Investigating food waste generation and prevention in Greek hotels using an AI technology

LOWINFOOD has selected a set of very promising innovations designed to reduce the amount of waste at certain stages in the food value chain.

The aim is to validate and improve them in order to provide society with tools to help combat food waste.

The Project is working on the following 4 value chains:

• Fruit & vegetables
• Bakery
• Fish
• At-home & out-of-home consumption.

LOWINFOOD has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101000439.
Innovations and their type of action

- Software to manage withdrawals of **fruit and vegetables** and donate them to charities
- Cooperation system between **farmers** and food service sector
- Foresightee: **Fruit and vegetables** sales-forecasting software for supermarkets
- Leroma: B2B digital market place for reducing food losses in the **vegetables** and fish industries
- Stakeholder dialogue to develop guidelines against food loss and waste in the **bread** and fish value chains
- FoodTracks: Software for optimization of bakeries’ production
- Innovative supplier/retailer agreements for **bakery products**
- Matomatic: Plate waste tracker for school canteens
- Educational approach against food waste at schools
- **KITRO**: Smart bin for restaurants’ and hotels’ kitchen
- Mitakus: Technological innovation to better forecast meals in food service
- Regusto: Mobile app to sell restaurants’ surplus food provisions
- CozZo: Mobile app to manage household food provisions

**TYPES OF ACTION**

- Food redistribution
- Consumer behaviour change
- Supply chain efficiency
- Food waste prevention governance
- Food valorisation
Food waste in EU (baseline year 2020): 127 kg/ca/yr

<table>
<thead>
<tr>
<th>PERCENTAGE OF OVERALL FOOD WASTE</th>
<th>COMES FROM...</th>
<th>PER INHABITANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>55%</td>
<td>Households</td>
<td>70 kg</td>
</tr>
<tr>
<td>18%</td>
<td>Manufacture of food products and beverages</td>
<td>23 kg</td>
</tr>
<tr>
<td>11%</td>
<td>Primary production</td>
<td>14 kg</td>
</tr>
<tr>
<td>9%</td>
<td>Restaurants and food services</td>
<td>12 kg</td>
</tr>
<tr>
<td>7%</td>
<td>Retail and other food distribution</td>
<td>9 kg</td>
</tr>
</tbody>
</table>
KITRO | Smart bin for the kitchen of restaurants and hotels

KITRO provides restaurants, canteens and hotels with a fully automated food waste management solution.

By combing image processing and deep-learning technologies with a hardware solution, relevant information on the food being thrown away is captured and analysed.

This empowers food services to make informed decisions and optimize work practices leading to a reduction in food waste, food cost and their negative environmental impact.
KITRO implementation in Greece

Santorini – TUI BLUE Meltemi (όμιλος Meltemi Hotels & resorts)
- 5 KITRO devices (Pastry, Preparation vegetable, Preparation meat / fish, Culinaria, Main restaurant)

Kos – Atlantica Thalassa Hotel
- 5 KITRO devices (Central Kitchen, Cold Kitchen, Restaurant, Terrace L, Terrace R)

Implementation period:
April 2022 – October 2022
April 2023 – October 2023
Kos – Atlantica Thalassa Hotel
Overall

Average waste per guest per day

Edible vs. inedible waste

Sources of edible waste

Edible waste - service times
Kos – Atlantica Thalassa Hotel

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Santorini – TUI BLUE Meltemi
### TUI Blue Meltemi

#### Food Waste per Guest:

**Main Restaurant vs Culinarium**

#### Top wasted items - trash event images

<table>
<thead>
<tr>
<th>Mixed vegetables</th>
<th>Other</th>
<th>Error</th>
<th>Sauce white</th>
<th>Paper</th>
<th>Sauce white</th>
<th>Bell pepper</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.06.2022, 13:43</td>
<td>04.08.2022, 13:04</td>
<td>30.06.2022, 11:34</td>
<td>10.07.2022, 12:28</td>
<td>27.05.2022, 07:14</td>
<td>03.07.2022, 11:43</td>
<td>20.06.2022, 16:24</td>
</tr>
<tr>
<td>10780 gr</td>
<td>6290 gr</td>
<td>4760 gr</td>
<td>3540 gr</td>
<td>3470 gr</td>
<td>3430 gr</td>
<td>3260 gr</td>
</tr>
</tbody>
</table>

#### Top wasted items - trash event images

<table>
<thead>
<tr>
<th>Other</th>
<th>Stock</th>
<th>Stock</th>
<th>Other</th>
<th>Bone</th>
<th>Stock</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.05.2022, 16:48</td>
<td>12.05.2022, 14:31</td>
<td>19.06.2022, 22:31</td>
<td>22.07.2022, 18:49</td>
<td>08.06.2022, 18:49</td>
<td>01.05.2022, 23:16</td>
<td></td>
</tr>
<tr>
<td>11830 gr</td>
<td>8870 gr</td>
<td>8010 gr</td>
<td>7960 gr</td>
<td>7570 gr</td>
<td>7100 gr</td>
<td>6780 gr</td>
</tr>
</tbody>
</table>

**Waste per guest**

- **Main Restaurant:** 38 gr [↑ 0% from 2022]
- **Culinarium:** 9 gr [↑ 0% from 2022]

**Cost per guest**

- **Main Restaurant:** EUR 0.22
- **Culinarium:** EUR 0.03
# Main Restaurant Food Waste Comparative Assessment: May vs July 2022

## Waste per Guest
- **May 2022:** 38 gr
- **July 2022:** 24 gr

## Cost per Guest
- **May 2022:** EUR 0.23
- **July 2022:** EUR 0.13

## Top Wasted Items - Trash Event Images
- **May 2022:**
  - Source white: 3640 gr
  - Sauce white: 3240 gr
  - Rice: 2600 gr
  - Liquid: 2410 gr
  - Bell pepper: 2260 gr
- **July 2022:**
  - Source white: 3540 gr
  - Sauce white: 3340 gr
  - Rice: 3260 gr
  - Liquid: 3090 gr
  - Other: 2780 gr

## Total Waste Weight
- **May 2022:** 215 kg
- **July 2022:** 304 kg

## Total Waste Cost
- **May 2022:** EUR 1,312
- **July 2022:** EUR 1,663

## Sources of All Waste
- **May 2022:**
  - Preparation: 141 kg
  - Overproduction: 30 kg
  - Plate: 70 kg
  - Preparation: 15 kg
  - Overproduction: 150 kg
- **July 2022:**
  - Preparation: 141 kg
  - Overproduction: 30 kg
  - Plate: 70 kg
  - Preparation: 15 kg
  - Overproduction: 150 kg

## Average Waste per Guest per Day
- **Edible:** 217 kg
- **Inedible:** 100 kg

## Edible vs. Inedible Waste
- **May 2022:**
  - Edible: 217 kg
  - Inedible: 100 kg
- **July 2022:**
  - Edible: 211 kg
  - Inedible: 193 kg
Santorini – TUI BLUE Meltemi
Main restaurant

Average waste per guest per day

Edible vs. inedible waste

Sources of edible waste

Edible waste - service times
**Strengths and challenges**

Plug ‘n’ play | Easy set up and adaptable to most kitchen bins | It should also be adaptable to bins with lids and foot pedal

User – friendly interface | The kitchen manager can easily input required data and instantly see the analysis of the results

Save resources | It identifies food waste hotspots and helps kitchen managers design and implement tailored actions to reduce food waste and save money | Staff should then be trained accordingly
Thank you for your attention!

klasaridi@hua.gr