



Understanding Shelf life

Public-private partnership



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It is estimated that one third of all food produced for human consumption ends up as waste. These losses occur along the entire food chain, not just at the consumer level. For example, 1.7% of all the food put on sale by supermarkets in the Netherlands never reaches a consumer. The public-private partnership '*Houdbaarheid Begrepen*' ('Understanding Shelf life') has improved our understanding of food waste in relation to shelf life and quality aspects, and provided insights on possible interventions at the consumer/supermarket interface to reduce food waste.

Fresh products account for a relatively large share of food waste, particularly potatoes, fruits, vegetables and bakery products, followed by dairy, eggs and chilled ready-to-eat products. Consumers are responsible for a substantial share (around 30%) of food waste across the chain as a whole. There are a number of underlying causes, but a significant amount of waste is related to shelf life. Working with its project partners, 'Understanding Shelf life' addressed various knowledge gaps around improving product quality, valorisation of side streams, the use of misting, the relationship between packaging and product quality and shelf life, and how packaging information influences the way consumers discard food.

1. Improving product quality and reducing spoilage at the supermarkets

Based on eight sample products selected from different fresh food categories – including fruit, fresh prepared vegetables and fresh meat – an overview of possible measures to improve product quality while at the same time reducing spoilage was created. Utilising collected sales and spoilage data and information from product quality procedures, the reduction potential was modelled of selected measures including changes in stock management and prolonged expiry dates. Other promising measures include a targeted cooled transport and storage strategy for vulnerable products, improvements in staff training on quality aspects, appropriate packaging, and smaller ordering units. Although monitoring of spoilage is already daily practice within supermarkets, improvements can still be achieved by means of increased automation and a higher level of detail on spoilage causes. Other potential benefits can be

expected from increased collaboration with suppliers to improve quality and shelf life. These options have been documented in an opportunities roadmap, and divided into short-term and long term measures.

2. Utilising unsold products from supermarkets

Unsold bread is typically one of the largest waste streams for supermarkets. There are various options for keeping these side flows available for human consumption. An interesting option is to utilise the so-called 'returned bread' for the production of (craft) beer. In order to promote local partnerships, a manual was produced for the Vakcentrum (the umbrella body for independent retailers) with an action plan to help supermarkets collaborate with local breweries to brew and sell craft beer made from unsold bread. The action plan and beer recipes were piloted with a SSK certified supermarket located in the eastern part of the Netherlands. The resultant tasty beer from bread was presented at the Vakcentrum's 2019 New Year event.

3. Misting technology for fresh produce on the shelf

Loss of moisture is a major cause of spoilage in fresh products. Products dry out the longer they sit on the shelf, and they become limp and less appealing to consumers. Misting technology can solve this problem by using either a wet or dry mist to maintain moisture levels in products. A literature review was carried out as part of the project to collate all the latest scientific knowledge on this topic in relation to quality preservation and consumer perceptions of quality. Currently, the

"This research has scientifically proven that the Magic Box is an effective means in the fight against food waste"

Joost Rietveld, Too Good To Go Netherlands

scientific evidence is not conclusive yet on the effectiveness of misting technology and quality preservation. More research is needed to show how the technology might be used best to help reduce food waste.

4. Explaining packaging and shelf life for supermarkets

Supermarket owners are often asked to justify the use of plastic packaging. Wouldn't it be much better for the environment if we used less packaging? In order to be able to provide evidence-based answers to related questions, a Q&A document was developed for Vakcentrum which clarified the relationship between packaging, waste and sustainability. It also addresses issues around product quality, shelf life and labelling. Main conclusion: it all depends on the desired functionality. Packaging plays an important role within transport, protection and information. By selecting the appropriate packaging for the right product, it can contribute to improved shelf life and less food waste. On the other hand, excessive or inappropriate packaging materials can increase the environmental burden. The document sets out the various factors that might be considered.

5. Too Good To Go: Magic Box effective against food waste

The Too Good To Go app enables consumers to buy a 'magic box' of food that would otherwise have been wasted. This sales model offers supermarkets and other food outlets a way to offload, at a discount, unsold products that are still within their expiry date. These efforts would however be pointless if consumers then went on to throw most of it away at home. However, the pilot research revealed that most of the contents of the magic boxes are consumed, meaning the

model has the potential to achieve a significant reduction in food waste.

6. Frozen or fresh: what gets wasted at home?

An online questionnaire targeting more than 500 households was used to investigate if consumers are more or less likely to waste certain foods depending on whether they are bought fresh, frozen or in tins/jars. Results show that food waste could be further reduced if consumers can be encouraged to buy certain frozen foods more often rather than buying these fresh or in tins/jars.

7. Volume discounts, discount stickers and smart sensors

A questionnaire targeting 1,500 households investigated the discard behaviour in relation to purchase date and food management at home. How is consumer food waste influenced by packaging information, including volume discounts, discount stickers and smart sensors that provide additional information on a product's remaining shelf life? The results indicate that remaining shelf life is the main influencing factor on premeditated waste. Additionally, extra information regarding the remaining shelf life, particularly through the use of a smart sensor, can also sway consumers when deciding whether to still use a product or dispose of it.

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