

Examining Effects of Mixing Variations on Physical and Sensory Characteristics of Muffins

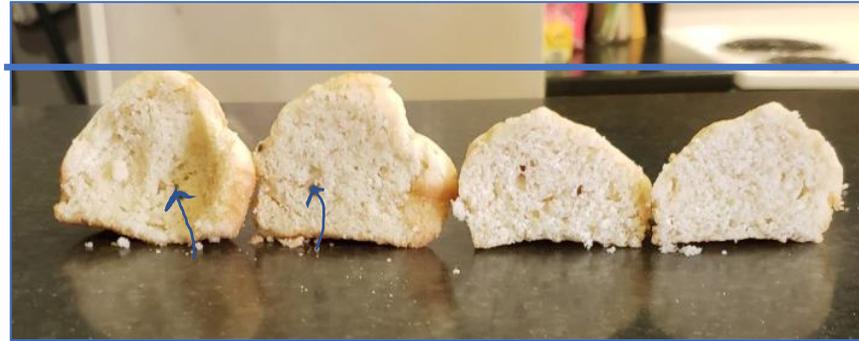
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Abstract

Agitation has been shown to have an impact on gluten development. Two batches of muffins were made, one being mixed with 10 strokes (the control) and one being mixed with 90 strokes (the variation). The expected results were achieved, but the experiment should be replicated due to a myriad of uncontrolled extraneous variables.

Methodology

The experiment was conducted in the food science lab at Eastern Illinois University. Ingredients were weighed to the nearest hundredth of a gram on a scale. The ingredients were Two batches of muffins were made: a control following the standard recipe, and a variation. The control was mixed with 10 strokes, and the variation was mixed with 90 strokes. Both batches were then baked in separate time intervals at 425 degrees Fahrenheit for 10 minutes. The muffins were then allowed to cool for five minutes before being moved to a cooling rack. Some variation should also be noted as the experimenter lost track of the number of strokes when mixing the 90-stroke variation, which may have had an impact on the results. Other extraneous variables that should be noted were that the oil and milk were not mixed beforehand on the variation, and the batter was not allowed to sit on the variation, and the batter was more evenly distributed in the muffin cups on the distribution.



Results

After the agitation of gluten could cool it was then then cut and measured with a standard ruler. The variation (90 strokes) measured at 4.25 cm from base to the peak, and the control measured 3.3 cm from the base to peak. The variation also showed significant tunneling and peaking as shown in the picture above (indicated by arrows). A sensory analysis was also conducted on the muffins and the control was noted to be more tender and moister than the variation. The variation was dryer and less tender.

Discussion

McWilliams wrote about overdeveloped gluten, noting how tunnels are a result of overdeveloped gluten (2017). This could be observed in the variation and is tied to the amount of mixing that occurred, being 9 times the recommended amount. The overmixing also led to other undesirable characteristics, such as the dryness (McWilliams 2017). However, the ideal muffin for the control was not obtained because of the lack of accuracy when counting strokes and not using an accurate timer. If this experiment were to be redone, the results would most likely be similar, but may exhibit the qualities to a clearer extent.

Conclusion

The initial hypothesis was supported as the agitation (the mixing) of the muffins had an impact on the height of the muffin as well as the tenderness. This experiment could be conducted again with more attention paid to eliminating extraneous variables to get a clearer answer.

References

McWilliams, M. (2017). *Foods: Experimental perspectives* (8th ed.). Boston: Pearson.