market involvement for each document.
We assure high consistency through guiding documents, issue papers, transversal working groups (packaging working group, cow model working group, construction working group).
The governance structure (committee meetings), external reviewers and public consultations assure expert inputs and approval.
We are testing different verification approaches to validate a PEF-compliant study.
Each PEFCR identifies what really counts and thus allows companies to focus on the most important issues.
The aim with this is to increase transparency throughout the supply chain, which reduces green washing and therefore correct competition.
24 product groups belonging to different sectors have been involved in the process: batteries and accumulators, decorative paints, hot and cold water supply pipes, household detergents, IT equipment, leather, metal sheets, footwear, photovoltaic, electricity generation, thermal insulation, T-shirts, uninterruptible power supply, intermediate paper product, retail, copper, beer, dairy, feed for food-producing animals, packed fresh meat from bovine, pigs and sheep, wine, uncooked pasta, packed water, pet food, olive oil.
For meat, there are *three representative products:* beef, pig meat, lamb. The functional unit is *100 g of fresh meat including inedible animal parts (such as bone) presented to consumer in retail packaging*.
Each product could be assessed under different parameters: climate change, resource depletion, land transformation, eco-toxicity, human toxicity, radiation, acidification, radiation, ozone depletion, water depletion, particulate matter, eutrophication.
Primary, secondary and tertiary packaging shall be included in each assessment:
Production of packaging,
Reuse, recycling, waste treatment,
Product waste related to packaging.
An assessment on the level of 'product consumed' shall be provided; indeed, meat is packed and sold and at storage, retail or consumer level there are some food loses.
The production of waste is related also to packaging, this means that it shall be assessed in function of the material and the different conditions of atmosphere.
EXPERIENCE GAINED
Till now the EC has understood that more guidance is needed on the granularity of the functional unit.
Furthermore, better market data is needed to define the representative product(s).
The development of « benchmarks » is technically feasible.
The definition of classes of performance requires further thoughts.
No information yet on verification approaches.
No information yet on communication.
In 2017, the EC will face a deep evaluation of the projects and a peer review while after 2018 a policy discussion is expected with EU Member States.
Link to the presentation

Panel discussions - Facilitator: Annette Dresling, Chairwoman of the UECBV working group of veterinary issues

1. General interest in such a project

i. What are the challenges when setting "best-by" dates?

- To identify maximum shelf-life
- To monitor both food safety and spoilage

ii. Do you consider that in most cases the "best-by" date is shorter than it could be?

Yes, it is, as FBOs foresee a marge. It is a "best-by date minimum".

iii. What is the importance of meat wasted at retail?

It is difficult to quantify but there is still too much meat wasted at retail.

iv. When there is unsold meat at retail point, does it happen that it is sent back to the meat producer?

No, the meat is discarded. It is a huge cost for retailers. These costs are calculated in the margin of the meat producer.

In Romania, it is compulsory to have an agreement with a company for discarding. There is a national agreement for all the supermarkets to dispose of waste, it would be easy to propose the tool on a large scale.

v. When there are unsold products, retailers can always organise quick sales at reduced price or donation to food banks. Is it satisfactory in general? What other solutions do retailers have to reduce fresh meat waste?

According to the EU Animal By-Product Regulations, if it is Category 3, it can be processed for pet food, and if it is Category 2, it can be used for production of biogas, but not for feed production. One difficulty is when all unsold food is put in the same bin because mixing Cat. 2 and Cat. 3 will render all the ABPs as Cat. 2.
Sometimes there are integrated systems so that the unsold food is sent to biogas plants, when it is all put in one bin.

vi. Are consumers concerned about food waste at retail?

According to Euro Coop, consumers are concerned by food waste at home but not so much at retail.

In butcher shops, there are some questions from consumers to the butcher on what is done with waste.

2. ToxDtect potential added value and challenges

i. Would it bring added value to have a system such as ToxDtect providing a shelf-life date based on the actual measurement clearly displayed DD/MM/YY? Which one(s)?

One question raised by the ToxDtect project is linked to the label of the date. There are a lot of discussions. The one who is putting the label takes the responsibility i.e. the meat producer or the retailer when he packs himself.
Caterers/restaurants could also use the device.

ii. Would it be useful to put the equipment in self-service for consumers so that they can check the 'best-by' date themselves? What implications would it have?

Consumers could check themselves at retail. In that case, is there a risk that more waste is generated? Who would be responsible if consumers are checking the date themselves: The person providing the device? The retailer?
Who should be trusted?
Maybe in the future the device could be used also at home.

iii. What are the main technical challenges to develop a system like ToxDtect?

The basis is there and could be developed for all types of meat, including fish.
Of course, the sensors/VOC would need to be adapted to each specie.
The size of the cut may have an influence as well and more tests are needed.

3. Economic aspects

What additional costs would be acceptable for the industry/ retailers taking into account the advantages of reducing waste and in terms of image?

It would depend very much on the added value compared to the price. It was assessed by the researcher that it would cost € 0.19 / 1,000 meters.

4. The way forward

What other use could be possible/ useful?

It could be used as well to validate FBOs process.

For craft butchers, the interest would be that it is validated once and then it can be used. Craft butchers are developing pre-packed food. It is an increased demand from consumers.

Further research is necessary.

Conclusions

- **There are still some improvements possible to reduce food waste at retail level**
- **Looking for ways to extend the shelf-life to the "real" one can only be satisfactory both for operators and consumers**
- **ToxDtect brings some answers**
- **Others still need to be explored at technical level, practical level but also at legal level. We need to find solutions that fit the legal framework but also we need to make legislation evolve to take on board innovation**
- **In particular, particular attention needs to be paid to food safety.**

Finally, Annette Dresling closed the meeting thanking everyone for the input. Partners will fine tune the project to take on board some remarks. Synergies will be looked at when possible.

Photo Gallery: Click HERE