FDA Regulations and Process Validation Considerations

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Regulatory Agencies

USDA

FDA

NOAA

EPA
Regulatory Agencies

• Red Meat
  – > 3% raw
  – > 2% cooked
• Poultry
• Egg products
Regulatory Agencies

- Seafood Quality Grading (Grade A)
- HACCP Quality Management Program
- Fee Based
Regulatory Agencies

- Water (drinking and waste)
- Pesticides
  - Antimicrobial
  - Insects
Regulatory Agencies

- Additives
- Pesticides
- All foods not inspected by USDA
- Animal drugs
- Nutritional labeling
- Ingredients labeling
Avenues of Compliance

• Governmental Acts
• Promulgated Regulations
• Policies
• Guidance documents
FD&C

Direct/Indirect Additives
Labels, Standards of Identity

Dairy/PMO
LACF
Juice
Seafood
FDA “Requirements”

- Federal Food Drug and Cosmetic Act (FFDCA)
- 21 CFR 110 Current Good Manufacturing Practice in Manufacturing, Packing or Holding Human Food
(a) *Raw materials and other ingredients.*

(2) Raw materials and other ingredients shall either not contain levels of microorganisms that may produce food poisoning or other disease in humans, or they shall be pasteurized or otherwise treated during manufacturing operations so that they no longer contain levels that would cause the product to be adulterated within the meaning of the act.
(b) Manufacturing Operations.

(4) Measures such as sterilizing, irradiating, pasteurizing, freezing, refrigerating, controlling pH or controlling aw that are taken to destroy or prevent the growth of undesirable microorganisms, particularly those of public health significance, shall be adequate under the conditions of manufacture, handling, and distribution to prevent food from being adulterated within the meaning of the act.
LACF Regulations

- Current Good Manufacturing Practice (cGMPs): 21 CFR Part 110
- Low-Acid Canned Foods: 21 CFR Part 113
- Acidified Foods: 21 CFR Part 114
- Emergency Permit Control: 21 CFR Part 108
The regulations...

• Describe both recommended (should) and required (shall) items.

• In CFR parts 110, 113 and 114 apply to both domestic and imported products.
LACF Facility Registration, Filing Forms & Instructions

• FDA/LACF Registration Coordinator (HFS-617) Center for Food Safety & Applied Nutrition
  5100 Paint Branch
  College Park, MD  20740

• LACF@FDA.HHS.GOV

Internet search keywords: FDA LACF
What is pasteurization?

“What process, treatment, or combination thereof, that is applied to food to reduce the most resistant microorganism(s) of public health significance to a level that is not likely to present a public health risk under normal conditions of distribution and storage.”

(NACMCF, 2006)
Pasteurization is defined in the PMO and 21 CFR 1240.61 as:

- 145°F for 30 minutes
- 161°F for 15 seconds
- 191°F for 1 second
- 194°F for 0.5 seconds
- 201°F for 0.1 seconds
- 204°F for 0.05 seconds
- 212°F for 0.01 seconds
120.24(a) – “In order to meet the requirements of subpart A of this part, processors of juice products shall include in their Hazard Analysis and Critical Control Point (HACCP) plans control measures that will consistently produce, at a minimum, a 5 log (i.e., $10^{-5}$) reduction, for a period at least as long as the shelf life of the product when stored under normal and moderate abuse conditions …”
FFDCA: Misbranding under Sec. 403

• Section 403(h) A food shall be deemed to be misbranded as a pasteurized food unless:
  – A) Subject to a safe process prescribed as “pasteurization” in a regulation

Continued....
FFDCA: Misbranding under Sec. 403

– B) Subject to a safe process:
  • I) Reasonably likely to destroy organisms of public health significance
  • II) Is at least as effective as a process specified by regulation
  • III) Is effective throughout product’s shelf-life when stored under normal or moderate abuse conditions
  • IV) is documented by notification to the Secretary and not rejected within 120 days for failure to meet clauses I, II, or III
Irradiation

• 21 CFR 179 – Irradiation in the production, processing and handling of food
  – Covers radiation sources, general provisions, ionizing radiation, radiofrequency (and microwave), ultraviolet, pulsed light and petitioned amendments.
Irradiation

• The use of a source of radiation that does not comply with our current regulations requires an amendment to the regulations through the submission of a food additive petition
  
  – Example: To use higher UV intensities (i.e., > 1W per 5 to 10 ft2) an interested party would have to petition the agency. The 2000 final rule was specific for juice products and does not apply to any other foods.

• The agency encourages early industry consultation
Food Safety Modernization Act

http://www.fda.gov/Food/GuidanceRegulation/FSMA/default.htm
Get FSMA updates by E-mail!
Preventive Controls Rule

• Preventive Controls Proposed Rule for Human Food – Final Rule due Aug. 30th, 2015

• FSMA exempted LACF with respect to microbiological hazards
  – LACF processors will still have to address physical and chemical hazards
  – Acidified and acid foods not exempt—manufacturers of these products will have to comply with ALL FSMA requirements unless an exemption applies (e.g., Qualified Facility)
FSMA Preventive Controls

• Facilities are required to conduct a hazard analysis and implement preventive controls for identified hazards.

• Preventive controls: risk-based, reasonably appropriate procedures, practices, and processes that a person knowledgeable about the safe manufacturing, processing, packing, or holding of food would employ to significantly minimize or prevent the hazards identified in the hazard analysis...and that are consistent with the current scientific understanding of safe food manufacturing, processing, packing, or holding at the time of the analysis.
Specific Requirements (Proposed)

- Identify and evaluate hazards
- Implement preventive controls for the hazards
- Monitor and verify preventive controls and take corrective actions if not properly implemented
- Keep records of these activities

Food Safety Plan
Preventive Controls

• Preventive controls should be implemented when pathogens in foods pose a risk.

  “identify and evaluate known or reasonably foreseeable hazards” (FSMA, Sec. 418b)

• Preventive controls will need to be validated.

• Pasteurization requires [FFDCA 403(h)] submission of a notification to FDA with the data.
What is validation?

• **Validation** is the collection and evaluation of scientific and technical information to determine if the treatment when properly applied, will effectively control the hazard.

National Advisory Committee on Microbial Criteria for Foods – Pasteurization

*J. of Food Protection, Vol 69, No. 5, 2006, 1190-1216*
Why do we need to validate?

- To establish **documented evidence** that provides a **high degree of assurance** that a specific process or system will **consistently produce a product meeting its predetermined specifications and quality attributes**.

*Adapted from NFPA Bulletin 43-L*
Validation Studies

• Are needed for process technologies implemented as preventive controls for pathogen reduction in foods
• For equipment operating within its established control limits, microbiological validation provides documented evidence that the process delivers microbiological inactivation to predefined, acceptable and safe levels.
Validation within FSMA

- The validation of preventive controls:
  1. Must be performed or overseen by a qualified individual
  2. Must include collecting and evaluating scientific and technical information (or ... conducting studies) to determine whether the preventive controls, when properly implemented, will effectively control the hazards that are reasonably likely to occur

  Human food: 21 CFR 117.150 (a)(1), (a)(2)
  Animal food: 21 CFR 507.45 (a)(1), (a)(2)
Approaches to validation

- Government guidance
- Safe harbors
- Published scientific literature
- Mathematical models
- Data from previous studies
- Data from new scientific experiments
- Any combination of these approaches
Validation of Control Measures

• Use available scientific guidance for validation.
Validation Studies

• Define the test methodology that will be used for the process, may be technology & decontamination process specific.

• Identify the target organism for each specific product and process and establish the desired log count reduction.

• Calibrate the resistance of the surrogate against the target pathogen for each specific product and process.

• Develop a suitable inoculation method and appropriate load.
Validation Studies

- Challenge the locations in the process and food matrix where treatment dose is expected to be lowest—"cold spot”.
- Sample sufficient amounts of product to have confidence in the results
- Replicate validation experiments to establish confidence in process delivery
- It is useful to “test to failure.”
  - Understand the boundaries between inactivation and survival
  - Provide information for deviation evaluation
- Make appropriate considerations for culture media, incubation temperature, etc.
Validation Studies

- Determine the appropriate critical factors, limits and design specifications for the desired process.
- Critical factors may include:
  - physical (e.g., time, piping design)
  - chemical (e.g., sterilant concentration)
  - mechanical (e.g., conveyor speed)
  - thermal (e.g., temperature, specific heat)
  - radiation (e.g., electromagnetic, photonic).
Considerations for Worst-Case Scenarios

• Critical factors should reflect the “worst case” expected operating conditions.
  – Min/Max values for the control measure
  – Permitted manual operations
  – Interactions between multiple control measures
  – Loading and speed of conveying systems
  – Motion of conveying systems
  – Hot and cold starts, ramp-up and ramp-down
  – Equipment wear that can impact critical parameters
Criteria for Evaluation

• A system that meets all of the regulatory requirements specified in the FD&C Act, FSMA and pertinent regulations

• FSMA requires preventive controls to be implemented and validated.
  – Pasteurization requires submission of a notification to FDA with the data. [FFDCA 403(h)]
Criteria for Evaluation

• An appropriate risk assessment of the process with an agreed target level of control/reduction – is the treatment sufficient to prevent illness?

• Validation must be based on the most resistant microorganisms of public health significance relevant to the food and the process.
Criteria for Evaluation

• Able to effectively control the hazard (meet specifications)
• Scientific evidence that the process is capable of consistent treatment with a high degree of assurance
• Determination that treatment is effective for at least as long as the shelf-life of the food
Criteria for Evaluation

• Complete documentation of the process including a description of the system, list of critical factors, results from biological test, and list of factors monitored and recorded

• Programs are needed to verify that the process is operating within specific limits