Product development considerations of flaxseed (*Linum usitatissimum*) supplementation for the aging population: A pilot study

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**Background**

**An Aging Society**
- Between 2014-2060, the U.S. population is projected to increase from 319 million to 417 million; 1 in 5 Americans expected to be 65 years old or over by 2030
- The baby boomer cohort, individuals born post-World War II between 1946-1964, is largely responsible for this growth in the older population

**Inflammaging**
- During the aging process, immune system shifts to a state of low-grade chronic inflammation and declines in reliability and efficiency
- This dysregulation of the immune system (immunosenesence) may make it difficult to cope with and adapt to stressors
- May lead to increased susceptibility to diseases and has been associated with obesity, cardiovascular disease, some cancers, frailty, and mortality

**Flaxseed (*Linum usitatissimum*)**
- Contains biologically active components (α-linolenic acid, lignans, and soluble and insoluble fiber)
- Shown to reduce blood pressure, improve lipid abnormalities, increase anti-inflammatory mediators, and decrease chronic inflammation markers
- Little is known regarding the acceptability among baby boomers in relation to food products with flaxseed

**Objectives**
To evaluate the acceptability of a food product formulated with flaxseed among baby boomers or individuals 50 years and older.

**Hypotheses**

H₀₁: There is no significant difference in the likability of the flaxseed bagel compared to control (0% flaxseed).

H₀₂: There is no significant difference in the preference of the flaxseed bagel compared to control bagel.

H₀₃: There is no significant difference in the intended frequency of eating the flaxseed bagel compared to control bagel.

**Methods**

**Product Development**

- Milled flaxseed 30.00 g, flaxseed 0.06 g, control
- Bread flour 42.37 g, flaxseed 72.37 g, control
- Salt 1.22 g
- Active dry yeast 0.61 g
- Honey 3.02 g
- Ground cinnamon 0.74 g
- Seedless raisin 10.33 g
- Water 42.13 g

**Recruitment**
Flyers were placed around Osher Lifelong Learning Institute (OLLI), LifeFit Center, and the Department of Family and Consumer Sciences (FCS) at CSULB two weeks prior to the sensory evaluation.

**Sensory Evaluation**
- Occurred under controlled conditions at the sensory evaluation laboratory in CSULB FCS Department
- Panelists were provided with two coded bagels in a random order
- Tools used:
  - 9-point Hedonic scale: Measures food likeability using sensory attributes
  - Paired Preference test: Measures overall preference between products
  - Food Action (FACT) rating scale: Measures food acceptance by frequency consumption
- Water was supplied to cleanse the palate between samples

**Correlation of sensory attributes to overall acceptability of bagels**

- There was no significant difference in the frequency of consuming both bagels

**Results**

**Paired Preference test:** 50% of participants preferred flaxseed bagel while 50% preferred control bagel.

**FACT rating scale:** There was no significant difference in the frequency of consuming both bagels

**Conclusion**

- Flaxseed can be successfully incorporated into a cinnamon raisin bagel as there were no significant differences between the two bagels with respect to sensory attributes, overall acceptability, preferences, and FACT ratings
- Enhancing appearance, flavor, color, and texture may improve consumer acceptability for bagels among older adults
- Small sample; further consumer evaluations among a large sample may be required to verify the acceptance of bagels containing flaxseed