Addition of young bamboo culm flour and commercial bamboo shoot fiber as partial substitutes of fat and/or sugar in cookies formulations

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Abstract
Commercial bamboo shoot fiber (CBSF) has been used in food products, and young bamboo culm flour (YBCF) could also be used as a source of fiber, attending consumer demand for healthier products, as well as providing sustainable exploration of the clumps. So, this project aimed to study comparatively the addition of YBCF and CBSF in cookies formulations with reduced contents of fat and/or sugar. Technological parameters were evaluated by surface response methodology (SRM), and no significant difference was observed between formulations. This results shows that YBCF and CBSF are potential ingredients to partially substitute fat and sugar in cookies formulations.

Key words: Bamboo, Fiber, Cookies

Introduction
Consumer demand for healthier products has increased, so calorie reduction and fiber addition in food formulations have been recurrent. The CBSF has already been used in bakery products, and Brazil, being the country with one of the largest species diversity in the world, must follow the trends to better use the young bamboo culm, through sustainable exploitation [4]. In addition, the young bamboo culm presents greater yield in the production of fibers, when compared with the shoot. So, this study aimed to compare the effect of the addition of YBCF (15%) and CBSF (3%) in cookies formulations with reduced contents of fat (0-50%) and/or sugar (0-50%) using two central composite design (CCD).

Results and Discussion
All the elaborated formulations were evaluated for moisture content [2], water activity, color, texture, thickness, diameter, weight loss and specific volume [1] and compared with a control formulation (CF), defined in a previous study [5]. No significant difference was observed between formulations using SRM, neither with respect to the reduction of sugar and fat contents at high levels (50%), nor for the addition of YBCF or CBSF. The formulations had, on average, a diameter of 39.09 mm and a thickness of 9.31 mm. Moisture content was lower than 9% and lower values of water activity. All the formulations presented L values very similar to those of CF, and with the parameters a* and b* in the low red and yellow regions, respectively.

Conclusions
YBCF and CBSF are potential ingredients for cookies formulations, replacing partially fat and sugar contents up to 50%, and without changing the technological characteristics of the product.

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References