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Analysis of Peak Food Waste Events in Households Using Smart Bins and Qualitative Interviews

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Abstract

In Sweden, household food waste makes up about 48% of all food waste, according to the Swedish Environmental Protection Agency (2025), but the situation is complex, and the underlying causes of food waste are hard to capture in the short-term, because household waste generation is highly irregular and driven by sporadic high-impact events that are often smoothed in short-term averages. Existing literature often assumes food waste is evenly distributed across daily routines. Still, recent evidence suggests food waste is concentrated in a small number of high-impact events, though the specific causes of this concentration are not yet clear. This research aimed to identify and categorise the contextual drivers of these high-waste peak events and better understand the drivers of household food waste variability. Long-term food waste monitoring was performed in 12 Swedish households of varying demographics. A smart bin, Svinnson©, was used to measure household food waste over periods ranging from 65 to 333 days. While analysing the quantified data, high-waste peak events were identified, which were further investigated using qualitative interviews with participating households to gain a better understanding of the context that was associated with these high-waste events. Peak analysis revealed that on average, 10% of days account for 70% of total avoidable waste across households. This has been investigated with the help of qualitative interviews with households, which gives a better understanding with respect to the peak analysis. The qualitative finding revealed that these causes can be grouped into different categories, including; i) poor storage management (e.g. rotten vegetable or fruits), ii) improper meal planning (e.g. overcooking, picky eating, leftover, and unexpected guests), iii) shopping practices (e.g. impulsive buying, buying bulk on discounts), and iv) consumer behaviour (e.g. uneaten pizza/bread crust, edible but passed the expiry date, improper peeling). These categories were observed across households with varying demographic backgrounds. The results show that various situational/contextual factors affect the overall food waste generation. Long-term monitoring and qualitative understanding of the food waste in households gives the opportunity to design context-specific interventions.

Keywords: Long-term data monitoring, smart bin, Svinnson, household food waste, behavioural patterns