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Process optimization and kinetics of deep fat frying conditions of sausage processed from goat meat using response surface methodology

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n actual practice, frying operations has been devoid of the methodology to make frying operations easier for commercial Lpurposes alongside reducing health related issues. This study investigated the optimization of cooking time (5, 10, 15 minutes), frying temperature (150, 170, 190 oC) and frying time (3, 6, 9 minutes) by Response Surface Methodology (RSM) using a three-level Box-Behnken design and effect of these processing variables on the quality and sensory attributes of deep fat fried goat meat sausage as well as the kinetics of moisture loss and fat absorption. The obtained experimental values were fitted with a second order- polynomial equation. The moisture content, moisture loss, fat and protein content ranged from 10.75 to 53.33%, 36.33 to 69.18%, 19.38 to 36.02% and 14.84 to 41.78%, respectivelyy. The textural properties (breaking force), ranged from 2.98 to 28.46 N. Lightness, redness, yellowness, hue angle and colour difference ranged from 15.68 to 26.65, 10.53 to 15.29, 7.92 and 12.72, 21 to 330 and 156.23 to 171.42, respectively. The statistical indices showed the relative validity of the generated models [absolute average deviation (AAD between -0.84 and 15.50), bias factor (Bf between 0 and 13.97) and accuracy factor (Af between 0 and 13.97). The effective moisture diffusivity ranged from 2.43 x 10-9 to 1.22 x 10-8 m2/s for moisture loss and fat absorption. Activation energies estimated for moisture loss and fat absorption ranged from 65.82 to 77.76 KJ/mol, while the rate constant, D-value and Z-value ranged from 0.0592 to 0.449s-1, 5.13 to 38.90s, 800 to 875 K. The optimal conditions for the deep fat frying of goat meat sausage were cooking time of 10 minutes at frying temperature of 150 oC and frying time of 9 minutes. The resulting sausages were better preferred by the panellists. The regression equation models generated suggests a useful design in the food industry for commercial purposes to develop optimum conditions for the deep fat frying of meat sausages, produce aesthetically acceptable, shelf stable and nutritionally fit products.

Biography

Samuel Sunday Sobowale (PhD), born in Nigeria in 1977 is an erudite scholar and has several years of lecturing, teaching and research in the area of Food Processing and Engineering. He obtained his Bachelor of Technology in Food Engineering in 2000, and obtained M.Sc and PhD Degree in Food Engineering in 2005 and 2015, respectively. He is an active member of different scientific organizations including the Council for the Regulation of Engineering in Nigeria (COREN), Nigerian Society of Engineers (NSE), Institute of Food Science and Technology (IFT), Nigerian Institute of Food Science and Technology (NIFST) and South African Association for Food Science & Technology (SAAFoST). He has over 29 published articles in several local and international journals as well as 19 conference presentations. He is equally a reviewer of different high impact scientific journals. He has also won several research grants in the field of Food Processing and Technology and received various awards, both locally and internationally. Engr. (Dr.) S. S. Sobowale is currently a senior lecturer in the Department of Food Technology at Moshood Abiola Polytechnic, Abeokuta, Nigeria.

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