Food Safety and Quality Management Systems

Dr. Yen-Con Hung
Department of Food Science and Technology
and
Food Product Innovation & Commercialization Center (FoodPI&C)
The University of Georgia

September 15, 2009
Hot Topics on Peanuts
Food Safety and Quality

- Two of the foremost concerns in the minds of consumers
- Safety and quality must go hand in hand
Peanut Butter Food Chain

- Planting
- Cultivation
- Harvesting
- Drying/curing
- Grading
- Storage
- Cleaning
- Shelling
- Blanching
- Roasting
- Sorting
- Grinding
- De-aeration
- Cooling
- Filling
- Packing
Food Safety and Quality Programs

- GAPs
- GMPs
- SSOPs
- HACCP
- ISO 9000
- ISO 22000
Good Agricultural Practices (GAPs)

- It is a program that informs growers and farm workers about the microbial risks associated with agricultural production and to assist them to control these risks.
- Key areas of GAPs program are prior land use, adjacent land use, water quality and use practice, soil fertility management, wildlife, pest, and vermin control, worker hygiene and sanitary practices, and harvesting and cooling practices.

www.fda.gov/ora/inspect_ref/igs/epigde.html
Good Manufacturing Practices (GMPs)

- GMPs are the part of quality assurance program that ensure foods are consistently produced and controlled in such a way to meet the quality standards appropriate to their intended use as required by the FDA.

- It is concerned with both production and quality control.

www.access.gpo.gov/nara/cfr/waisidx_01/21cfr110_01.html
Sanitation Standard Operating Procedures (SSOPs)

- SSOPs are written procedures that food processors develop and implement to prevent direct contamination or adulteration of product.
- FDA does not require SSOPs but USDA mandates SSOPs for meat and poultry operations. Meat and poultry processors must maintain daily records sufficient to document the implementation and monitoring of the SSOPs and any corrective action taken.

Hazard Analysis and Critical Control Point

- HACCP is a system of risk management that focuses on preventing hazards that could cause foodborne illnesses by applying science-based controls in all steps of the food production process.
- It is applied to identify biological, chemical, and physical hazards that may result in contamination of food in the production, storage, distribution, or preparation stages.
- HACCP originated in the late 1950s when NASA contracted with the Pillsbury Company to manufacture foods for manned space flight and was first presented to the public during the 1971 National Conference of Food Protection.

www.haccpalliance.org
Seven Principles of HACCP (cont.)

- Perform a hazard analysis
  - List all potential hazards associated with each step of the process
- Identify the critical control points (CCPs)
- Establish critical limits for CCPs
  - Determine at what level critical limit is exceeded
  - This can be based on known limit or risk assessment
- Establish monitoring procedures for CCPs
  - Continuous monitoring
  - Periodic audit
- Establish corrective actions
  - Actions that are able to deal with the loss of control
- Set up record-keeping and documentation procedures
  - Depending on the nature and scale of the operation
- Establish verification procedures
  - For routinely assessing the effectiveness of the HACCP procedure, once implemented
Identify CCPs

- "A point, step or procedure at which control can be applied and as a result a hazard can be prevented, eliminated or reduced to acceptable level."
- Technique available at reasonable cost
- For peanut butter processing, roasting is the CCP.
Peanut Receiving and Cleaning
Peanut Roasting and Cooling
Blanching, Sorting, Size Reduction
Peanut Butter Making (Urschell Mill)
De-aeration and Cooling by Votator
Filling
ISO 22000

- Is a new international standard designed to ensure safe food supply chains worldwide.
- ISO 22000 incorporates the principles of HACCP and covers the requirements of key standards developed by various global food retailer syndicates in a single document.
- Food safety management systems that conform to ISO 22000 can be certified.
ISO 9000 and ISO 14000

- ISO 9000 is concerned with “quality management.” It enhances customer satisfaction by meeting customer and applicable regulatory requirements. The most recent revised version of the standards is ISO 9000:2008.

- ISO 14000 is primarily concerned with “environmental management.” It minimizes harmful effects on the environment caused by its activities.
International Food Safety Standard

- In the US, food safety is regulated by the States with general but non-binding guideline from USDA and FDA.
- The closest thing to an US national standard is the FDA Food Code.
- About a dozen private third-party auditing schemes used by different suppliers and companies in the US.
- About 50 different private third-party auditing schemes used by different suppliers and companies in the European Union.
Wal-Mart’s Action in 2008

- More than 20% of food expenditure in the US are spent at Wal-Mart.
- In 2008, Wal-Mart sent a letter to all their food suppliers for adopting Global Food Safety Initiative (GFSI) standards.
- Food producers must adhere to the GFSI framework by the end of 2009 in order to do business with Wal-Mart.
The Global Food Safety Initiative (GFSI) co-owned by CIES (the Food Business Forum) was launched in May 2000.

Objectives are:

- Maintain a benchmarking process for food safety management schemes to work towards convergence between food safety standards.
- Improve cost efficiency throughout the food supply chain through the common acceptance of GFSI recognized standards.
- Provide a unique international stakeholder platform for networking, knowledge exchange and ----

www.globalfoodsafetyinitiative.com
GFSI (Cont.)

- Requirements for a conforming food safety management standard (Key elements)
  - Food safety management systems
  - GMP, GAP, GDP (good distribution practices)
  - HACCP
GFSI (Cont.)

- Requirements for the delivery of food safety management systems
  - Accreditation
  - Duration and frequency of audit
  - Food certification categories
  - Auditor qualifications, training, experience and competencies
  - Minimum requirements for audit reports
Food certification categories

**Manufacturing**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Fish</td>
<td>5. Produce</td>
<td>6. Dairy</td>
</tr>
<tr>
<td>16. Oils and fats</td>
<td>17. Food ingredients</td>
<td></td>
</tr>
</tbody>
</table>

**Agriculture**

- 1. Production and capture of livestock and game animals
- 2. Animal feed production
- 3. Production of fresh produce
- 4. Fresh produce pack house operations
- 5. Extensive broad acre agricultural operations
- 6. Growing and production of coffee
GFSI Approved Standards for manufacturing schemes

- British Retail Consortium (BRC) Global Standard for Food Safety version 5
  [www.brc.org.uk](http://www.brc.org.uk)
- International Featured Standards (IFS) International Food Standard version 5
  [www.food-care.info](http://www.food-care.info)
- Safe Quality Food (SQF) 2000-Level 2 standards [www.sqfi.com](http://www.sqfi.com)
- Dutch Hazard Analysis and Critical Control Point (HACCP) standards option B
  [www.foodsafetymanagement.info](http://www.foodsafetymanagement.info)
- Foundation for Food Safety Certification, FSSC 22000 version 5 (conditional recognition)
  [www.fssc22000.com](http://www.fssc22000.com)
GFSI Approved Standards for primary production schemes

- GlobalGAP (fruit and vegetable scope options 1 and 2 only) www.globalgap.org
- Safe Quality Food (SQF) 1000-Level 2 standards www.sqfi.com
Safe Food Quality (SQF)

- SQF is a HACCP based third party audited food safety and quality program implemented by suppliers.
- It consist of SQF 1000 code and SQF 2000 code.
- It is administered by SQF Institute, a division of Food Marketing Institute (FMI)

www.sqfi.com
British Retail Consortium (BRC) Global Standard for Food Safety

- The Global Standard for Food Safety was first developed by the British Retail Consortium (BRC) in 1998 for the food service industry for suppliers to be audited by third party certification bodies against a single consistent standard.
- This standard is managed by the BRC who license the use of the standard to certification bodies who also need to be accredited by their national accreditation body.

www.brc.org.uk
## Comparison of GFSI Standards

<table>
<thead>
<tr>
<th></th>
<th>British Retail Consortium (BRC)</th>
<th>Safe Quality Food (SQF)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current version</strong></td>
<td>Jan. 5, 2008</td>
<td>Aug. 6, 2008</td>
</tr>
<tr>
<td><strong>Scheme auditor qualification</strong></td>
<td>Two-day awareness course and existing lead auditor qualification or 4-fay BRC third party auditor training course</td>
<td>Three-day auditor course by SQF</td>
</tr>
<tr>
<td><strong>Required personal experience and education</strong></td>
<td>Five years of job experience in the food industry</td>
<td>Five years of food industry work experience, HACCP knowledge, audit experience, and other training</td>
</tr>
<tr>
<td><strong>Number of specific auditor/product scopes</strong></td>
<td>6 fields/18 product categories</td>
<td>25 fields/product categories</td>
</tr>
<tr>
<td><strong>Peanut butter</strong></td>
<td>Category 15</td>
<td>Category 22</td>
</tr>
<tr>
<td></td>
<td>Dried food ingredients</td>
<td>Processed grains, cereals, nuts</td>
</tr>
</tbody>
</table>

Adopted and modified from K. Wybourn and A. Niemann-Haberhausen. *Food Quality* (Dec/Jan 2009)
Comparison of GFSI Standards (Cont.)

<table>
<thead>
<tr>
<th>Possible final grades</th>
<th>British Retail Consortium (BRC)</th>
<th>Safe Quality Food (SQF)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>E-Excellent (&gt;95)</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>G-Good (86-95)</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>C-Complies (75-85)</td>
</tr>
<tr>
<td></td>
<td>D (failed)</td>
<td>M-Marginal (60-75)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F-Failed (&lt;60)</td>
</tr>
<tr>
<td>Audit frequency</td>
<td>12 months (A and B), six months</td>
<td>Six to 12 months, three-month</td>
</tr>
<tr>
<td></td>
<td>(C), 28 days verification on site</td>
<td>review if defined number of</td>
</tr>
<tr>
<td></td>
<td>(C).</td>
<td>Major/Minor non-conformities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>found and at least two audits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>within six months afterwards</td>
</tr>
</tbody>
</table>
Conclusions

- Everyone in the food system – from farmers, processors, to consumers – shares responsibility for food quality and safety.
- HACCP can only function if those prerequisite programs (GAPs, GMPs, and SSOPs) are in place and functioning properly.
- Roasting is the CCP for peanut butter processing.
- They are many steps after roasting, so separating roasted peanuts from raw ingredients are important.
- Minimize storage, human handling, and environmental contacts after roasting.
- All certification program (like SQF) does not guarantee the safety of a supplier’s food or service. It is a statement that the supplier’s food safety plans have been implemented in accordance with the HACCP method and applicable regulatory requirements, and that the validation and verification of the food safety plan has been evaluated and determined effective to manage food safety.