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Meat icing on muffins- healthy snacking for older adults (#389)Samarakoon Mudiyansele C. S. Samarakoon^{1, 2}, Bogodage D. Perera¹, Mustafa M. Farouk²¹ Waikato Institute of Technology, Centre for Applied Science and Primary Industries, Hamilton, New Zealand; ² AgResearch Ltd, Food & Bio-based Products, Meat Quality Team, Hamilton, New Zealand**Introduction**

Older adults have a higher requirement for protein compared to younger adults. An imbalance between protein supply and protein need can result in loss of skeletal muscle mass. Ingestion of 25–30g of protein per meal stimulates muscle protein synthesis in both young and older individuals[1]. The quality of protein ingested is also essential to promoting muscle health. Red meat contains high quality proteins and is rich in leucine. Decreased chewing efficiency and digestion in the elderly are responsible for lower meat protein intake from this group. Minced beef has been shown to be more rapidly-digested than servings of intact beef, resulting in increased amino acid availability and greater postprandial protein retention[2]. Muffins are common bakery snacks, mostly preferred by older adults [3]. Designing muffins to suit nutritional needs of older adults could contribute to increased dietary protein intake. This study proposed novel easy consumable dietary approach to enhance quality protein intake for older adults. Incorporation of meat into muffin's icing provide better snacking option to complement their protein needs.

Methods

Three different muffins were formulated: wheat (26% wheat flour), coconut (18% wheat and 8% coconut flour) and chestnut (18% wheat and 8% chestnut flour). Two different icing formulations were prepared: chocolate (45% butter, 45% Icing sugar, 7% Cocoa powder and 3% vanilla essence) and meat (8% butter, 30% meat, 55% Icing sugar, 5% Cocoa powder and 2% vanilla essence). Consumer acceptance and ranking preference tests were conducted with 90 adult consumer panellists consisted of 53 individuals aged above 55 years old (older adults) and 37 panellists aged below 55 years old (younger adults). Wheat muffin with chocolate icing was used as the standard control. Three treatments were designed for the sensory trial by combination of muffins and icings; Wheat muffin with meat icing (T1), chestnut muffin with meat icing (T2) and coconut muffin with meat icing (T3). Mini muffins with frosted icing were prepared so that whole muffin could be served without creating sensory fatigue for panellists. Each panellist received one each of the four muffins. Panellists were asked to discriminate the treatments (T1, T2 and T3) against the standard control. Panellist assessed the samples based on acceptability for each given sensory attribute and then ranked based for preference. The sample presentation was balanced with complete sets, that were randomized and monadic, and seven- point hedonic scale was used to indicate degree of acceptance for each descriptor.

Results

Addition of meat into the icing reduced its smooth texture and affect the mouthfeel properties and appearance. Images of the mini muffin with frosted meat icing is presented in Figure 1.B. T2 had similar preference to the control sample among older adults. Younger adults had higher overall preference for T1 and T2 (Figure 1.i). T3 had lowest preference among all samples in both age groups. Muffins are the most popular snack choice among 70% of consumers. 84.4% of the panellists (91.6% of <55 and 79.6% of >55) considered muffins as a better snack. Both age groups (Figure 1.ii) preferred muffins as a snack during morning (28% of <55 and 30% of >55) and afternoon teas (44% of <55 and 42% >55).

The sensory hedonic data generated over the muffin and icing properties; texture, flavour and appearance shown in Figure 2. Older adults had more acceptance for the meat-based icing compared to younger adults. Overall muffins with meat icing had lower acceptability compared to controls regardless of age groups (Figure 2). The panellists were able to identify the meat icing due to its coarse texture, meat flavour and unsmooth appearance. Although 58.8% of the panellists (56.8% of <55 and 60% of >55) responded that they were willing to purchase muffins with meat icing if the product is commercially available.

Conclusion

Muffins are popular snack among adult consumers. Muffin frosted with meat icing is a healthy snacking option for older adults. Offering fortified icing with meat along with muffins could improve meat protein intake in older adults. Meat icing muffins were preferred over the control sample by younger adults and there was no difference found in the acceptance scores for sensory attributes among older adults. Further development needs to be done to improve the texture of the meat icing and to lower the amount of sugar used in the icing to make it tastier and healthier for older adults.

Acknowledgment

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References

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2. Landi, F., et al., *Protein Intake and Muscle Health in Old Age: From Biological*

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Plausibility to Clinical Evidence. *Nutrients*, 2016, 8(5): p. 295.

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Figure 2. Acceptance scores for mean sensory attributes

Acceptance scores of two age groups (<55 and >55) for mean sensory attributes (colour, aroma, taste, level of sweetness, mouth feeling, acceptability) of icing and muffins among three treatments. Each attribute was compared relative to the sandard control sample.

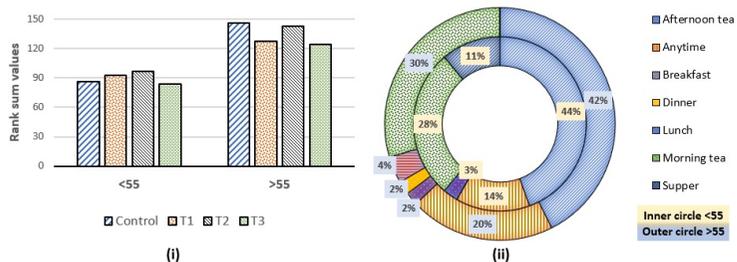
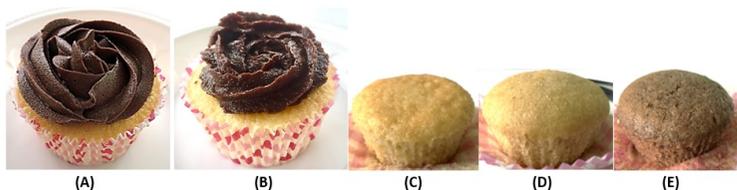
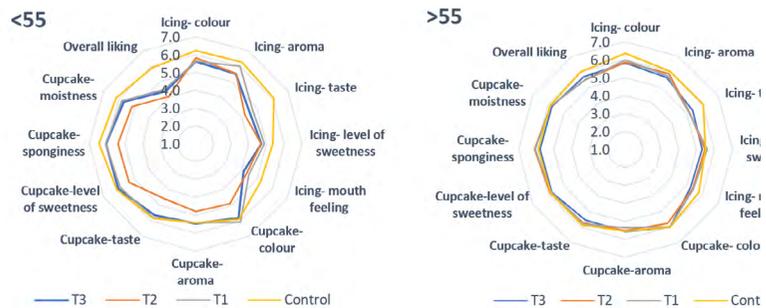


Figure 1. Sensory preference and appearance of meat icing cupcakes

(A) control muffin with control icing, (B) control muffin with meat icing, (C) control muffin, (D) coconut muffin and (E) chestnut muffin, (i) Comparison between overall ranking of treatments based on overall preference, (ii) Comparison between two age groups based on the time preference in consuming muffins

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