



# Consumer behaviour towards price-reduced suboptimal foods in the supermarket and the relation to food waste in households



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## ABSTRACT

To combat food waste, supermarkets offer food items at a reduced price in-store when they are close to the expiration date or perceived as suboptimal. It is yet unknown, however, which considerations consumers engage in when deciding about the offer, and whether focusing particularly on the price during food purchase might be related to greater food waste at home. Knowledge about both the consumers' food purchase process for these price-reduced foods and the potential wastage of price-focused consumers can contribute to the assessment of whether or not offering suboptimal food at reduced prices in-store actually reduces food waste across the supply chain. We explore these questions in a mixed-method study including 16 qualitative accompanied shopping interviews and a quantitative online experimental survey with 848 consumers in Denmark. The interviews reveal that the consumers interviewed assess their ability to consume the price-reduced suboptimal food at home already while in the store. Consumers consider the relation between product-related factors of package unit, expiration date, and product quality, in interaction with household-related factors of freezing/storing, household size/demand, and possible meal/cooking. The survey shows that consumers who are more price-focused report lower food waste levels and lower tendency to choose the optimal food item first at home, than those who are not emphasizing the price-quality relation or do not search for price offers to the same extent. Higher age and high education also played a role, and the price-focus is lower in high-income groups and among single households. The findings allow deriving recommendations for retailers and policy makers to support both the marketability and the subsequent actual consumption of price-reduced suboptimal food, but they also raise questions for further research of this underexplored area.

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## 1. Introduction

Food waste in the agricultural and food supply chain has been increasingly acknowledged as a challenge to creating more sustainable food systems (Foley et al., 2011). With a fourth to a third of food lost or wasted in the supply chain (FAO, 2011; Kummur et al., 2012), these numbers exceed the oversupply suggested to safeguard against volatility in the supply chain (FAO, 2015; Papargyropoulou, Lozano, Steinberger, Wright, & Ujang, 2014). Causes for food loss are lack of adequate or sufficient infrastructure in harvest, storage, processing and transport as well as lack of coordination, and food loss majorly occurs in developing countries. In

developed countries and more affluent societies, food waste is to a greater extent caused downstream in the supply chain, thus, in the interaction between retail, food service and the consumers as well as in consumer's homes (Fusions, 2013; Göbel, Langen, Blumenthal, Teitscheid, & Ritter, 2015; Parfitt, Barthel, & Macnaughton, 2010). At distribution level in Europe, according to data from FAO, less than 10% of the wastage occurs, but more than 30% of the waste volumes are caused by consumer households (FAO, 2011). Meanwhile, a food waste study by the European Commission identifies around 5% for retailers and above 40% for households (EC, 2010). In Scandinavia, for example, between 10 and 30% of consumers' food purchases is assessed to be wasted (Gjerres & Gaiani, 2013).

Many causes of food waste are explained by affluent consumers lacking planning routines and cooking capabilities (Stancu, Haugaard, & Lähteenmäki, 2016), misunderstanding of date labelling (van Boxtael, Devlieghere, Berkvens, Vermeulen, &

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Uyttendaele, 2014), demanding high levels of ‘perfection’ of the food that they buy (Loebnitz, Schuitema, & Grunert, 2015), and avoiding potential or perceived risks (Watson & Meah, 2013). Retailers are pre-empting consumer expectations and demands of ‘optimal’ food by striving to offer e.g. full supermarket shelves of fruit and vegetables of good appearance, and sorting out items with minor damages or products approaching the expiration date (Gruber, Holweg, & Teller, 2016; Loebnitz et al., 2015; Mogensen, Hermansen, & Knudsen, 2013; Stuart, 2009). However, the discussion about food waste in developed societies has raised criticism of these practices, and amongst others led to the establishment of supply chain actions to tackling food waste across Europe. These can be grouped into information and capacity building, redistribution to alternative retail or food donation schemes such as food banks, and alteration of the conventional retail and supply chain (Aschemann-Witzel, de Hooge, Rohm, Normann, Bossle et al., 2017). Donations of surplus food are found to have challenges when evaluating it with the goal of efficient waste reduction and contribution to poverty relief (Alexander & Smaje, 2008), but are also reported to successfully reduce wastage in-store (Cicatiello, Franco, Pancino, & Blasi, 2016). A lot of food that is wasted at the retail stage is disposed of in good conditions, and only discarded based on the fact that the expiration date has passed (e.g. in Austria, more than ¼ of the discarded food, Lebersorger & Schneider, 2014).

Food retailers have reacted by offering food items close to the expiration date or suboptimal in appearance or in any other way, but at a lower price (Aschemann-Witzel, Hooge, Amani, Bech-Larsen, & Oostindjer, 2015). This has become a widespread practice, at least in Denmark (Aschemann-Witzel & Kulikovskaja, 2016). Given greater sales have been found linked to lower food waste rates, there might be evidence for this to be a successful strategy (Lebersorger & Schneider, 2014). At first sight, this action appears not only more morally ‘right’ to consumers (Gjerres & Gaiani, 2013) but also economically sensible, as retailers would still make some profit from foods that otherwise are wasted. From the retailer point of view, however, it is not as straightforward, and exact information on the potential value of recovering food waste is yet missing (Cicatiello et al., 2016). Firstly, depending on the contractual agreements for the specific product in question, it is not necessarily the retailer that bears the cost of unsold products. Secondly, both offering products at reduced prices as well as the appearance of these products might impact consumer expectations towards the prices of the ‘normal’ products and how the remaining product range as well as the store as a whole is perceived. This is due to the fact that low prices (Theotokis, Pramataris, & Tsiros, 2012) and imperfect products (Jaeger et al., 2016; White, Lin, Dahl, & Ritchie, 2016) might be consciously or subconsciously interpreted as an indicator of low quality. In addition, it is due to the fact that consumers majorly learn prices during shopping (Boutrup Jensen & Grunert, 2014), and the prices they see can impact their price knowledge and subsequently the image of the store. The price-reduced food items might thus negatively impact the ‘normal’ business. Thirdly, compared to the profit that can be expected from selling the price-reduced food items, the extra resources needed for store personnel to identify the items, attach a new price-tag to them, and make sure they are removed before or once they are finally not suitable for sale any more (e.g. mouldy, or past the expiration date) might be too high. The process furthermore entails the risk that items might slip the attention of the store personnel and pose a safety risk to a customer. Fourthly, the sale of price-reduced items might cannibalize the more profitable sales of normal-priced food items (see Fig. 1 for a framework of the challenges and opportunities).

Due to these reasons, retailers have been hesitant to change their practices (Grandhi & Appaiah Singh, 2015; Hooge, Oostindjer,

Aschemann-Witzel, Normann, Mueller Loose & Lengard Almli, 2016; Loebnitz et al., 2015), until the upsurge of a societal discussion about food waste and the role of the supply chain members has paved the way for retailer action. Retailers have reported to introduce measures of food waste avoidance based on store managers or management own interest and motivation (Aschemann-Witzel, Hooge, & Normann, 2016b). However, these actions have also become much more profitable given the positive effect that ‘being seen to act’ might have on the image of the store as a responsible stakeholder, with the potential to influence consumer’s retail preferences or loyalty (Lombart & Louis, 2014). This is of importance in an increasingly competitive retail market (Ganesan, George, Jap, Palmatier, & Weitz, 2009). Not least, having to throw edible food ‘in the bin’ negatively affects store personnel (Gruber et al., 2016), thus, store managers desire to improve work satisfaction of her or his personnel might also play a role.

Most of the suboptimal price-reduced food products that retailers offer appear to be bought by consumers, according to own records by the retailers (Aschemann-Witzel & Kulikovskaja, 2016). It is interesting to note, however, that reports on food waste propose that, amongst other factors, price promotions (e.g. buy one get one free) and low valuation of foods, are triggers of food wastage (Lyndhurst, 2010; WRAP, 2012). Thus, one can raise the question of whether or not the practice of selling the suboptimal food at reduced price and as an offer is contradictory to its goal of reducing food waste (Aschemann-Witzel, 2016). The scarce findings on food waste consumer behaviour and price so far provides no clear picture. ‘Buying a lot and wasting a lot’ characterised the least price conscious UK consumer segments with high self-reported food waste in a recent UK cluster study (Mallinson, Russell, & Barker, 2016), and great abundance of food might trigger food waste according to an US qualitative study (Porpino, Wansink, & Parente, 2016), suggesting that ‘buying more for less’ might cause wastage. However, it has also been found that consumer motivation to avoid food waste is often driven by disliking the thought of ‘wasting money’, as UK qualitative interviews showed (Graham-Rowe, Jessop, & Sparks, 2014), and price promotions are, in fact, more frequently used in Finnish households with lower food waste levels (Koivupuro et al., 2012). Generally, it has been established that consumers are not comfortable when food remains unused or with food wastage (Aschemann-Witzel et al., 2015; Bolton & Alba, 2012; Evans, 2012; Hoek, Pearson, James, Lawrence, & Friel, 2017; Stefan, van Herpen, Tudoran, & Lähteenmäki, 2013), but it is unclear how this relates to either their behaviour towards prices or their tendency to show frugality in purchase consumption (Melbye, Onozaka, & Hansen, 2016). So far, it remains under-researched which considerations consumers engage in-store when they are met with such price-reduced suboptimal food items, how consumers are impacted by the presence of these price-reduced foods, and how consumers are characterised who prefer to select the suboptimal items. Furthermore, it is unclear whether or not selling foods otherwise wasted in the supermarket might simply be wasted at a later stage in the supply chain, that is, the wastage only moved to consumer households but not avoided.

On this background, the research presented in the following aims to explore two questions from the range of open issues with regard to consumer perception and behaviour, price-reduced food and food waste. Firstly, it aims to explore consumer’s consideration on the offer of price-reduced suboptimal foods in-store (also called ‘expiration date pricing’, Theotokis et al., 2012), with the goal to identify which factors consumers report to take into account and why, when being met with these price-reduced foods during their food shopping. Secondly, it aims to shed light on whether consumers characterised by giving focus to price as a criterion in food shopping and seeking price promotions (thus, indicating

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