

Rethink Food Resources, Losses and Waste. An Insight into the Retaste Conference 2025

Perspektiven zu Lebensmittelressourcen, Verlusten und Verschwendungen. Ein Einblick in die Retaste-Konferenz 2025

Ripensare le risorse alimentari, le perdite e gli sprechi. Uno sguardo alla conferenza Retaste 2025

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RETASTE 2025

From 24th to 27th September 2025, Harokopio University in Athens hosted the 5th Retaste international conference, entitled "Rethink Food Resources, Losses and Waste." It was organized by Harokopio University of Athens, in collaboration with various partners such as the ROSETTA project and other institutions active in sustainable food systems innovation. The event brought together researchers, entrepreneurs, non-governmental organization, and actors from across the food supply chain to discuss issues of food loss and waste, explore novel materials and innovations, share policy and measurement methods, and promote sustainability and circular economy practices. Thus, all through plenary sessions, poster presentations, panel discussions, and technical visits. The location offered an interdisciplinary, international context, suitable to host a focused yet wide-ranging conference. The Laimburg Research Centre did not miss this opportunity and presented key findings during the session "Prevention of Food Loss and Waste: policy, methods and best practices".

The conference venue was the Harokopio University campus ((Fig. 1) located in Kallithea, a district in Athens known for its urban lifestyle and access to the sea. Its modern facilities and welcoming atmosphere make it an ideal venue for fostering interdisciplinary dialogue and international collaboration. The old and impressive campus was founded in 1990 and named after the Greek educator Panagis Harokopos, today over 3000 students are enrolled at the University.

CONSUMER FOOD WASTE

This theme focused on consumer behaviours, awareness, and strategies for reducing waste at household and retail levels. Special attention was directed towards the use of consumer surveys and questionnaires to monitor and better understand consumer behaviour related to food waste, given that more than half of total food waste is generated at the household level, mainly during post-purchase handling and storage. Further factors, such as the impact of packaging and the influence of cultural and socio-economic factors on waste generation, were also included as topics within this research field. Pietrangeli et al. especially focused on the association between dietary patterns and the waste generation in Italian household. A total of 65 households were investigated using a diet diary and a food waste diary, followed by a final survey on purchasing and consumption habits. Results showed that individuals following a healthier diet (Mediterranean diet) tend to waste less food [1]. Furthermore, larger households generally waste more food overall, but the amount of waste per person is lower [1]. In general, the session was clearly focused on the challenging task of quantifying household food waste, with creative solutions such as organic waste bins equipped with scales or cameras.

NOVEL MATERIALS FROM FOOD RESOURCES

In the "novel materials" session, biodegradable or compostable packaging, coatings, smart materials to sense spoilage, and materials sourced from food by-products (circular materials) were discussed, showing studies involved in the investigation of innovative materials used in food preservation, or packaging that can reduce food spoilage or extend shelf-life. The importance of these studies was also highlighted in a dedicated presentation: researchers from Spain developed a flexible, sustainable stretch wrapping material made from expanded starch biocomposites and 40% orange peel. The packaging demonstrated improved flexibility and is considered a more sustainable alternative to conventional wrapping solutions [2].

During the session, insights of the ongoing Greek BAC2FOOD project were presented. The research project was supported by the Hellenic Foundation for Research and Innovation (H.F.R.I.) under the "2nd Call for H.F.R.I. Research Projects to support Faculty Members & Researchers" (Project Number: 03591). The aim of the project is to design and optimize the recovery of selected bioactive compounds (BACs), notably carotenoids, phenolic compounds, and omega-3 fatty acids, from plant and animal by-products using novel technologies. The focus is on maximizing yield and improving bioaccessibility. Recovered BACs are encapsulated into food model systems to assess their biofunctionality. Advanced extraction techniques such as high-pressure processing, pulsed electric fields, and microwave-assisted extraction are employed. The impact of non-thermal processing on the bioaccessibility and potential bioavailability of BACs are evaluated. The study also explores the exploitation of side streams from tomato and fish processing as sustainable sources of BACs within the circular bioeconomy framework [3].

PREVENTION OF FOOD LOSS AND WASTE: POLICY, METHODS AND BEST PRACTICES

This theme covered regulatory frameworks, national and EU policy instruments, and best practice examples from industry and agriculture. Methods discussed included improved supply chain logistics, cold-chain management, optimizing harvest timing and processing techniques. The Laimburg Research Centre contributed to this session with two poster presentations: One study investigated unripe grape juice, a by-product of viticulture, as an acidifying agent in two case studies; elderflower syrup and horseradish preserve. The use of this acidifier supports the circular economy through the utilization of a viticulture by-product. Discussions on the topic with international scientists gave insight into a project using similar acidifiers, also taken from unripe grapes, used in traditional cooking in Lebanon and thereby putting the topic into an international frame. The second poster presented by the Laimburg research centre team included the development of a healthy, additive-free kiwi snack, by using DIC (Instant Controlled Pressure Drop) drying technology. This process



Fig. 1: Venue of the Retaste Conference 2025; Harokopio University Athens.

includes a texturization step that causes the product to expand, increasing pore size and creating a unique texture that enhances crispness while reducing overall drying time. Moreover, the method makes it possible to dry the whole fruit, thereby helping to prevent food waste. This innovative and not widely adopted drying method attracted great interest, providing many inputs for further analysis and elaboration of the technique.

On this occasion, ZeroW (Innovations for Zero Food Waste) was presented. ZeroW is a €12 million EU-funded project under the Horizon 2020 Green Deal call (Grant Agreement No. 101036388), focusing on developing systemic innovations to reduce food waste. The project runs from 2022 to 2025 and brings together 46 partners from 17 countries. It addresses the entire food value chain and aims to support the transition towards a near-zero food waste system. The initiative is grounded in a collaborative, interdisciplinary approach and targets a 25% reduction in food waste at micro level via nine Systemic Innovations Living Labs (SILLs). These innovations address key stages: pre-harvest and harvest (farming), processing, packaging, retail, and consumption. Solutions include smart packaging, data-driven process control, food valorisation technologies, and consumer behaviour change. ZeroW also improves food bank efficiency and data quality to support evidence-based decision making. Insights from SILLs, combined with sustainability assessments and macroeconomic modelling, will inform policies for a just transition toward near-zero food waste by 2050 [4].

Other aspects in this session pointed out the importance of consumer standards for food loss at a retailer

level. Considering that 13.8% of the economic value is lost in the global fruit and vegetable sector at retail level. R. Pietrangeli et al. investigated this food loss in the carrot supply chain of an Italian producer organization, by analysing the main downgrading factors based on individual cosmetic quality standards. Among the downgraded carrots, about 67% were rejected due to their size and 33% due to cosmetic defects. In both cases the carrots were safe for consumption but did not match the consumer expectation. As a result of the study, different scenarios were modelled to analyse how varying levels of consumer acceptance standards could influence potential positive outcomes [5].

TECHNICAL TOURS

Technical visits to two infrastructures in and around Athens were an important part of Retaste 2025. These offered insights into water management and heritage infrastructure, useful analogies for resource flows, resilience, and sustainability in an urban context.

Hadrian's Aqueduct, Athens

This historical construction was presented as an interactive art performance, thereby strengthening the interaction between participants, encouraging communication, and promoting greater exchanges.

- The ancient Roman aqueduct (built around 140 C.E.) spans about 24 km and crosses through eight municipalities, from Acharnes to Kolonaki.
- It is unique in Europe for its length and type and, though partly damaged and interrupted, still collects

water via underground sources and aquifers.

- A pilot section (~ 4.5 km) in Chalandri has been re-activated to supply non-potable water for uses like irrigation, cleaning, etc.
- Potential is estimated: if the entire aqueduct were fully restored/used, it could deliver roughly 1 000 000 m³ per year of water.

Psyttalia Wastewater Treatment Plant (WWTP)

During the conference, a technical visit to the Psyttalia WWTP took place. The tour began with a bus ride to the wastewater pre-treatment facility located in the port of Athens. Afterwards, participants boarded a ferry that took them to the nearby Psyttalia Island, where the main part of the treatment plant is situated.

- Psyttalia is the main wastewater treatment plant serving the Greater Athens area. Its capacity is 5 600 000 population equivalents (p.e.), making it one of the largest in Europe.
- The average incoming wastewater flow is about 730 000 m³ per day.
- Treatment stages: pre-treatment, primary sedimentation, secondary biological treatment (activated

sludge, nitrogen removal), sludge treatment including anaerobic digestion, de-watering, and thermal drying.

- Energy efficiency improvements: integration of thermal hydrolysis (THP) for a portion of the waste activated sludge, improving dewaterability, increasing biogas production, and reducing energy costs especially for sludge drying.
- The plant can cover approximately 40% of its own energy needs with its produced biogas.

LOOKING AHEAD

Being a very focused conference, Retaste 2025 provided a rich interdisciplinary forum for exchanging ideas on innovations, research, policy, and practices in the fight against food loss and waste. While some topics were not primary research focus of the Laimburg Research Centre, the main focal point was still food waste. On one hand, the focus was on exploring household food waste and providing insights into innovative strategies to reduce it; on the other hand, attention was paid to investigating meaningful use of by-products and residues from agriculture and food industry. Combined, these approaches support efforts to overcome one of the most pressing issues of our time: developing safe and sustainable food value chains.

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