**Introduction**

Before using this shelf life protocol, it is highly recommended that you first review AURI’s *Food Product Shelf-Life Guide for Scaling Businesses* and the associated Microsoft Excel workbook *Sample Shelf Life Protocol,* available at <https://www.auri.org/>. If you have questions, please contact AURI at <https://www.auri.org/contact/> or via phone at 218-281-7600. For a listing of individuals at AURI, see <https://www.auri.org/about-auri/staff/>.

In determining a product’s shelf life, all variables involved in the final product (including package, product, processing, and environment) must be involved in the assessment. As such, a true shelf life based on the quality of your product’s eating experience can only be determined accurately through testing. This workbook provides a protocol to guide your real time shelf life assessment and may be customized to fit your individual product’s needs.

**Planning and Preparing**

Refer to the tab titled “Test Protocol” to design your shelf life evaluation.

Step 1: Determine the number of product variations and enter it in the green box. This number is inclusive of all different flavors, product recipes, or process differences you are evaluating. For instance, if you are evaluating the difference in shelf life between cookie recipes with different levels of vanilla, you would enter the number of different levels you are testing (in this case, 2).

Step 2: Determine the number of different storage conditions at which you will hold product for evaluation over time. Typically, this will be 1 (room temperature). However, you may be interested in understanding how your product also behaves in the summer months, or in a warmer environment – in which case, you would enter 2 (room temperature and high temperature). Do not include the condition under which the reference samples are stored.

Step 3: Select the appropriate distribution mode for your product and fill out the green boxes with an “x” under the week you would like to evaluate the product. Note that the populated week numbers are suggestions based on distribution mode – you may adjust the week numbers as appropriate to suit your needs. Evaluation pulls should be spaced appropriately for you to see changes in product attributes over time and should extend beyond your expected shelf life to validate your shelf life assumptions. Scheduling pulls too frequently will require a large number of samples to evaluate, whereas scheduling pulls too infrequently may not allow you to determine the shelf life endpoint accurately, depending on mode of failure.

A note on reference samples: Reference samples represent "fresh" product that will deliver the optimal consumer experience. They should be made in the same production lot from which you have drawn test samples but stored in such a way to “pause” aging. For instance, when evaluating a shelf stable product, this means storing the reference samples in the freezer in an air tight container. You should have at least one reference sample for each product variation at each pull in your evaluation schedule. Please contact AURI for guidance on reference samples if testing a refrigerated or frozen product.

Step 4: Clearly mark all samples (test and reference) with a sample ID and the intended pull week.

Step 5: Place all test samples in the appropriate AND consistent storage condition, where they will age without being disturbed (note that the storage condition should be relatively consistently dark). Place reference samples (if they are to be frozen) in a non-self-defrosting freezer that maintains a consistent temperature of approximately 0oF.

**Sample Evaluation**

1-2 days prior to your scheduled evaluation, pull the appropriate reference samples from the freezer (if applicable) or the test samples from an elevated temperature condition, and allow to come to room temperature for 24 hours.

Review Table 1, ***Difference Scale for Shelf Life Evaluations***. This scale will be used to rate the difference from the reference of test samples for each attribute (appearance, aroma, taste, texture) on a scale from 1 to 5.

Use the scoresheets as designed on the “Sample Eval” tab of this worksheet or use your own.

Step 1: Evaluate the reference sample to ground yourself on the attributes (appearance, aroma, taste, texture) of the “fresh” product.

Step 2: Evaluate the first sample and score the attributes (appearance, aroma, taste, and texture) versus the reference using the 5 point scale included in Table 1..

**Table 1. Difference Scale for Shelf Life Evaluations.**

|  |  |
| --- | --- |
| 1 | No difference from reference |
| 2 | Slight difference from reference (a consumer WOULD NOT notice a difference without side-by-side comparison to reference) |
| 3 | Noticeable difference from reference (a consumer WOULD notice a difference without side-by-side comparison to reference) |
| 4 | Major difference from reference in one or more attributes (with or without the side-by-side comparison) |
| 5 | Unacceptable difference from reference in one or more attributes, to the point of inedible (with or without the side-by-side comparison) |

Make comments in the scoresheet for each difference noted, in order to review HOW the product attribute has changed over time, in addition to the DEGREE OF CHANGE indicated by the scale. If you have multiple tasters, reach a consensus score to record in the scoresheet (example scorecard in Figure 1).



**Figure 1. Sample Scorecard for Shelf Life Evaluation**. Refer to “Sample Eval” tab of Sample Protocol Workbook.

Step 3: Repeat the evaluation and scoring for each test sample.

Step 4: Save the consensus scoresheet and repeat this scoring procedure for each pull in the evaluation schedule. You will reach the endpoint of your shelf life when a critical product attribute (typically taste, texture, or appearance) has reached a degree of change from the reference such that you deem the product is no longer acceptable for sale.

If you have questions, please contact AURI at <https://www.auri.org/contact/> or via phone at 218-281-7600. For a listing of individuals at AURI, see <https://www.auri.org/about-auri/staff/>.