

Project Title: SUSSLE (Sustainable Shelf Life Extension) - Enhancing sustainability of chilled prepared foods by using risk assessment to set shelf life, reduce processing energy and wastage whilst assuring safety

Project Number: AFM 266

Context:

The shelf life of foods that are not sterile depends upon the microbial loading of the raw materials, process lethality, post-process contamination and constraints on growth in post process storage. The UK chilled food industry supplies large volumes of foods given a low intensity heat process targeting vegetative pathogens (>70°C/2 minutes but <90°C/10 minutes) and a limited amount of food processed to meet the voluntary 90°C/10 minutes criterion for foods with shelf lives greater than 10 days.

Shelf life limitation to 10 days is set in a voluntary agreement of 1992 established by ACMSF. In 2007 CFA succeeded in re-securing this '10 day rule' for the shelf life of chilled products (foods stored at 3-8°C) against FSA's proposed change to 5 days. A reduction to 5 days would have made the production and distribution of the vast majority of chilled foods impractical and was agreed in 2006 by ACMSF to be unnecessary as the 10 day rule is demonstrably effective in assuring the safety of chilled prepared foods.

Project Overview:

The £750,000 SUSSLE research programme was carried out at the Institute of Food Research, Norwich being funded jointly by the Chilled Food Association, the Defra LINK Food Manufacturing programme, Unilever and BBSRC, with the Food Processing Faraday Partnership Ltd/Quotec managing the project to February 2012. SUSSLE ran from 1/12/08 to 31/3/12. Outputs of the project are subject to a confidentiality agreement until 1/4/14. Participation was restricted to CFA Full Members. The project included an Expert Group to monitor the quality and relevance of the work in an international context.

The challenge for SUSSLE was to define and achieve recognition for a designed approach to linking actual microbial loads of non-proteolytic *Cl. botulinum* through a defined heat process to a safe shelf life using risk assessment techniques. Increased shelf life should lead to a reduction in waste at all points in the supply chain and lower heat treatment processes than 90°C/10 mins should lead to energy savings for manufacturers.

Purpose of the work:

- 1. Establish an appropriate protection factor (level of reduction in the probability of growth and toxin production) for spores of non-proteolytic *Cl. botulinum* in minimally heated refrigerated foods.** The application of a risk assessment based statistical approach and the production of the relevant, well-founded microbiological data allowed a realistic protection factor to be calculated for the first time.
- 2. Establish example shelf-lives of chilled foods that are given** a medium heat intensity process (with respect to non-proteolytic *Cl. botulinum*). To build on the risk assessment model unique to SUSSLE, time to toxin was measured first in broth and then validated using model commercial food products, inoculated with realistic spore concentrations (based on the protection factor identified above), exposed to a medium heat intensity at different time combinations. From this work and the mathematical models developed by SUSSLE an appropriate maximum shelf life/lives at a defined time / temperature profile, was established with respect to non-proteolytic *Cl. botulinum*.

It must be noted that an extended universal shelf life cannot be arbitrarily applied to chilled foods and that restrictions will apply. It is essential therefore that all products are validated by the SUSSLE software model and that the SUSSLE guidance/rules document is applied.

As a reminder the Intellectual property derived from SUSSLE is restricted to CFA member companies until 1 April 2014.

- 3. Technology transfer and evaluation.** The benefits and restrictions of the research outcomes will be evaluated in commercial practice.
- 4. There will be training workshops for CFA member companies, to allow the science from SUSSLE to be applied to CFA members' products.** It is also planned to hold a briefing session, subject to demand, for CFA members' customers, the brand owners of many member products.