Microbial Risk Profiling of Cooked Chilled Foods

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Introduction: Cooked chilled foods, more aptly known as REPFED (refrigerated and processed foods of extended durability), are a very heterogeneous group of food products. To assure their microbial safety, the food industry relies on a combination of mild heat treatment (i.e. pasteurisation), refrigerated storage and consumer instructions for handling and preparation.

Purpose: This research assessed the potential risk to the consumer for different types of REPFEDs, based on the production process, labelling and data collection on prevalence and survival of pathogens.

Methods: The production-processes of 5 Belgian REPFED-producing companies were analysed according to their microbial risk profile. Both historic (n=1533) and new (n=90) analysis results for 3 pathogens (B. cereus, L. monocytogenes and sulphite reducing Clostridia) were collected for final products on the day of production and for final products at the end of shelf life. The pasteurisation value (P-value) for heat treatment at consumer phase was determined for 50 products by simulating the proposed heat treatment as recommended on the label. Finally, one high-risk product (paella) was challenge-tested (in 12-fold) for survival of L. monocytogenes during heat treatment at the consumer phase.

Results: Three types of cooked chilled foods could be distinguished based on the heat treatment applied during the production process (P_{90}=10, P_0=2 or no safe harbour), while 5 types of REPFEDs could be distinguished based on the heat treatment applied at consumer phase (Ready-to-eat (s.l./s.s.), ready-to-reheat, ready-to-heat and ready-to-cook). The combination of the production and consumer heat treatment ultimately determines the risk to the consumer. None of the analysed products (n=1533) carried unacceptable numbers for any of the three pathogens. Only 10 out of 50 products that were reheated obtained a P-value sufficiently high to eliminate L. monocytogenes (P_0=2). During the challenge tests of L. monocytogenes in paella, the pathogen was able to grow in all 12 replications and remained present in 7 out of 12 replications after reheating at consumer level.
**Significance:** Results indicate that the current microbial safety of REPFEDs is good, but that a thorough validation of both production-process and final product is necessary to guarantee the food safety. If reheating by the consumer is necessary for food safety, then this process should also be validated.