

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

Patricia S. E. Miyake\*, Mária H. F. Felisberto, Maria T. P. S. Clerici.

### 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:** *Bambo, fiber, cookies*

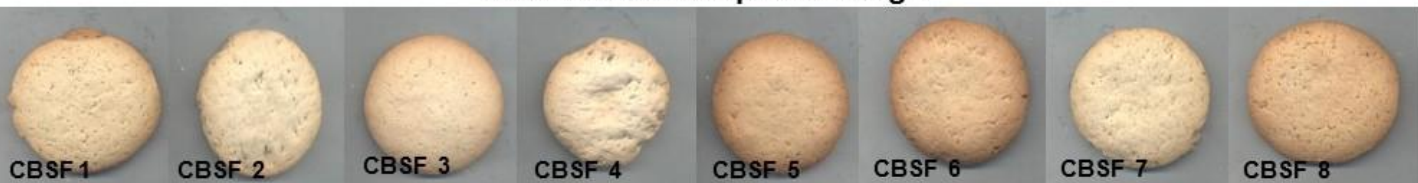
### Introduction

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<sup>4,5</sup>. 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<sup>2</sup>, water activity, color, texture, thickness, diameter, weight loss and specific volume<sup>1</sup>, and compared with a control formulation (CF), defined in a previous study<sup>3</sup>. 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 9.31mm. 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 low yellow regions, respectively.

### CBSF central composite design



### YBCF central composite design



Figure 1. Elaborated cookies from the two CCD evaluated.

### 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.

### Acknowledgement

We are grateful to: CAPES - scholarship of Mária H. F. Felisberto; SAE/Unicamp - scholarship of the students who supported the project; FAEPEX and FAPESP - financial support (2015/19637-4) and scholarship of Patricia S. E. Miyake (2016/13533-5).

<sup>1</sup>AACCI. Approved Methods of Analysis. St. Paul, MN, U. S. A., 2010.  
<sup>2</sup>AOAC. Official methods of analysis Gaithersburg: AOAC INTERNATIONAL 1998. <sup>3</sup>CLERICI, M. T. P. S.; OLIVEIRA, M. E. D.; NABESHIMA, E. H. Qualidade física, química e sensorial de biscoitos tipo cookies elaborados com a substituição parcial da farinha de trigo por farinha desengordurada de gergelim. Brazilian Journal of Food Technology, v. 16, p. 139-146, 2013. ISSN 1981-6723. <sup>4</sup>MIYAKE, P. S. E.; FELISBERTO, M. H. F.; CLERICI, M. T. P. S.; FERRARI FELISBERTO, M.; BERALDO, L. B. Physicochemical characterization of three bamboo species: *D. asper*, *B. tuldoideis* and *B. vulgaris*, available in Unicamp. In: XXIV CONGRESSO DE INICIAÇÃO CIENTÍFICA DA UNICAMP - 2016. Campinas, 2016. <sup>5</sup>PEREIRA, M. A. R.; BERALDO, A. L. Bambu de corpo e alma. 4. Bauru/SP, 2010.