

# Shelf-Life Studies

## Recurring questions, challenges and best practices inspired by a concrete case

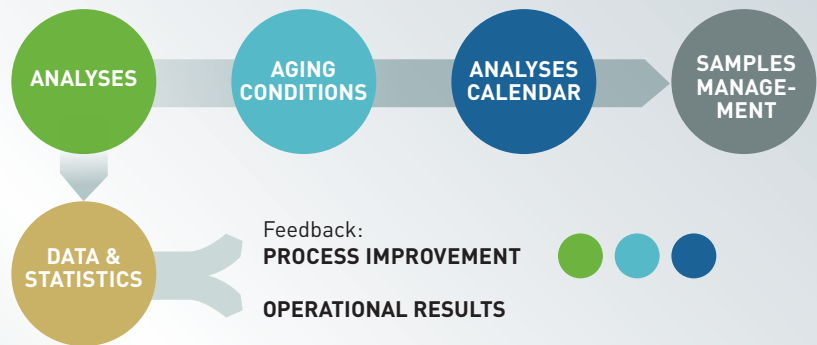
DE GOUVILLE Blandine, DUBREUIL Guillaume, BONNET Melissa  
Eurofins | SAM Sensory and Marketing Research International

### Background

Manufacturers need to measure the effects of aging on products to determine their best-before or expiration dates and understand aging process.

A case-study has highlighted the common issues impacting effective shelf-life studies and key significant & recurring questions.

This case-study has contributed to determine guidelines to monitor product aging.



### ANALYSES

Anticipating expected changes in the products and relations between monitored parameters

- Sensory
- Physicochemical
- Nutritional

→ Comparative Profile

Aged Standard



### AGING CONDITIONS

Multi-purpose storing: preserve a standard reference and age product at both a normal and a faster pace to eventually predict evolution

**Frozen** -  
Slowed/stopped aging  
The point of comparison for sensory analyses (standard)

**Ambient** - Normal aging

**Stress test** -  
Accelerated aging  
A Fast forward aging to get a glimpse of the future

### ANALYSES CALENDAR

Capturing every moment and possibly accelerating frequency during key periods of product evolution

- Starting & ending points
- Frequency
- Aging conditions specificities

### SAMPLES MANAGEMENT

Rigorous and long-term surveillance

### DATA & STATISTICS

Observation over time, integrated database and cross-product overall analysis: Operational results and process improvement

- Preliminary steps on sensory data
- Parameters co-evolution
- Prediction of sensory evolution over aging

## CHALLENGES AND ALTERNATIVES

### SENSORY ANALYSIS METHODS

- A stable standard does not always exist (e.g. freezing can impact organoleptic qualities)
- Spectrum methodology is an alternative solution, in the absence of stable standard

### STRESS TEST CONDITIONS

- Not all products can be aged at a faster pace under the same conditions (e.g. high temperature for a frozen product)
- Temperature, pressure, hygrometry, and light can serve as aging factors

### MONITORED PARAMETERS

- Specific requirements depend on the nature of the products
- Microbiological analyses can be required

## SLS LEARNINGS

We have defined a proven SLS process.

We have understood the challenges, key issues & questions to be resolved prior to designing SLS studies.

We can improve the accuracy & efficiency of SLS.

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