Food quality assurance

What is quality?

- The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs

International Organization for Standardization (ISO) Standard 8402

Wholesome food:

- Nutritious
- Safe
- Palatable
Microbiological testing

- Useful for controlling quality
- Not very useful for controlling food safety

Control procedures

- Inspections
  - Check for compliance with GMP and SOP
- Sampling plans
  - Check for product compliance with quality criteria
- HACCP
  - Focus on process adjustments for controlling food safety hazards

Sampling

Observation of a set amount of product (lot) resulting in the separation of lot units or portions for further testing
Some definitions

- Sampling
  - Action of separating a portion of a production lot for further testing
- Random sampling
  - Sampling procedure where ever unit in a lot has the same chances of being selected for analysis
- Representative sample
  - Sample possessing characteristics comparable to the average of the whole lot

Some definitions

- Sampling plan
  - Instructions specifying the number of units to be tested and the criteria for accepting or rejecting the lot
- Risk to the consumer
  - The risk for consumers that a defective lot be accepted
  - Usually set at 10%
- Risk to the producer
  - The risk for the producer that the sampling plan reject a non-defective lot
  - Usually set at 5%

Sampling plans

- By attribute
  - Require Normal, Poisson, binomial or hypergeometric distribution
    - Two-class plans
    - Three-class plans
    - Double sampling plans
- By variables
  - Require normal distribution
Two-class plans

- $n =$ No. sample units to be tested
- $c =$ No. sample units allowed to yield unsatisfactory results

Example: $n = 5, c = 2$

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Three-class plan

- $n =$ No. sample units to be tested
- $c =$ No. sample units allowed $>m$ but $<M$
- $m =$ Acceptable level of the test organism
- $M =$ Level above which the sample unit is unacceptable

Example: $n = 5, c = 2, m = 10^2, M = 10^3$
Multiple plans

- The lot is accepted or rejected on the basis of a sequential decision
- Example:
  - Coliforms in cooked ham (<10 MPN/g)
  - $n_1=10$, $c_1=0$; $n_2=6$, $c_2=1$
  - 10 samples tested
    - Lot rejected if 1 or more samples have $\geq 10$ MPN/g
    - Lot accepted if all 10 have <10 MPN/g
  - If the lot is accepted, 6 more samples are collected
    - Lot rejected if 1 or more have $\geq 10$ MPN/g
    - Lot accepted if all 10 have <10 MPN/g

Double sampling plan
Operating characteristic curve