

Dear CLIENT,

Thank you for your interest in The National Food Lab's shelf life services. The NFL is a consulting firm for the food and beverage industry specializing in Sensory Evaluation, Product Innovation, Commercialization, Consumer Insights, Packaging, Chemistry, and Microbiology. With all of these integrated services, The NFL is able to help our clients speed their new products to market and more easily protect their existing brands. Confirmation of stability and quality of a product during distribution and storage are important considerations in marketing food products. Our customized shelf-life testing programs use the integrated services of our Sensory Evaluation, Microbiology, Chemistry, Packaging, and Food Technology groups to identify all issues related to your product's shelf-life. Our results provide information that can help guide product, package, or processing modifications. Our shelf-life services include full-term testing and accelerated testing.

**Basics about our shelf life services:** Depending on the anticipated mode of failure, The NFL will design a study to aid in the business decision of end of shelf life. This study design could include microbial, chemical, physical, sensory, and packaging attributes. It may also include full-term and accelerated options. If you have a shelf-stable product, the biggest piece of this study would likely be the sensory evaluation. For a 1-year shelf life, we could have accelerated results in 3 months; however, we strongly suggest a full term-study be run concurrently, which would last 1 year (or longer if you choose) so that the accelerated results can be better interpreted. If you have a refrigerated product, you may need only microbiological testing.

**Basics behind our sensory evaluation:** Your product(s) will be evaluated at every pull by a trained sensory panel that will compare the aged product against a reference sample. A sensory orientation and initial evaluation session will establish the attributes needed to describe the appearance, aroma, flavor, and texture of your product. An initial profile of the sample will be established. This will be done by The NFL's trained descriptive panelists and coordinated by a panel leader. Then, under the guidance of the panel leader, the panelists will participate in a group discussion in which a consensus of opinion is reached for the intensity of each of the sensory characteristics of the samples. Subsequent evaluations of product from storage will focus on key product attributes that show change when compared to a reference sample (stored at 0°F or at refrigeration temps). During each evaluation session, the panelist will rate key product attributes for degree of change against the reference and will rate the product for overall change in quality. Panelists will also provide a subjective opinion on acceptability of the products, although the final judgment on acceptability will be decided by you.

**Basics behind our microbiological studies:** Microbiological shelf life studies will address changes in the bacterial levels in the product throughout the shelf life. Each study is designed based on the specific attributes of your product and process. Based on the answers you provide in your application questionnaire as well as any discussions we have we will design a customized study to determine which organisms to test for, how often to perform the testing, the length of the study, how many samples to test at each interval and storage conditions. Microbiological shelf life studies are performed in real-time as changes in bacterial level from accelerated studies may not provide meaningful data. Microbiological studies will include some rudimentary observations of the odor and appearance of the product throughout the study, this work is performed by the micro personnel.

**Basics behind our packaging studies:** It is important to evaluate your product-package interaction together to better understand the shelf life expectancy of your product. If your product is under development, it is essential to consider accelerated aging of your packaging materials early during the product development phase. And based on the product we can evaluate packaging material options for your container to help reduce uptake of flavors, odors, oxygen, and moisture which can negatively impact the shelf life of your product. If you have an existing product we can provide advice on how you might be able to improve your shelf life through different packaging options.

**Fee estimates:**

- To evaluate one shelf-stable variable for full term AND accelerated study for sensory attributes is in the \$10,000 - \$15,000 range. To evaluate each additional flavor or sku, at the same time, adds about \$2000- \$5000 (for each sku) to our fee.
  - If you choose to only perform the accelerated study, our fee for a sensory mode of failure would be in the \$8,000- \$10,000 range.
  - Additional chemistry testing and/or microbiological testing, if needed, are based on the type and number of analyses needed to complete the study. Chemistry and microbiological fees are figured on a per-test basis. A project can range from \$1,000-\$10,000.
- The fees for microbiological shelf life studies are dependent on the final agreed upon design. As an example of our fees for a refrigerated product with a 2 week shelf life, held under one storage temperature, tested for 7 different analyses, the estimated fees would be in the range of \$2,500.
- The fees for packaging testing and evaluation can range from \$1,000 - \$5,000.

If any of these numbers sound like they are in your budget range, and you would like to engage with The NFL for shelf life work, please complete the attached application so we can better understand what your shelf life needs are and the modes of failure for your product. Upon review of your application we will determine the best course of action.

Please send the completed application and send it back to me at [FredianiM@TheNFL.com](mailto:FredianiM@TheNFL.com)

Thanks so much for reaching out to us!

Michael Frediani  
The NFL