Baseline Assessment of Product Waste Giveaway: Ready-Meal Food Sector Case Studies

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INTRODUCTION

Food product wastage is reported in the food industry (including the ready-meals sector) due to production / processing methods and visual, physical, microbiological or compositional reasons (Hyde *et al.* 2004). Minimisation of such losses may not only improve technological effectiveness but also be of substantial financial benefit for food sector businesses and increase potential sustainability/profitability. The reduction in the use of raw materials is reported to carry the greatest potential for financial savings (Henningsson, *et al.* 2001) and over-production wastes have been found to account for 20-40% of material wastes generated by some convenience food manufacturers (Darlington *et al.* 2009). Reports indicate that ready meals and chilled products generate up to 12% of the total waste arising in the food and drink chain (including packaging) (WRAP, 2016).

The aim of this study was to conduct an in-depth analysis of processing techniques and process flows of ready-meal food products in terms of waste production, processing efficiency and recommendations for waste minimisation and cost savings.

METHODS

- Detailed audits (n=5) were undertaken for multiple product-lines in two ready meal sector businesses processing and manufacturing 'ready-to-cook' meat and poultry convenience meals.
- In-use process flows of five product lines were evaluated according to quantitative observations.
- Processing waste volumes and associated costs during raw material weighing, cooking of components, final assembly and packing were identified and reviewed.
- Data collated was compared with company product specifications.

RESULTS

Overall, data capture and review from the production processes of five ready-meal products in two companies indicated variable 'waste giveaway' values.

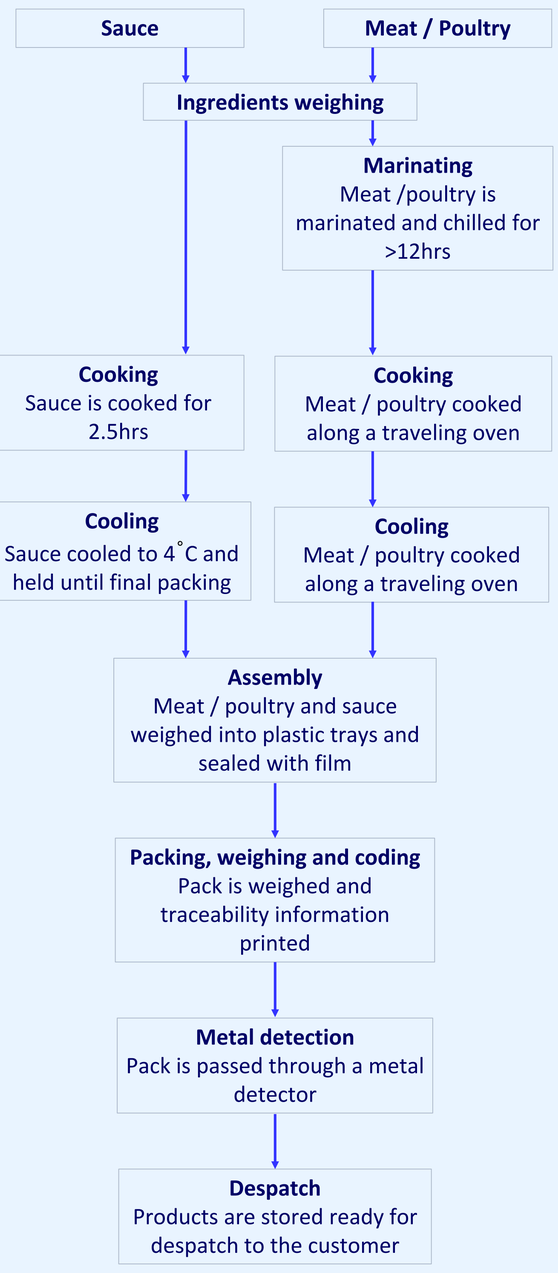
Data presented in Table 1 illustrates the variation in % across the final product weight specification tolerance. Overall, 44.4 - 92.5% of meat/poultry based ready meals in audited product lines were within/above the upper target specification weight range; 2.0-28.1% exceeded specified weight targets, thus represented processing inefficiencies.

Table 1. Ready meal end product specification and target weight adherence

	Company A			Company B	
	Product A1	Product A2	Product A3	Product B1	Product B2
Specification target weight (g)	355g (+/- 10g)	320g (+/- 10g)	320g (+/- 10g)	400g (+/-10g)	400g (+/-10g)
Above Maximum Target Weight Range	2.0%	8.0%	4.9%	28.1%	9.3%
Upper Target Weight Tolerance	90.5%	74.0%	82.9%	51.6%	35.1%
Target weight	3.0%	6.0%	12.2%	3.2%	6.6%
Lower Target Weight Tolerance	4.5%	4.0%	0.0%	16.0%	41.7%
Below Minimum Target Weight Range	0.0%	8.0%	0.0%	1.1%	7.3%

- During auditing of Company B the majority of final product weights were in the upper target weight specification tolerance range (35.2-82.9%).
- The main source of waste in this company was identified during the marinating process of a poultry product (Figure 1). Data indicated up to 16Kg of marinade/1062Kg was wasted due to direct drip loss from the belt as the poultry entered the travel oven.
- Further analysis indicated that reduction of the marinade portion in the recipe by 20% would reduce marinade loss during pre-processing.
- Reducing the overall total batch size by up to 2% could therefore save up to £80,000 annually based on the volume of poultry processed with no impairment of product quality.

Figure 1. Production process flow with observations and weighed product loss (Company B, n=2 ready-meal products)



Audit waste analysis

Raw Materials
A review of the raw materials found that all ingredients including the packaging received were 'in-weight' with the exception of one supplier of dry ingredients being up to 4% underweight.
Raw poultry delivered in 15Kg bags were found to be 0.5 Kg underweight; 94% of raw poultry was within the customers required specification.

Weighing Up
Auditing the 'weighing process' indicated that all ingredients were weighed correctly within target weights.

Cooking/Cooling
Both sauce and poultry were cooked as specified and yields were found to be 1-2% under of the expected value once cooled; 16Kg of marinade was lost during the pre-processing of cooked chicken.

Assembly
Meal component weights for sauce and chicken were found to be between 1.25 – 3.4% below the required specification target weight.
This gave an average final packed weight which was underweight by 0.5% of the stated pack weight.

Regular weight checks and a greater understanding of production process at each stage is required to ensure that products are made to the correct specification.
Producing a product close to the target weight with minimal give away during the process will reduce financial loss, maximise resources and ensure production of a product that is to the correct yield and agreed customer cost.

CONCLUSIONS

- **Processing of audited ready-meal food production lines accrued minimal product waste giveaway.**
- **Maximum target weight tolerances were exceeded in all observed product lines with substantial excesses recorded.**
- **Substantial financial savings could be achieved by improving processing efficiency methods, thus potentially improving business profitability and sustainability.**

REFERENCES

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