



Abstract Effects of Partially Replacing Wheat Flour with Tiger Nut Flour on the Physical and Sensory Properties of Different Types of Bread

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Abstract: This study investigated the effects of partially substituting wheat flour (WF) with tiger nut flour (TNF) on the physical and sensory properties of different bread types. The substitution was performed at a WF:TNF ratio of 100:0, 90:10, 85:15, 80:20, 75:25 and 70:30 for butter bread (B_b), tea bread (T_b) and sugar bread (S_b). Substituting WF with TNF increased bread brownness, increased colour saturation and decreased lightness, showing the highest impact on S_b , followed by T_b and B_b . Additionally, bread-specific volume decreased significantly after 20 % (B_b), 25 % (T_b) and 30 % (S_b) TNF substitutions. Furthermore, substituting using 30 % TNF increased crumb hardness from approx. 1.87 N to 3.64 N (B_b), 3.46 N to 8.14 N (T_b) and 6.71 N to 11.39 N (S_b), and caused significant increases after 3 d storage to 17.80 N (T_b) and 21.08 N (S_b). Only a minimal effect on hardness of B_b (4.32N) was observed after storage. Substituting WF with 10 % TNF for Bb or 25 % TNF for Tb led to significantly higher consumer (N = 56) scores for all attributes and overall acceptability, but no significant effects on the overall acceptability of S_b were observed. Flash profiling showed frequently used descriptors for B_b as firm, moist, buttery, smooth and astringent. After 10% TNF substitution, descriptors were chewy, firm, sweet, porous, dry, caramel, whilst that of 30 % TNF were grainy, chocolate, brown, nutty and flaky. Substituting WF with TNF increased the lipids, fibre and minerals but decreased the protein and carbohydrate contents of bread. TNF substitution led to different physical and sensory changes depending on bread type, showing higher consumer acceptability for B_b, followed by T_b and S_b. The study is relevant for utilizing tiger nuts as an ingredient in bakery products.

Keywords: tiger nut flour; partial substitution; breads; physical property; consumer acceptability

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