

Foodborne Disease Strategy: **Focus on *Listeria***

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Programme

- **UK retail chilled prepared food industry**
- **CFA membership and strategy**
- ***Listeria monocytogenes* and listeriosis**
- **Highest risk foods**
- **Controls used by professionals and their efficacy**
- **What we want**
- **Guidance available**

UK Retail Chilled Prepared Food Industry

Year	Market (£m)
1989	550
1999	4550
2005	7357
2009	8708

Chilled foods' unique position

- Retail brand dominance, although brands now emerging
- No manufacturer contracts
- Unpreserved
- Just in time
- HACCP from the outset
- Exacting microbiological standards
- Significant annual churn
- Predominantly made in the UK

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Chilled Food Association

- **Who are we?**
 - Represent professional manufacturers supplying UK market
- **What is our Mission?**
 - To promote and defend the reputation and value of the professional chilled food industry through the development and communication of standards of excellence in the production and distribution of chilled food
- **With whom do we work?**



CFA – Our Partnerships



Samworth Brothers
QUALITY FOODS



Our Overall Strategy

- **To promote our standards and sector to regulatory bodies, policymakers and other stakeholders**
- **For CFA Members to promote CFA standards throughout their supply base**
- **To catalyse action on issues broader than the chilled food sector alone**
- **To attract members who**
 - **Are professional chilled food manufacturers and chilled component/raw material suppliers**
 - **Meet CFA Guidelines standards**
 - **Are accredited to appropriate technical standards**



UK Chilled Prepared Food Ranges

- Dressed salads
- Leafy salads
- Prepared Vegetables
- Prepared fruit
- Stir fry kits
- Sandwiches and wraps
- Sandwich fillings
- Quiche/flans
- Pizza
- Recipe dishes/kits
- Meal Accompaniments
- Sushi
- Filled and plain fresh Pasta
- Soups (some RTE)
- Sauces
- Desserts

Items in green = ready to eat

Ready to Eat Food = ?

Defined in Regulation 2073/2005 as:

“food intended by the producer or the manufacturer for direct human consumption without the need for cooking or other processing effective to reduce to an acceptable level or eliminate microorganisms of concern.”

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Not included in CFA's scope:

- **Meat, e.g.**
 - Raw or air-dried
 - Cooked or cured
- **Dairy products, e.g.**
 - Milk (fresh or fermented)
 - Cheese
- **Fish, e.g.**
 - Unprocessed raw whole/fillets

BUT... chilled prepared foods may include these ingredients

Listeria monocytogenes

- One of 6 spp of *Listeria* (mono, innocua, welshimeri, seeligeri, ivanovii, grayi)
- Gram-positive rod-shaped bacterium
- Most strains pathogenic, those that aren't are detectable
- Most heat resistant vegetative pathogen (6D = 70°C/2 mins)
- Facultative anaerobe
- Relatively cold tolerant
- Relatively salt tolerant



Lm Distribution

- Occurs naturally in soil, sewage, silage, gut of many animals, raw meats
- Estimated that 10% of healthy adults carry in gut
- Transmission from
 - infected food
 - the environment
 - mother to foetus
- **Major transmission route into humans is through contaminated foodstuffs**



Listeriosis - the commonest cause of food-related deaths in the UK

- **'Flu-like, septicaemia, meningitis, spontaneous abortion**
 - Immunosuppressed: meningitis-encephalitis ± brain abscess
 - Adults: bacteraemia, sometimes with organ abscesses
 - Pregnant women: often → foetus infection, stillbirth
- **Hospitalisation rate: 85-90%**
- **Death rates:**
 - meningitis ~70%
 - septicaemia 50%
 - perinatal/neonatal >80%
- **Infective dose variability between strains (5-fold?)**
- **Long incubation period: 3-70 days (→source ID?)**

Listeriosis – Epidemiology

- **Changes**
 - Incidence approx doubled since 2001
 - Mainly in 60+ group
 - Bacteraemia without CNS infection
 - This increase has continued into 2009
- **Cannot be explained by**
 - Recognised outbreaks
 - Regional differences
 - Age
 - Gender or
 - A predominant *Lm* subtype
- **Other European countries report similar increases**

Listeriosis - Risk Factors

- **More likely to report consumption of:**
 - cooked meats (beef and ham/pork; not poultry)
 - cooked fish (i.e. (cold?) smoked salmon) & shellfish (prawns)
 - dairy products (i.e. milk but also certain cheeses)
 - ‘mixed salads’
- **More likely to be bought from:**
 - convenience stores & local shops (bakers, butchers, fishmongers and greengrocers)
- **Incidence higher in most deprived areas**
 - Observed in patients aged 60+
 - More marked for pregnancy-associated cases
- **Pregnancy-associated cases increasingly ‘ethnic’**
 - 16.7% to 57.9% from 2001-8, most marked 2006-8

Greatest Risk Foods?

- **EFSA BIOHAZ Panel Lm Opinion (2007-8)**
 - The ‘small proportion’ of RTE foods with ‘high levels’ of *Lm*
 - Foods supporting the growth of *Lm* to ‘high levels’
- **FAO/WHO/JEMRA: Micro Hazards in Foods (2001)**
 - **by eliminating higher dose levels ($>10^{3.5}$) the number of predicted cases would be reduced by $>99\%$**
- **Not made according to GMP/GHP**
- **Long/excessive shelf life**

% Lm *Prevalence in Food (EU): 2004-6

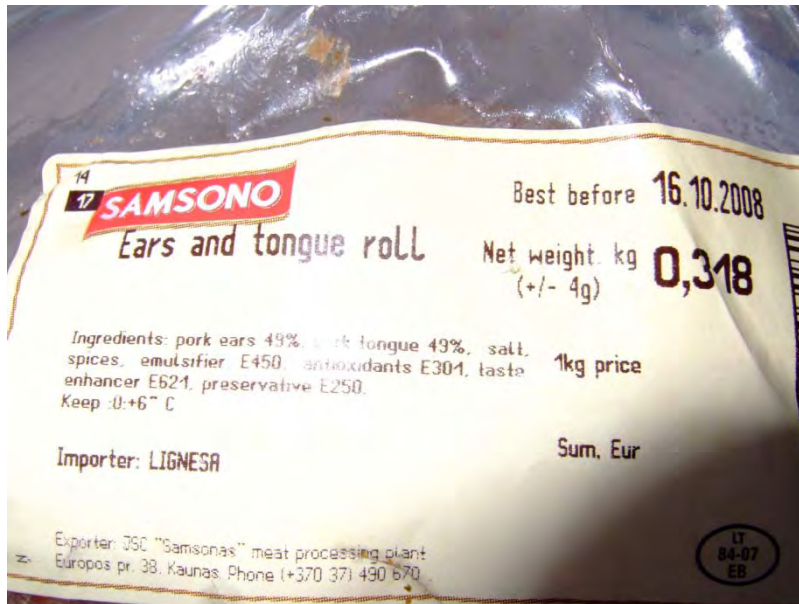
- **0-30% fish products**
- 0-33% fruit and vegetables
- 0-33% sandwiches
- **0-38% cheeses**
- **0-40% poultry meat products**
- **0-48% meat products**
- 0-100% raw milk

*presence in 25g

Recent Recalls from the UK Market

Ear & Tongue Roll

Lithuanian import - 2.8×10^6 cfu/g
Use by 16/10/08, Recall 22/10/08



Home Black Pudding Sausage

Polish import – 6×10^5 cfu/g
Use by 30/10/10, Recall 20/10/10

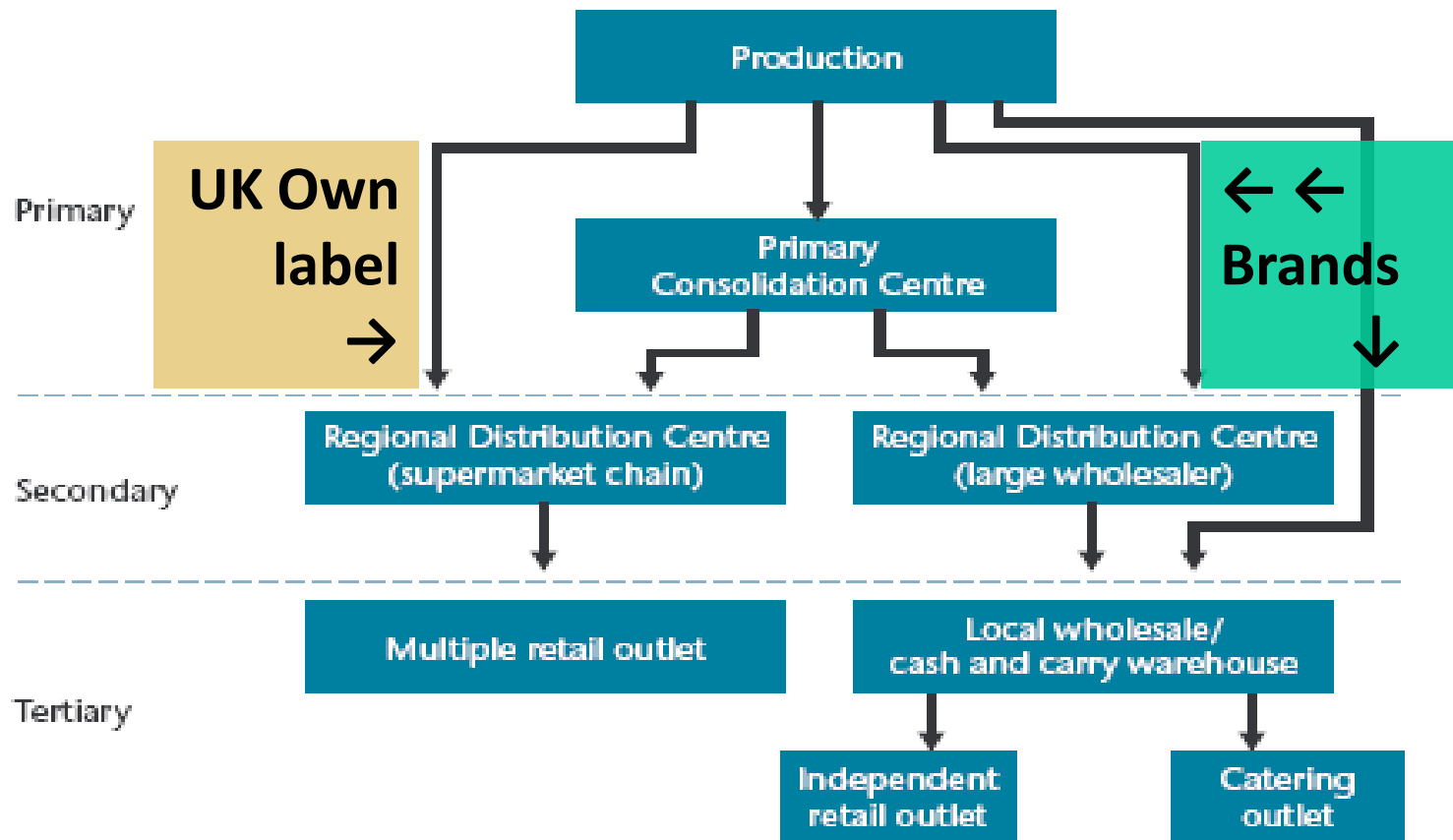


Prevalence in UK RTE Foods

- Higher prevalence in food sliced to order than pre-packed
- Greatest prevalence
 - Non-prepacked foods without clear storage/usage instructions
 - Food from sandwich bars, butchers, convenience shops, bakeries
 - Sandwiches (7%) & sliced meats (3.7% within s/life, 4.2% @ end)
- 'Consumer at risk' score inversely proportional to prevalence:

Premises Type	Total No. Samples n= 6299 (%)	No. Samples Unsatisfactory n = 55 (%)	Samples with all <i>Listeria</i> spp. n = 296 (%)	Samples with <i>Lm</i> n = 137 (%)
Bakery	217 (3.5)	12 (5.5)	18 (8.3)	8 (3.7)
Butcher	140 (2.2)	3 (2.1)	17 (12.1)	6 (4.2)
Convenience shop	1331 (21.1)	15 (1.1)	92 (6.9)	55 (4.1)
Delicatessen	201 (3.2)	4 (1.9)	5 (2.5)	1 (0.5)
Farm shop/market	119 (1.9)	4 (3.3)	7 (5.8)	2 (1.7)
Market shop/stall	15 (0.2)	0	0	0
Sandwich bar	106 (1.7)	3 (2.8)	12 (11.3)	6 (5.7)
Supermarket delicatessen	203 (3.2)	0	6 (3.0)	2 (1.0)
Supermarket pre-packed	3820 (60.7)	13 (0.3)	134 (3.5)	55 (1.4)
Other (Service station, cash & carry, greengrocer, village shop)	147 (2.3)	1 (0.7)	5 (3.4)	2 (1.4)

Example structure of food distribution channels



Probable & Possible Listeriosis

cases/clusters (England, Wales: 1999-2007)

Year	Region	Cases	Vehicle
1999	NE England	4	Hospital sandwiches
2003	NE England	17	Butter
2003	NE England	18	None identified
2003	S Wales	2	Hospital sandwiches
2003	SW England	5	Hospital sandwiches
2004	E Mids	6	None identified
2004	SE England	2	Hospital sandwiches
2005	NW England	1	Sliced meat
2006	London	1	Sliced meat
2007	London	1	Hospital sandwiches

What Makes Chilled Food RTE?

Controls at manufacture:

- **Manufacturer's risk assessment and product design, i.e. HACCP plan**
 - Supply QA and audits – raw materials
- **Appropriate controls**
 - Minimise potential for contamination by zoonotic organisms
 - CFA's Micro Guidance for Growers [produce]
 - CFA Best Practice Guidelines for the Production of Chilled Food
- **Hygienic preparation and packing – High Care and High Risk Areas**
 - Prevent re-/cross-contamination
- **Specified thermal processes followed by rapid chilling**
 - Equiv. to min. 70°C/2 mins – ≤ 10 d shelf life
 - Equiv. to min. 90°C/10 mins – > 10 d shelf life
- **Limited shelf life**
 - Ensure peak quality
 - Minimise opportunity for microbial growth

What Makes Chilled Food RTE?

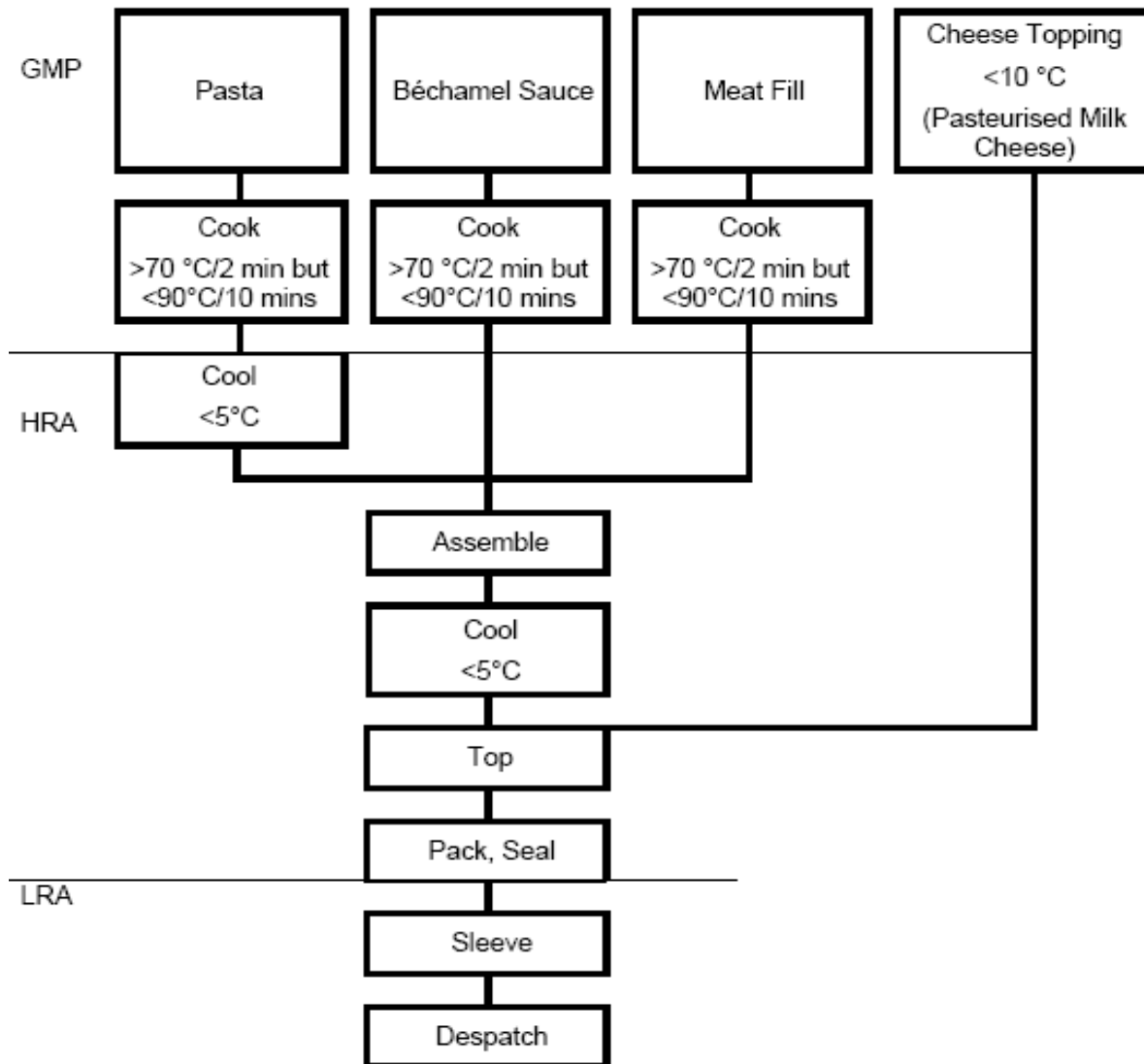
Post-Manufacture Controls

- Chilled distribution, sale and storage
 - Minimise potential for microbial growth
- Despatch and distribution to retail
 - $<5^{\circ}\text{C}$ required and monitored by UK major retailers
- Retail storage
 - $\leq 8^{\circ}\text{C}$ legally
- Consumer storage
 - Use by date
 - Usage instructions

Segregation – GMP/LRA, High Care and High Risk Areas

- **GMP/Low Risk Area**
 - Raw material intake
 - Ready to cook foods
 - Packaged product
- **High Care Area**
 - RTE food production
 - Includes non-thermally processed ingredients having been through a decontamination process
 - Separate equipment, utensils, staff and changing areas
- **High Risk Area**
 - RTE and ready to reheat food production
 - Only thermally processed foods (minimum 70°C/2 mins)
 - Separate equipment, utensils, staff and changing areas

High Care/Risk Manufacture



Micro Criteria 2073/2005

- **Applicability:**

- ‘Products placed on the market during their shelf-life’, or
- ‘Before the food has left the immediate control of the FBO who has produced it’ (and throughout the shelf life)

- **Sample number:**

- n=10 (infants, particular medical uses)
- n=5 (other foods)

- **Specified methods:**

- Detection: EN/ISO 11290-1
- Enumeration: EN/ISO 11290-2
- or alternative validated using ISO 16140

- **RTE foods only**

Which *Lm* Criterion?

Is product RTE?

NO
→

No specific *Lm* criterion applies

↓ YES

Is product intended for infants/special medical purposes?

YES
→

Lm absent

↓ NO

Is product excluded in a footnote?

YES
→

No specific *Lm* criterion applies*

↓ NO

Is $\text{pH} \leq 4.4$ or $a_w \leq 0.92$ or $\text{pH} \leq 5.0$ & $a_w \leq 0.94$ or shelf life $< 5\text{d}$ or frozen at $\leq -12^\circ\text{C}$?

YES
→

Product unable to support *Lm* growth. Limit of 100 cfu/g applies

↓ NO

Do scientific/modelling/historic/etc data show growth not supported within shelf life?

YES
→

Limit of 100 cfu/g applies

↓ NO

Will low levels of *Lm*, if present, grow to ≥ 100 cfu/g within shelf life under expected storage conditions?

YES
→

Reduce shelf life so that limit of 100 cfu/g not exceeded during shelf life

↓ NO

Shelf life is appropriate

*default is 100/g in RTE food

What do manufacturers have to do?

- **Implement GMP & HACCP: EU hygiene 852/2004 etc**
- **Sample for HACCP verification and monitoring, compositing across lots**
- **Carry out environmental swabbing:**
 - *Lm* (RTE food) – *Listeria* spp as indicator
- **Set appropriate shelf life**

Comparing chilled foods' shelf lives

	UK	Other EU	USA
Delicatessen meat	10-15 d (uncured) 15->30 d (cured) [major retailers]	14-28 d(uncured) 14-56 d(cured)	28-84 d
Sandwiches	2 d [major retailers]	≤14* d	≤ 21 d
	4 d [airline]		
	10 d [discounter]		
Cold-smoked salmon	21-24 d	≤120 d	≤120 d

Fundamentally the same food so why such different shelf lives?

Answer: **Shelf life protocol variability, lack of shelf life validation + reacting to commercial demands**

CFA/BRC Shelf Life Guidance

- **Consortium of organisations inc FSA, CIEH, LGR**
- **Contents**
 - Who Needs to Use This Guidance?
 - Requirements for the Safe Manufacture of RTE Food
 - Establishing Shelf Life
 - **Practical Application of Shelf Life Studies**
 - **Checklist for Buying Ingredients**
 - Questions and Answers
 - Glossary
 - Further Sources of Information
 - Worked Examples Weblinks
- **Free download:**
<http://preview.tinyurl.com/ycyyydu>

CFA/BRC/FSA Shelf Life Guidance – Key Points

Ensure that requirements for safe manufacture of RTE foods are in place. See section 5.



If buying RTE ingredients ensure they comply with this guidance. Buy from a reputable source. Obey usage and storage instructions provided, in particular the UBD.
See 'Checklist for buyers' if in doubt. See section 8

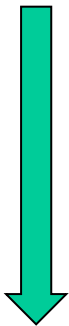


If buying ingredients that are not RTE, ensure they are processed to make them RTE, e.g. cooked then cooled. See section 8.



Do the final product's characteristics control or prevent the growth of Lm or is shelf life <5d? See section 6i.

Yes



Limit of 100 cfu/g applies throughout shelf life

No

Assume the food will support the growth of Lm. Do you have evidence 100 cfu/g will not be exceeded during the proposed shelf life? See section 6.

Yes



Demonstrate that the food does not contain Lm at the end of manufacture

No



Example Use of *Lm* Historical Data

If *Lm* detected in a RTE product:

- at the beginning of shelf life at a level of e.g. <20 cfu/g, **and**
- data on a representative sample from the same batch at end of life shows levels remain below 100 cfu/g

Then...

- the data help demonstrate that the product remains within the *Lm* criteria over its shelf life
- Under such circumstances, a low level (e.g. <20 cfu/g) detection during shelf life should not need to be withdrawn

CFA/BRC Shelf Life Guidance – Worked Examples

- **Data to support shelf life must be documented**
- **No requirement for data to be held in the format as set out**
- **Worked examples**
 - **New Product**
 - **Cold Smoked Salmon & Fresh Watercress Sandwich – Simplified**
 - **Cold Smoked Salmon & Fresh Watercress Sandwich – Technical**
 - **Altering an existing recipe**
 - **Brie with Garlic and Herbs – Simplified**
 - **Brie with Garlic and Herbs – Technical**
 - **Justifying the shelf life of an existing product**
 - **Cold Smoked Salmon and Fresh Watercress Sandwich**

Efficacy of Controls - Industry Data

- **Unique, substantial database**
 - Data likely to be biased
- **High volumes of verification analysis by CFA members**
 - Food samples: >356k 2003-9 (RTE + non-RTE)
 - Environmental swabs: >221k 2006-9
- **DOP (Day of Production)**
 - Manufacturing hygiene
- **EOL (End of Life)**
 - Shelf life appropriateness
- **Demonstrates**
 - Low isolation frequency and low levels, even at EOL
 - Better control than shown in wider surveys, e.g. HPA, EU
 - Shelf lives are appropriate
 - Implementing current legal & best practice approach works

Conclusions & What We Want

- Applying GMP + HACCP, i.e. High Care/Risk Area regimes, are a **demonstrably effective** control strategy
- DOP and EOL analysis **works** as a means of demonstrating manufacturing control and shelf life appropriateness
- **Current rules and guidance need to be implemented and enforced**
 - Hygiene legislation
 - Shelf life establishment
 - Micro Criteria for Foodstuffs

HACCP in Practice – CFA Guidance

- **CFA Best Practice Production Guidelines:**
 - www.tsoshop.co.uk/chilledfoods
 - Covers all chilled prepared foods
 - Integrates with BRC Global Standard and IFS
 - **20% discount code for EHPs: 'CFA'**
- **CFA Lm Management Guidance:**
 - Best hygiene practice, methodology, implementation
 - Hard copy available from CFA by request
- **Microbiological testing - application & interpretation:**
 - <http://preview.tinyurl.com/ybo2p35>
- **EU Microbiological Criteria Regulation 2073/2005:**
 - CFA/BRC guidance: <http://preview.tinyurl.com/yaxr9ss>
 - CFA/BRC Lm and shelf life guidance + worked examples: <http://preview.tinyurl.com/ycyyydu>



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