



EFFECT OF EXTRUSION VARIABLES IN THE PHYSICAL CHARACTERISTICS OF COOKIES PREPARED WITH WHOLE RICE (ORYZA SATIVA L.) AND BLACK BEANS (PHASEOLUS VULGARIS L.) FLOUR

MARQUES, G.A. (/slaca/slaca/autores/gleicyane-de-almeida-marques?lang=en);

MAGALHÃES, C. S. (/slaca/slaca/autores/camila-soares-magalhaes?lang=en);

DELMAESTRO, J. N. (/slaca/slaca/autores/julia-delmaestro?lang=en);

OLIVEIRA, A. P. R. (/slaca/slaca/autores/ana-paula-rezende-de-oliveira?lang=en);

MATTOS, M. C. (/slaca/slaca/autores/mariana-da-costa-mattos?lang=en);

CARVALHO, J.L.V. (/slaca/slaca/autores/jose-luiz-viana-de-carvalho?lang=en);

ASCHERI, J. L.R. (/slaca/slaca/autores/jose-luis-ramirez-ascheri?lang=en);

SILVA, E.M. M. (/slaca/slaca/autores/erika-madeira-moreira-da-silva?lang=en)

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Cookies are accessible and popular, additionally are flexible for insertion of raw materials with better nutritional value. This study evaluated the effects of extrusion variables on the development of cookies. The mixed flour was obtained using a single screw extruder, with the following parameters: screw speed (150rpm), black bean (BB) (13,18-46,82g / 100g), feed moisture (14,63-21,36g / 100g) and temperature (91.36-158.66 ° C), established by the rotational compound design, totaling 20 treatments. The weight loss was obtained with variation before and after baking, diameter and thickness determined with pachymeter before and after baking, expansion factor obtained by the ratio between diameter and thickness, and specific volume was calculated by the apparent volume ratio and its weight. Water activity was analyzed on Decagon Devices (AquaLab) equipment. Color was determined using Hunterlab ColorQuest (XE) colorimeter, and the hardness was measured on TAXt2i texturometer. The interaction between BB and moisture produced cookies with smaller variation in diameter and thickness. Lower variation in thickness was also observed when BB was higher and temperature has increased. However, highest variation of thickness was observed only with increment of moisture. Other measurements were not influenced by the independent variables ($p > 0.05$). The highest value of water activity was found in the treatment with 30g/100g of BB, which may be due a hygroscopic characteristics of BB fibers, resulting in greater water retention in cookies. Cookies became darker with rise of BB and moisture, but an increase of BB in combination with higher temperature caused less darkening. The increase flours' moisture and processing temperature resulted softer cookies. On the other hand, the increase of BB along with moisture increased hardness. It was possible to develop cookies using extruded mixed flour presenting good texture, low water activity, besides good color characteristic for this type of product.