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 product specification and target weight adherence

<table>
<thead>
<tr>
<th></th>
<th>Company A</th>
<th>Company B</th>
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<tbody>
<tr>
<td>Specification target weight (g)</td>
<td>355g [-5/ 10g]</td>
<td>350g [-1/-15g]</td>
</tr>
<tr>
<td>Above Maximum Target Weight Range (%)</td>
<td>0.0%</td>
<td>8.0%</td>
</tr>
<tr>
<td>Upper Target Weight Tolerance (%)</td>
<td>90.5%</td>
<td>74.0%</td>
</tr>
<tr>
<td>Target weight (%)</td>
<td>3.0%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Lower Target Weight Tolerance (%)</td>
<td>4.5%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Below Minimum Target Weight Range (%)</td>
<td>0.0%</td>
<td>8.0%</td>
</tr>
</tbody>
</table>

- 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.

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