

Cornell AgriTech

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Food Shelf-life Analysis

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What is a shelf life study?

The shelf life of food is the period during which the food retains an acceptable quality from a safety, and organoleptic point of view, based on formulation, processing, packaging and storage conditions. Many factors like pH, water activity, distribution and retail conditions, storage temperature, humidity, ingredients, use of the preservatives, packaging can all affect the shelf life of a food product.

Standard shelf life vs. an accelerated shelf life?

Food product is stored at similar storage temperature as the distribution environment in a standard shelf life study. Microbial changes in the product are evaluated at specific interval (daily, monthly, weekly, etc.) Whereas in an accelerated shelf life, food product is stored an elevated temperature instead of the typical storage/distribution temperature. The shelf life of the product is estimated based on the specific rate of microbial changes.

Why is a shelf life study important?

Shelf Life Studies are performed to determine and validate the length of time a product will retain its quality under a certain set of storage conditions. It is used to ensure the safety and quality of products prior to consumer release. It is the manufacturer's responsibility to make sure that the food is safe for consumption, retains product quality and meet any nutritional claims. A standard shelf life involves a microbial evaluation for Total Aerobic Count Plate and Yeast and Mold counts. The lactic acid bacteria count is also assessed for fermented products.

Microbiology tests for shelf life study

Microbiological analyses are selected based on the product type, spoilage microflora, as well as packaging and storage conditions. Results are presented in Colony Forming Unit (CFU). The food is considered unacceptable when product contains 1,000,000 CFU or 10^6 CFU or 6 log CFU/g or ml. Results are available after 48 hours of aerobic incubation of plates at 30°C. A minimum of 50 g of solid or 4 oz of liquid food sample is required for testing in our facility.

Total Plate Count (TPC)

Total Plate Count is also known as standard plate count, total aerobic plate count or aerobic colony count. This test estimates the microbial population on the food samples. No specific bacterial identifications are made. These results can provide a food manufacturer with information on the quality, history of raw materials, processing, and storage conditions. The media used is Standard Methods Agar.

Yeast & Mold

This test enumerates the total Yeast and Mold population on a food sample. No specific identifications are made. However, the data can be applied to internal acceptance criteria for a product, process, or storage condition. A food product may appear to be mold-free but can still be contaminated. The media used is Potato Dextrose Agar.

Lactic Acid Bacteria

This test selects for lactic acid bacteria in food sample. This group of bacteria often play a positive role in the food industry especially in fermentation process (cheese, yogurt, pickles etc.) and food preservation. They can be beneficial organism or spoilage organism. This analysis gives an overall population of lactic acid bacteria present in the food sample without any specific identification. The media used is Man Rogosa & Sharpe Agar.



Figure 1: This pesto is an example of a food product that needs a shelf-life study (Photo Credit: Casey MacMacnus, Cornell Food Venture Center)



Figure 2: Yeast and Mold Counts from food sample on Potato Dextrose Agar Plate (Photo Credit: Casey MacMacnus, Cornell Food Venture Center)