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Ensuring food safety in food donations: Case study of the Belgian donation/acceptation chain

E. De Boeck*, L. Jacxsens, H. Goubert, M. Uyttendaele

Laboratory of Food Microbiology and Food Preservation (LFMFP), Department of Food Safety and Food Quality, Faculty of Bio-Science Engineering, Ghent University, Belgium

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ABSTRACT

The food donation process in Belgium is mapped and analyzed to identify bottlenecks in compliance with the legal framework and implementation of food safety management, based on literature search and interviews with stakeholders (donors, acceptors, regulators and facilitators) in Belgium and at EU level. The study revealed that the food donation/acceptation chain is far less structured and organized than the conventional food supply chain. The fragmented landscape of many small food banks and charity organizations (acceptors), often directed by and working with volunteers without training in food safety and lack of knowledge of legal food hygiene requirements is a bottleneck to generate trust among food donors and restricts the provision of perishable products in food donations. Lack of refrigerated transport and insufficient cold/freezing capacity in food banks and charity organizations was identified as a barrier to distribute perishable products. Furthermore, in two cities in Flanders (Belgium), at some food donation centers, donated perishable food samples (n = 72) were taken and subjected to microbiological analysis to determine their overall food quality, hygiene and food safety status. Twenty-two of 72 analyzed samples showed marginal microbiological quality based on numbers of yeast, lactic acid bacteria or total viable count. In three samples *Listeria monocytogenes* was detected per 25 g among which one ready-to-eat cooked meat product which showed increased numbers of *L. monocytogenes* (3.5 log CFU/g) and *Enterobacteriaceae* (6.7 log CFU/g). Overall, in Belgium, most of the donated foods considers nonperishable foods, with more or less half of the food collected by the food banks being purchased with funds from FEAD (Fund for European Aid to the Most Deprived) and thus not derived from food losses. Efforts are being made by facilitators to provide a platform for better coordination of donors and acceptors to make more efficient use of food losses. Regulators at the national level are taking action to clarify and provide some flexibility in food hygiene regulation and initiatives on EU level to facilitate food donation in the combat of food losses are pending. As from the side of the acceptors, it is recommended to professionalize the acceptation chain in Belgium and seek for a more harmonized approach and concerted action.

1. Introduction

Ninety million tons of food was wasted in Europe in 2010, globally it is estimated to be about 1.3 billion tons (FAO, 2013). For Belgium the annual food loss is estimated to be 3.6 million tons (DGENV, 2010; Roels & Van Gijseghem, 2011). These food losses have many causes, both within the agro-food chain and with the consumer. Food waste in Europe and North America is estimated at 95–115 kg per capita per year, while for Sub-Saharan Africa and South/Southeast Asia this is about 6–11 kg per capita per year (Priefer, Jorissen, & Brautigam, 2016).

Many definitions for 'food loss', 'food waste', etc. are being used in literature and all types of reports, which leads to confusion and impedes uniform measurement and as such, straightforward comparison between studies in this field (FUSIONS, 2016; Lebersorger & Schneider, 2014). 'FUSIONS' (Food Use for Social Innovation by Optimizing Waste Prevention Strategies) was an EU FP7 project (2012–2016) initiated to harmonize food waste monitoring, to link social innovation to reduction of food waste and the development of guidelines for a common Food Waste Policy for EU-27 (FUSIONS, 2014, 2016). Based on this FUSIONS' framework, studies of Tarasuk and Eakin (2005) and the Public Waste Agency of Flanders (OVAM, 2012) a definitional framework was set, which is illustrated in Fig. 1. In this paper 'food waste' is defining those losses not suitable anymore for human consumption while 'food loss' are considered to be those losses which are still applicable for human consumption, including 'surplus food' being structurally over

* Corresponding author.
E-mail address: Elien.Deboeck@ugent.be (E. De Boeck).

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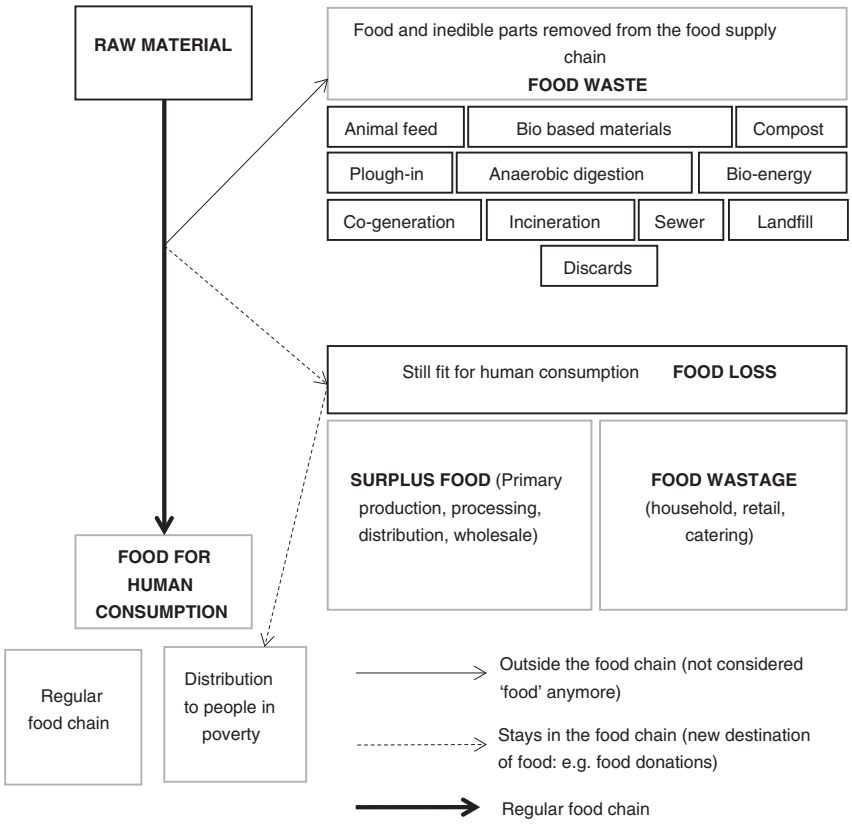

Fig. 1. Flow diagram explaining definitional framework: food loss, food wastage, surplus food and food waste. Based on OVAM (2012), Tarasuk and Eakin (2005) and FUSIONS (2014).

production along the agro-food chain and 'food wastage' being overproduction during food preparation in domestic kitchens, restaurants or catering.

In primary production food waste/losses are mainly caused by plant diseases or molds damaging plants or by sorting out of products due to rigorous qualitative standards etc. (Priefer et al., 2016). A second source of food waste/losses is created during processing due to overproduction, technical shortcomings, damage of products or packaging, etc. (Richter & Bokelmann, 2016). In distribution and retail short shelf life dates, miscorrelation between customer demand and offer, damaged packages for instance will result in food waste/losses (Lebersorger & Schneider, 2014; Roels & Van Gijseghem, 2011). Also in food services (e.g. restaurants and catering) food losses can occur. Wrong portion sizes and difficulty to predict customer demands are important causes(Engstrom & Carlsson-Kanyama, 2004; Silvennoinen, Heikkila, Katajajuuri, & Reinikainen, 2015). The last shackle in the chain is the consumer/household itself. Wrong portion sizes, insufficient knowledge of appropriate food storage and food preparation practices, poor experience in planning meals, etc. can lead to food losses (Edjabou, Petersen, Scheutz, & Astrup, 2016; Priefer et al., 2016). A major cause here is wrong interpretation of shelf life dates, which remains an important issue for consumers. Indeed, the study of Van Boxstael, Devlieghere, Berkvens, Vermeulen, and Uyttendaele (2014) provided evidence that 30% of Belgian consumers don't know the difference between 'use by' and 'best before' dates.

The first measure to reduce food waste/loss is prevention (Papargyropoulou, Lozano, Steinberger, Wright, & bin Ujang, 2014). Ways to prevent food waste/loss are already widely discussed in literature, for example changing aesthetic criteria and cultural expectations of size and shape of fruit and vegetables could significantly reduce food losses at primary production (Mourad, 2016), optimizing food packaging design to extend the shelf life of products (Gronman et al., 2013), a close collaboration between food manufacturer and retailer could lead to more accurate prediction of orders and stock management (Richter & Bokelmann, 2016). At retail level, Lebersorger and Schneider (2014) mention education and awareness raising of employees and they propose that food service providers could adapt portion sizes to customers' real needs, by offering choice of portion sizes to graded prices (Priefer et al., 2016). Potential prevention strategies in households could be to streamline food date labeling and intelligent packaging, for example by use of time temperature indicators (Pennanen et al., 2015; Priefer et al., 2016).

A second possibility is to consider to what extent food losses are still appropriate for human consumption and to provide the surplus food fraction of food losses for donation to economically deprived people. In 2014 24.4% Europeans were at risk to end up in poverty and 9.6% was not able to pay for a full meal (FEBA, 2014). Specifically for Belgium, Vandevoort (2013) reports that 1 in 10 Flemish people are living in poverty. Better coordination between food losses and the demand for food aid would be beneficial for both issues: minimizing food still applicable for human consumption to be discarded and providing access to wholesome and nutritious food to economically deprived persons. Several authors already stated that reducing food waste could significantly impact an increase in food security (Ingram et al., 2013; Priefer et al., 2016). Optimization of the donation/acceptation process can only be achieved, if all stakeholders, such as donating retail or processing companies, regulatory bodies, food banks, charity organizations, etc. are willing to cooperate (Priefer et al., 2016).

Among the EU Member States and also outside EU, roles and organization of food banks and charity organizations can vary a lot. In some countries they merely serve as intermediate agents receiving donations, store them and then redistribute them (Garrone, Melacini, & Perego, 2014). In contrast, the North-American/Australian food bank model is deemed to be going further and actually providing assistance to economically deprived persons by focusing on 'healthy food', providing nutritional information and combing food literacy programs with initiatives to stimulate physical activity (Butcher et al., 2014; Garrone et al., 2014; Lindberg, Lawrence, Gold, & Friel, 2014).