Increasing Public Confidence in the Recycling of Organic Resources: 
Considerations from a chilled food perspective

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SORP Annual Conference, 19/2/09
Content

- The unique UK chilled prepared food sector
- **Agricultural issues** - waste as an input
- **Waste outputs** – why, what, how much, where
- Requirements/challenges
UK Chilled Prepared Food

**Consumer confidence & trust: safety, quality**

- £8.5bn+ UK retail market
  - 9,000 SKUs made by CFA members at any one time
  - Factories produce 30-40 different foods each day
- Just in time manufacture
- Dedicated supply chain, integrated control, own/contract growers
- 95% retailer own label, no manufacturer contracts
- Very few finished product imports
- Largely RTE – hygiene critical
Chilled Food Characteristics

• Short shelf life ingredients and final products
  – *Perishable waste requires efficient disposal routes*

• Multicomponent products
  – Complex ingredients streams → **heterogeneous waste**
  – Animal derivatives content 0-100%, but large proportion of foods within 5%-25% range
  – 50-70% moisture
  – Remainder: carbohydrate, e.g. bread, pasta, produce

• Potential for re-working generally low
UK Retail Chilled Prepared Food

- Dressed salads
- Leafy salads
- Prepared Vegetables
- Prepared fruit
- Stir fry kits
- Sandwiches
- Sandwich fillings
- Quiche/flans

- Pizza
- Recipe dishes/kits
- Meal Accompaniments
- Sushi
- Filled fresh pasta
- Soups
- Sauces
- Desserts

2008 retail value ~£8.5bn, equating to ~3.5Mte
Completed:

- Defra **Sustainable Food and Farming Research Priorities Group** 2003-7
- Defra-funded research by PICME: **Chilled Food Manufacturing Waste Minimisation Study** (FT0351) 2005
- Defra **Food Industry Sustainability Strategy Champions Group on Waste** 2006-8
- Defra-funded research at IFR: **Factors affecting the attachment of bacteria to, and their detachment from, prepared fruit and vegetable tissues** (AFM 234) 2005-8
- Defra-funded PhD at Imperial College: **Sustainable Waste Management in the Chilled Foods Sector** (FT0348) 2004-7
CFA Sustainability Activities

Ongoing:

• Leading LINK-supported £750k research: **Sustainable Shelf Life Extension** (SUSSLLE) (AFM266): 2008-11

• WRAP **use of waste on agricultural land** and subprojects including risk assessment for the use of source-segregated composts in UK agriculture: 2008-10 (?)

• Sheffield Hallam University: **Domestic v Industrial Lasagne production – waste and energy comparison**: 2008-9

• Defra-funded Cranfield/IGD: **Evidence on the role of supplier-retailer trading relationships & practices on waste generation in the food chain** (FO0210) 2008-9

• Defra-funded OU: **Attitudes towards the Use of Organic Resources on Land** (WR0510): 2007-9
Agricultural issues: waste as an input
Agricultural issues - waste as an input

• **Consumer confidence and trust**
  – Unrivalled standards in place in the UK retail chilled prepared produce supply chain → **exceptional record**

• **Food safety**
  – Microbiological
  – Chemical
  – Physical

• **Quality**
Agricultural issues - waste as an input

• **Food safety**
  – **Microbiological**
    • Bacteria:
      – Vegetative: VTEC, Shigella, Salmonella, Listeria
      – Sporeformers: Bacillus cereus, Clostridia
    • Viruses
    • Parasites
    • [Plant pathogens]
  – **Chemical** including allergens – animal- and plant-derived
  – **Physical** – foreign bodies

• **Quality**, e.g. *vegetarian pedigree*
UK Chilled Prepared Food

- Dressed salads
- *Leafy salads
- Prepared Vegetables
- Prepared fruit
- Stir fry kits
- Sandwiches
- Sandwich fillings
- Quiche/flans

- Pizza
- Recipe dishes/kits
- Meal Accompaniments
- Sushi
- Filled fresh Pasta
- Soups (some RTE)
- Sauces
- Desserts

Items in green include raw ready to eat produce inc garnishes

*Leafy salads (1990+): UK: $2.7 \times 10^9$ packs, Worldwide: $2 \times 10^{10}$ packs
CFA Produce WG

• 1996
  – *E coli O157* fatalities linked to contaminated produce
    • 9,000 ill, reportedly linked with radish sprouts (Japan)
    • ‘red leaf lettuce’ (USA)
  – European Chilled Food Federation VTEC WG formed
    • Identify and break the chain of contamination/infection

• 1997
  – WHO EHEC infections consultation
  – CFA research priorities
    • Organic materials use on land + other vectors, e.g. irrigation water, animals
    • Growing conditions/agricultural practices
    • Handling issues
    • Location of organisms in/on crops
CFA Produce WG

- 1998
  - ECFF VTEC & Agriculture Report
    - Presented to European Commission 1999
    - Presented EC SCF 2000 → 2001 EC produce risk assessment
  - ADAS Safe Sludge Matrix (UK law yet??)
- 2000+
  - FSA FYM activity
- 2002
  - CFA growing controls (MGG1) published
    - Field controls - critical to assuring safety
      → Assured Produce (elements), retailers’ protocols
  - CODEX leafy vegetables + sprouted seeds
- 2005
  - FSA sprouted seeds guidance meeting
CFA Produce WG

• 2005-8
  – £100K CFA/Defra/IFR pathogen attachment research

• 2007
  – CFA Micro Guidance for Growers 2 (MGG2) published supported by BLSA, FPC, HDC, NFU, Health Protection Agency, (+ACMSF? + FSA?)

• 2008
  – UN CODEX code annex on leafy veg and herbs
  – UN FAO/WHO Expert Group: leafy veg + herbs
  – WRAP, OU etc

• 2009
  – FSA FYM guidance to be published?
    • What about small growers?
  – Assured Produce protocols – to be MGG2-based
CFA inputs into external work

• Government-funded research
  – Sewage sludge (WRc)
  – FYM (ADAS)
  – Applications of ozone (Bristol)
  – Irrigation water (UEA/Surrey etc)
  – Review of hazards, organic waste usage (Harper Adams)

• Nuffield Scholarship
  – Water quality & quantity and its impact on food production

• US FDA-funded research
  – *E coli* O157 and produce

• UN FAO/WHO Expert Group Leafy Veg & Herbs
  – Hazard review
  – CODEX Food Hygiene Committee - code
What makes produce ready to eat?

• Manufacturer’s risk assessment and food design, i.e. HACCP plan

• Appropriate field controls
  – Minimise potential for contamination by zoonotic organisms
  – CFA's Micro Guidance for Growers (2nd ed)

• Hygienic preparation and packing
  – Prevent re-/cross-contamination
  – Remove soil
  – CFA Best Practice Guidelines for the Production of Chilled Food (4th ed)

• Limited shelf life
  – Ensure peak quality and
  – Minimise opportunity for microbial growth

• Chilled distribution and sale
  – Minimise potential for microbial growth
Field controls and audits

• Crop protocols
  – Usage of organic waste in agriculture
    • Human-derived (sewage sludge)
    • Animal-derived (farmyard manures, abattoir waste)
  – Irrigation water quality

• Contracts and audits

• Supplier Codes and Guidelines
  – English, Spanish, French, Italian
  – Detailed audit documentation: full + core food safety
  – Same technical requirements for all suppliers - UK and Non UK
Relevant CFA Guidelines

• Fields
  – Microbiological Guidance for Growers
    • English language (2007, 2002) – support by major UK retailers
    • Spanish (2004)
    • Finnish (2005)
  – Pesticides Due Diligence (2002)

• Factory
  – Washing protocols (when using chlorine)

• General
Waste as an output
Why does waste arise?

- Chilled prepared food does not contain waste
- PICME 2005-6 Waste Minimisation Study:
  - Raw material quality rejects
  - Machinery capability = economic constraint
  - Raw material stock disposals
  - Trims
  - Market imposed = commercial constraint
  - Operator handling and processing errors
  - Production line drops/spills
  - Changeovers, clean outs
  - Start-up/shut down scrap
Waste as an output

• CFA route to solutions:
  – Obtained **ABPR implementation delay** (June 2003-Jan 2006) to enable disposal infrastructure to be developed
  – **CFA/Defra Workshop Sept 2003 → Compliance routemap**
  – **CFA/Defra Waste Technologies Workshop May 2004:**
    • CFA chilled food sector waste mapping data: **what + where**
    • Technical solutions options identified: **how**

• Manufacturers want to remain manufacturers and not become waste disposal companies
CFA 2003 ABPR Compliance Routemap

**Former Foodstuffs Treatment Milestones Timeline**

- Contracts in place for segregation, collection and treatment of raw meat already overdue!
- Management buy-in required, preferably with authority of waste audit, and legal ramifications.
- Resolution of mixed messages from Defra/EA over scope and application of ABP regs.
- Clear guidance from Defra/EU required on scope on unresolved products: pastries, biscuits etc..
- Industry waste arisings determined by volume and type.
- Match technology offerings to waste streams
- Contracts in place for waste disposal
- Planning for new infrastructure complete (earliest)
- CAPEX scheduled into company budgets
- Waste segregation and operator training being implemented
- Planning for new infrastructure complete (latest)
- Build, commission and operate waste plants
- Catering waste derogation ends
- End 2005
2003-4 CFA Waste Mapping

• Quantify and locate biodegradable (inc Cat 3) waste produced by the sector
  – Members
  – Estimates for non-members

• Assist industry in identifying investment requirements
  – Appropriate disposal systems, locations
  – Waste minimisation, site benchmarking
2003-4 CFA Waste Mapping Findings

- Biodegradable packaging content range: 0-45%
- Waste composition dependent on foods produced at each site
- **Disposal system location requirements** - hot spots
  - Lincs, Cambs: (43%)
  - East Mids, East: (53%)

<table>
<thead>
<tr>
<th>Total daily tonnage</th>
<th>Total Cat 3 food (Cat 3) &amp; biodegrade pack waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Daily Tonnage:</td>
<td>470 426</td>
</tr>
<tr>
<td>Total Annual Tonnage:</td>
<td>171,590 155,490</td>
</tr>
</tbody>
</table>

~5% final manufactured volume
Requirements/Challenges

• Waste outputs
  • Minimise waste
  • Know waste characteristics
  • Identify viable disposal technologies
  • Identify [local] solution providers
  • Potential liaison with
    • Other local manufacturers to share solutions (volumes)
    • Local Authorities – piggy backing with local systems

• Invest in compliance
• Do it now!
Requirements/Challenges

• Waste inputs in agriculture
  • Minimise/prevent contamination in/directly from
    • animal or
    • human waste or
    • other material potentially presenting hazards
  • Spread best practice on key controls internationally
    • correct field management (growing) and
    • handling in the supply chain
  • Obtain overt Defra, FSA, EC, UN support for appropriate GAP applied to all RTE produce inc wholesaled
Conclusions

• **Waste as an input**
  – Over a decade of CFA proactive work
  – Field controls established = **critical** to assuring safety
  – Best practice guidance in place
  – Research continuing
  – Incident alerts and resolution
  – Network of expertise internationally
  – **Seeking international uptake of standards**

• **Waste as an output**
  – Wide range of carbon impact reduction activity
  – **Disposal/reuse options still required**
Sources of Further Information

• CFA guidance documentation
  – www.chilledfood.org/resources/publications.htm

• Presentations from CFA/Defra Waste Technologies Workshop (May 2004)
  – www.chilledfood.org/resources/Presentations.htm

• CFA 2003-4 resource mapping data
  – By town and county: http://tinyurl.com/d8ydrm
  – By town and EA region: http://tinyurl.com/dbxtzd
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