RESEARCH ON REPLACING CHEMICAL LEAVENING AGENTS WITH EGG WHITE AND THE IMPACT ON THE QUALITY OF FLOUR AND PASTRY PRODUCTS

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Introduction. Functional egg proteins play a crucial role in improving batter stability, gas retention, and structural integrity of baked goods.

Materials and Methods. This study evaluated the effect of replacing egg ingredients with egg white powder at 1.3% (P1) and 1.6% (P2) levels in pound cake recipes based on wheat flour type 550, compared to a control sample (0% egg white powder), aiming to enhance structural quality potential without impairing sensory attributes

Volumetric and dimensional profiling were performed using a Volscan Profiler 3D laser scanner to determine specific volume, density, total surface area, maximum height, and cross-sectional middle slice parameters. Visual and organoleptic evaluations were conducted on whole cakes and cut slices to assess dome curvature, crust uniformity, and crumb cell structure.

Results and Discussion. Laser scanning revealed a progressive modification in physical indicators with higher substitution rates. Specific volume slightly decreased from 2.22 mL/g (Control) to 2.19 mL/g for P1 (1.3%) and 2.08 mL/g for P2 (1.6%), corresponding to an increase in density from 450.78 kg/m³ to 481.60 kg/m³. Maximum product height remained stable at 1.3% addition (121.2 mm vs. 121.9 mm Control), whereas 1.6% caused a noticeable reduction to 103.0 mm (-15.5%). Organoleptic assessment showed that 1.3% egg white powder promoted a highly uniform, fine crumb porosity and intact dome, creating a cohesive matrix favorable for moisture retention and staling delay. Conversely, 1.6% addition led to an over-densified crumb and dome flattening

Conclusions. Incorporating 1.3% egg white powder represents the optimal formulation level. It refines crumb cell morphology and reinforces matrix cohesion—key factors for product geometry and visual sensory appeal

Keywords: *baked goods, crumb porosity, laser scanning, quality optimization, volume yield*

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