WHOLE FORAGE PALM PUREE, MULTI-TYPE RESISTANT STARCH AND WHOLE COWPEA FLOUR AS SUBSTITUTES FOR FAT AND DIGESTIBLE CARBOHYDRATES IMPROVE THE PHYSICOCHEMICAL CHARACTERISTICS OF BUTTERY BISCUITS

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RESUMO

Butter biscuits are highly consumed but have high levels of fat and sugars, making it necessary to develop low-carb and low-fat products with adequate technological and sensory characteristics. If it is not possible, reducing fat and available sugars is suitable. This study aimed to evaluate the replacement of 8.19% butter with whole forage palm puree (PP), 15.84% sucrose with multi-type resistant starch added with sucralose (RS+S), and 9.28% wheat flour with whole cowpea flour (CF) on the physicochemical characteristics of the batter and butter biscuits (BB). The substitutions were optimized and validated in a previous study. The standard formulation (SB) was composed of wheat flour (100%), butter (60%), sucrose (50%), in natura whole eggs (20%), and leavening agents (3.50%) (on flour basis). The parameters evaluated were pH and instrumental color and texture. The data were analyzed using the t-*Student* test (P<0.05). The pH of the batter and biscuits (5.74±0.03; 7.29±0.02) were lower for BB compared to SB (5.85±0.03; 7.62±0.05), respectively. This characteristic is due to the higher concentration of organic acids in PP and RS+S. BB showed lower L^*, a^*, and b^* values (64.19±0.17, 3.91±0.04, 29.76±0.31) compared to SB (70.49±0.11, 5.89±0.04, 32.66±0.10) for the batter, respectively. This behavior remained in the biscuits, with BB having L^*, a^*, and b^* values (50.29±1.61, 9.88±0.42, 8.43±0.40) lower than SB (55.82±0.40, 13.32±0.15, 28.26±0.25), respectively. In the batter, these differences can be attributed to the presence of chlorophyll and carotenoids in PP, the yellowish ton of RS+S, and the carotenoids, flavonoids, and dietary fibers in CF. Pigments are heat-sensitive and oxygen-unstable, and together with caramelization and the Maillard reaction, they promoted color changes in the biscuits. The instrumental texture of the dough showed higher hardness (3.32±0.07N) and adhesiveness (-9.76±0.53N.s) values for BB when compared to SB (hardness = 2.49N and adhesiveness = -13.16±0.56N.s). Although PP has a higher water content, the batter texture was favored by the greater water absorption capacity of RS+S due to pre-gelatinization during extrusion cooking and the presence of dietary fibers and proteins in CF. This behavior directly reflected the texture of the biscuits, with BB showing lower hardness, fracturability, and shear force values (9.69±3.16N, 5.06±3.21N, 15.36±3.51N) compared to SB (12.17±1.44N, 10.11±1.24N, 20.58±2.84N). Thus, PP, RS+S, and CF are alternatives to improve the technological quality of butter biscuits with reduced fat and available sugars, resulting in healthy and innovative products for human consumption. Acknowledgments to CAPES, FAPEMIG, and CNPq.

PALAVRAS-CHAVE: healthiness, new products, texture, color

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