HAURU

Waste composition & sorting study of mixed waste

Case study: restaurant in Oulu

Interreg Aurora
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1 Background and Objectives

This study was conducted to analyze waste composition and sorting efficiency at a restaurant in Oulu. It was executed collaboratively by Macon Oy and Haurun Jäteauto Oy as part of a broader waste management initiative. The aim was to assess the viability of multi-bin waste sorting solutions in commercial establishments, with a particular focus on plastics. The study adheres to the guidelines outlined in the Finnish Waste Management Association's "Guide to Mixed Waste Composition Studies."

The findings will provide insights into waste categories and volumes, supporting improvements in sorting, recycling, and overall waste management practices.

2 Methodology

The study analyzed waste collected over two weeks, totaling approximately 83 kg. The waste included both mixed waste and biodegradable waste, gathered in separate bins. All samples were manually sorted on-site into predefined categories, including bio-waste, paper, cardboard, plastics, metals, and glass. Plastics were further classified into subcategories (e.g., PET, PE-HD, and mixed plastics).

Each waste category's weight and volume were measured, and statistical analysis was performed using the Finnish Waste Management Association's Excel tool to ensure standardized reporting.

Picture 1. Bio and mixed waste for the analysis

Picture 2. Mixed waste bag spread open during the sorting phase

3 Key Findings

3.1 Composition Breakdown:

- Bio-waste accounted for 32.8% of the total weight.
- Soft paper (e.g., tissues) made up 31.4% of the total waste.
- Plastics comprised 27.9%, divided into:
- Rigid plastics: ~9.3%
- Film plastics: ~16.3%
- Mixed plastics: ~13.1%
- Cardboard, metals, and glass collectively accounted for less than 10%.

3.2 Carbon Footprint

Weekly waste emissions were estimated at 22 kg CO_2, with an annual projection of ~1,149 kg CO_2.

On a per-meal basis, the emissions were calculated at 18 g CO_2.

3.3 Sorting Efficiency

Many plastics, particularly multilayer and mixed types, were unsuitable for recycling and destined for energy recovery.

Improved labeling and the adoption of recyclable materials could enhance recycling rates

3.4 Cost Implications

The annual waste management cost was estimated at €1,768 with bio-waste bins or €1,050 without them.

Optimization opportunities, such as adjusting collection frequencies and bin sizes, could yield savings of up to €500 annually.

3.5 Recommendations

Soft Paper Sorting: Separate soft paper waste into bio-waste bins to reduce mixed waste volumes and its associated carbon footprint.

Plastic Recycling: Encourage suppliers to use better-marked and recyclable packaging materials. Reducing the use of multilayer and mixed plastics could significantly increase recycling potential.

3.6 Operational Adjustments

Utilize larger bio-waste bins or fewer collections to lower costs.

Sustainability Initiatives: Advocate for reusable cleaning materials over disposable paper where feasible, balancing hygiene and waste reduction needs.

4 Limitations

The study acknowledged potential biases in waste collection (e.g., unaccounted waste in Week 2) and recommended a larger sample size for more robust conclusions. Moreover, the lack of labeling on some plastics hindered precise categorization.

Towards Sustainable Waste Management

This study underscores the critical role of tailored waste management practices in reducing environmental impacts and operational costs for businesses. Enhanced sorting, material optimization, and policy adherence can collectively achieve greater sustainability in commercial waste management.

Picture 3-8. Sorted waste fractions (tissue paper, cardboard packaging, bio-waste, film plastic packaging, hard plastic packaging and cardboard packaging).