Thermostabilized Shelf Life Study

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RESULTS AND DISCUSSION

Entrées and Tuna Noodle Casserole

- **Grilled Pork Chops**
  - Vitamin B1 levels showed losses at higher storage temperatures.
  - Dryness of the product was cited as a reason for product failure.
  - Shelf life projected to be 72 months at 72°F.

- **Tuna Noodle Casserole**
  - Product failure was attributed to declining scores for hardening of noodles and darkening of color during the 36 month study.
  - Shelf life projected to be 48 months at 72°F.

Sweets (Bread Pudding)

- **High sugar items tend to have longer shelf lives**
  - Vitamin A, B1, and B2 demonstrated a linear decline with temperature.
  - The overall flavor, level of sweetness, and banana, and overall acceptability showed a decline likely due to the Maillard Browning reactions. The three most prevalent ingredients; skim milk, sugar and egg, would provide sufficient amounts of free amino groups and reducing sugar to allow for condensation reactions to occur.
  - Shelf life projected to be 48 months at 72°F.

Vegetables (Carrot Coins, Sugar Snap Peas)

- **Carrot Coins shelf life projected to be 48 months at 72°F.**
  - The sugar snap peas were unacceptable at all temperatures at 36 months.
  - Vitamin A significantly declined over time.
  - Apricot cobbler showed a decline in sugar content over time likely due to oxidation of the spices and lipids.

Cheese and Vegetable (Palak Paner)

- **Overall acceptability and specifically aroma scores decreased over time likely due to oxidation of the spices and lipids (cheese).**
  - Color changes indicated a loss of green color in the spinach and a degradation of the internal orange color.
  - Shelf life for both products projected to be 36 months at 72°F.

Fruits (Apricot Cobbler, Rhubarb Applesauce)

- **Vitamin C significantly declined over time.**
  - Apricot cobbler declined from 179 mg/100g to 4.8 mg/100g. The level in rhubarb applesauce declined from 1.16 mg/g to undetectable.
  - Folic acid declined by 44% in rhubarb applesauce.
  - Products darkened in color over time with the higher temperatures darkening more than the 40°F sample.
  - Shelf life for both products projected to be 15 months at 72°F.

Eggs (Broccoli Soufflé, Vegetable Omelet)

- **Sensory panel did not find the 0 month (baseline) product to be acceptable, due to rubbery texture and brown color.**
  - The panel continued over time but the texture did not change.
  - Vitamin E, B1, and thiamin were lost in蛋黄 and charcoal.
  - Broccoli Soufflé significantly declined in color and flavor.
  - Shelf life for both products projected to be 36 months at 72°F.

Starch (Homestyle Potatoes)

- **Flavor decreased over time due to acidic aftertaste, off aroma, and overall decrease in flavor.**
  - There was a significant decline in folic acid and thiamin.
  - Shelf life projected to be 48 months at 72°F.

MATERIALS AND METHODS

- **Products stored at three temperatures, 40°F, 72°F, and benchtop for an accelerated shelf life test.**
- **Evaluation: Every 4 months for the first 2 years and every 6 months for the 3rd year.**
- **Sensory testing includes difference from control testing and overall acceptability testing.**
- **Texture: sensory panel include texture, color, moisture, and water activity determination.**

SHELF LIFE CALCULATIONS

- **Shelf life will be determined by identifying the quality attribute, such as color, flavor, or texture, that will determine the shelf life.**
- **Temperature and Q10 for the product based on quality changes for the three temperatures.**
- **The Q10 provides a prediction of shelf life at different temperatures.**

REFERENCE