Preventing contamination from food packaging and other food contact materials

Teagasc Food Packaging seminar for SMEs
29 November 2012

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Overview

- Contamination
  - How packaging can contaminate food

- Legislation to prevent contamination

- Complying with the legislation
The jargon

**FCM**: food contact materials

**M&A**: materials and articles, term used in food legislation for all FCMs

**Migration**: unintended transfer of substances (e.g., residues of processing chemicals, impurities) from an FCM into foodstuff
Food contact materials include:

- Packaging materials
- Cutlery
- Dishes
- Food processing machines
- Containers
- Chopping boards
- ...

© FSAI
Plastics

- Polyethylene (HDPE, LDPE, LLDPE)
- Polypropylene (PP)
- Polyvinylchloride (PVC)
- Polystyrene
- Polycarbonate
- Polyethylene terephthalate (PET)
- ABS
- PVdC
- etc., etc.
Plastics additives

Anti-oxidants
Plasticisers
Lubricants
Emulsifiers
Fillers
Flame retardants
Impact modifiers

Stabilisers
UV absorbers
Preservatives
Optical brighteners
Foaming agents
Release agents
etc.
Potential impurities

- Residual monomers
- Polymerisation by-products
- Production chemicals (e.g. lubricants)
Examples of migration

- Tin migrating from steel cans
- Mineral oils from jute bags
- BADGE migration from coatings
- DIPN from packaging made from recycled paper
- Heavy metals from ceramics
- Aromatic amines from laminated plastics
- ITX from inks on cardboard/plastic
- Plasticised jar gaskets: ESBO, phthalates, SEM
Withdrawal of Black Nylon Kitchen Utensils due to migration of Primary Aromatic Amines

Alert Notification: 2008.07

11 September 2008

Category II: For Information

Country of Origin: China

Product: Nylon Kitchen Utensils

Batch Code: N/A

Message

Following routine sampling and testing by the HSE, the FSAI was notified of non-conforming food contact materials (Black Nylon Kitchen Utensils) on the market. These non-compliant products exhibited excess migration of Total Primary Aromatic Amines in contravention of Commission Directive 2002/72/EC and European Communities (Plastics and Other Materials) (Contact with Food) Regulations 2007; S.I. No. 587 of 2007.

Nature of danger

The products of concern (ladle, mashers, spaghetti server, turner, straining spoon, pasta scoop and slotted spoon) were found to exhibit excessive migration of substances known as Primary Aromatic Amines. Some of these substances are considered to be potentially harmful to human health, however any risk from the use of these utensils, is likely to be extremely small.

The implicated products were on sale in Tesco, Atlantic Homecare, Woodies DIY and other small independent retail outlets. These products have been removed from sale as they are not in compliance with food safety legislation.

Further checks on similar products are being conducted by the HSE.

The FSAI has informed the European Commission of the issue.

No action required; this alert is for information only

Brian Redahan
Packaging ink: 4-Methylbenzophenone

- UV photo-initiator for UV-cured printing inks
- Initially detected in breakfast cereals in Germany in February 2009 at 0.8 mg/kg
- Found in these and other foods at up to 5 mg/kg
- Source: the printing ink on the outside of the carton
More likely effects

- Long-term effects on human health arising from consumption of trace quantities of chemicals
- Effects on taste/odour of food
- Prosecution!
- Consumer concern and negative publicity
The solution:

- Legislation on safe manufacture and use of food contact materials (FCM);
- Safety evaluations of ingredients;
- Industry controls & testing;
- Official controls & testing
EU legislation on food contact materials (FCM)
EU Harmonised laws

General requirements for all FCM + Mandate for specific measures


SPECIFIC MEASURES

Materials
- Ceramics
- Regenerated cellulose film
- Plastics
- Recycled plastics
- Active and intelligent Materials

Substances
- Nitrosamines
- Epoxy substances
Hygiene of packaging

- **Hygiene** is not covered by food contact materials legislation

- Covered by Regulation (EC) No 852/2004
  - Annex II, Chapter X
British Retail Consortium & Institute of Packaging developed a Global Standard (issue 3 in 2008) for ‘Food packaging and other packaging materials’

• Document focuses on hygienic production of food packaging;

• Compliance with this industry document does not equal compliance with FCM legislation.

- General requirements for preventing food contamination, including labelling and traceability, declaration of compliance
- Allows for specific measures on individual FCM (17 groups listed in Annex I)
- Authorisation of substances or processes by EC, after evaluation by European Food Safety Authority
- Modification, suspension and revocation of authorisation
- Permits national laws to continue
- Safeguard measures
FCM Legislation covers...

- Manufacturers of food contact materials
- Importers of food contact materials
- Retailers of food contact materials

- Food establishments using food contact materials
- Food establishments selling packaged food
Underlying Principle

Any material or article intended to come into contact with food directly or indirectly must be sufficiently inert so that substances are not transferred to food in quantities large enough:

- to endanger human health or
- to bring about an unacceptable change in the composition of the food or
- a deterioration in its organoleptic properties (taint)

Article 3, Reg 1935/2004
Traceability requirements

For food:
Article 18 of Regulation 178/2002
(does not include food packaging)

For food packaging:
Article 17 of Regulation 1935/2004
Labelling – Article 15 of Reg. 1935/2004

Materials and articles (not already in contact with foodstuffs) must be accompanied by:

- The words “for food contact”, or
- a specific indication as to their use (e.g. soup spoon), or
- a notice showing the symbol.
- and, if necessary, any special instructions for safe use.
- And (trade) name & address or reg. office of supplier in EU
- And adequate labelling/identification for traceability

- Detailed rules laid down for implementation
Declaration of compliance

- Written declaration required for materials & articles subject to specific legislation stating that they comply with the applicable rules

- Legally required only for materials & articles subject to EU harmonised rules, e.g. plastics

- Appropriate documentation to demonstrate compliance must be available to the competent authorities on demand

- Specific requirements laid down for plastics, recycled plastics, ceramics, epoxy coatings, active FCMs, ...
Good Manufacturing Practice


• Applies to manufacturing, processing & distributing Food Contact Material
Specific measures

Specific laws for making plastics, more detailed than other FCMs

Requirements include restrictions on uses & migration of substances

Positive list of:
• Monomers & starting substances
• Additives

Declaration of compliance
Specific requirements for plastics

Plastics are subject to an Overall Migration Limit (OML), as a general measure of what’s migrating.

Substances used in the manufacture of plastics can be subject to a Specific Migration Limit (SML).

Annex specifies how testing should be carried out.

Other restrictions and specifications may also apply.
Declaration for plastics: Reg. 10/2011

1. Name & address of the business issuing declaration
2. Name and address of EU manufacturer or importer of food contact material, or FCM substances
3. Identity of the plastic material or substances
4. Date of declaration
6. Information on any substances used for which there are restrictions under Reg 10/2011 to allow users to comply
7. Information on any substances used for which there are restrictions under food law, to allow users to comply
8. Specifications for safe use (foods, time/temp, S/V)
9. For plastic multi-layer materials using ‘functional barrier’ layers, confirmation that finished FCM complies with relevant parts of Reg 10/2011
Regulation (EC) No 282/2008 on recycled plastics

• The problem: how to prevent contamination of food from a packaging made from ‘rubbish’?

• Regulation requires the individual authorisation of recycling process by Commission, after a toxicological evaluation by EFSA.

• Critical points in the recycling process:
  • the sourcing of the raw material;
  • the capacity of process to reduce contamination.

Register not yet in place
Other specific laws on:

**Ceramics** Directive 84/500/EEC
- Limits on heavy metal migration
- Declaration of compliance
- Test methods

**Regenerated Cellulose Film**
Dir. 2007/42/EC
- Includes RCF uncoated, coated with RCF & coated with plastics
- RCF composition restricted
- Plastic coatings to comply with law on plastics
Other specific laws on:

Certain epoxy chemicals
Reg. EC 1895/2005
  • Bans BFDGE, NOGE
  • SMLs for BADGE & derivatives
  • Covers plastics, coatings & adhesives

Nitrosamines in teats & soothers
Dir 93/11/EC
  • Limits release of N-nitrosamines
Active & intelligent materials
Active packaging

Packaging that alters the food, improves or maintains its condition

Can add extra substances to the food or absorb oxygen, moisture, etc.
Intelligent packaging

Provides useful information for the consumer of the packaged food;

E.g. freshness indicators, time-temperature indicators, atmosphere monitors, etc.
Legislation on active & intelligent FCMs

Regulation 1935/2004 has extra rules:

- Intelligent packaging must not give misleading information
- Non-edible parts (e.g. sachets) must be labelled
- Must be labelled as active/intelligent
- Extra information for active packaging that releases substances

Specific **Commission Regulation 450/2009**, requires **authorisation** for active/intelligent components, after evaluation by EFSA
Other food contact materials


These requirements include responsibility to ensure products are safe

Risk assessments, compliance with other national regulations/guidelines (EU Member States or other countries, Council of Europe resolutions)

Most MS have some additional **national legislation; only 9 don’t** (BG, CY, EE, IE, LT, LI, LX, MT, UK)
Legislation on Food Contact Materials

- European Communities (Plastics and Other Materials) (Contact with Food) Regulations 2007 [S.I. No. 587 of 2007]
  - Give effect to all the EU legislation on food contact materials
  - ‘Signposts’ the relevant requirements
  - Defines offences and penalties
  - Defines powers of authorised officers in official agencies
  - NO ADDITIONAL REQUIREMENTS
Complying with the legislation
Prevention of packaging contamination

Ensure **HACCP system** includes hazards derived from packaging materials

Possible control measures:

- **Documentation**, defined in the legislation
  - specification for use of the packaging material
  - ensure it is being used as specified
- **Approved supplier audit / listing**
- **Validation**
  - Spot checks on packaging materials using an accredited laboratory
Effects on migration

Increased temperature ➔
Increased contact time ➔
Increased contact area ➔
Increased % fat in food ➔
Migration tests are done, using model ‘foods’ for 5 food types

<table>
<thead>
<tr>
<th>Food type</th>
<th>Food simulant</th>
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</thead>
<tbody>
<tr>
<td>Aqueous foods:</td>
<td>10% ethanol/water</td>
</tr>
<tr>
<td>Acidic foods:</td>
<td>3% acetic acid/water</td>
</tr>
<tr>
<td>Alcoholic foods:</td>
<td>20% ethanol/water</td>
</tr>
<tr>
<td>Fatty foods:</td>
<td>Vegetable oil or 50% ethanol</td>
</tr>
<tr>
<td>Dry foods:</td>
<td>Tenax® polymer</td>
</tr>
</tbody>
</table>

Temperature, surface area & contact time also affect migration

*So packaging may be suitable for some applications and not others:*

*Does actual use match the intended use?*
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Further information

Food Safety Authority of Ireland: http://www.fsa.ie

European Commission (all FCM legislation, information): http://ec.europa.eu/food/food/chemicalsafety/foodcontact/index_en.htm


Council of Europe (Resolutions): http://www.coe.int/t/e/social_cohesion/soc-sp/public_health/food_contact/COE%27s%20policy%20statement%20food%20contact.asp#TopOfPage

Joint Research Centre (test methods): http://ihcp.jrc.ec.europa.eu/our_labs/eurl_food_c_m

CEN (test methods): http://www.cen.eu/cenorm/homepage.htm
Summary

• Contamination of food can arise from multiple sources, including food contact materials
• Producing safe food remains an industry responsibility
• Packaging and food industries need to co-operate to ensure safe food, compliant with regulations
• Food contact materials must be properly labelled and traceable
• Good manufacturing practice required
• Specific and individual substances rules in addition to Regulation (EC) No 1935/2004 general requirements
• Good Declarations of Compliance help you!