STUDY OF THE POTENTIAL OF ARABICA COFFEE RESIDUE TO DEVELOP FOOD PRODUCTS: PROXIMATE COMPOSITION

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Introduction

Brazil is currently the largest coffee producer in the world [1], with an estimated production of 55.7 million 60-kilogram bags of coffee in the year 2022 [2]. The coffee fruits are processed by dry, wet and semi-wet or semi-dry processes, to obtain the grain, which will produce the coffee beverage, generating different solid and liquid residues. During the different processes of coffee fruits, more than 50% of the fruit is discarded as residue [3,4,5]. Rio de Janeiro currently produces more than 10,000 tons of coffee, generating large amounts of solid waste during the annual harvest. The evaluation of the proximate composition (moisture content, ash, lipids, proteins, carbohydrates, and dietary fibers) of these coffee residues is important to assess their potential to be used by the food industry as a food ingredient. Thus, the present study aimed to evaluate the proximate composition of coffee residue from the processing of arabica coffee produced in the State of Rio de Janeiro.

Material and Methods

Solid residues of arabica coffee were obtained by donation from producers in the mountainous region of Rio de Janeiro. Samples from the wet processing method of 2020 and 2022 crop (CURJ-2020 and CURJ-2022), and sample of the dry processing of 2022 crop (CSRJ-2022) were obtained. Wet processing residues were collected after pulping the fruits, stored and immediately taken to the laboratory for drying in a ventilated oven at 55 °C for 72 hours. The dry processing residues were collected from the producer with moisture around 12% and stored in hermetic bags suitable for grains. Both residues were ground using a domestic mill, sieved (20 mesh) and stored in closed glass jars in desiccators (at room temperature 21 ± 2 ºC) protected from light until analysis. The proximate composition of the powder residues was performed in triplicate. The content of moisture (volatile at 105 ºC); total ash (muffle at 550 ºC), protein (Kjeldhal method), lipid (Soxhlet method) and carbohydrate (Nifext method) were performed according to IAL (2008) [6].

Results and Discussion

Mean moisture content of the analyzed samples were 12.1% ± 0.08, 7% ± 0.05 and 17.3% ± 0.11, for CURJ-2020, CURJ-2022 and CSRJ- 2022, respectively.

Proteins and lipids contents were 9.5% ± 0.18 of protein and 5% ± 0.15 of lipids for CURJ-2020, of 10.8% ± 0.26 of protein and 3.4% ±1.07 lipids for CURS-2022, and 9.03% ± 0.20 protein and 0.82% ±0.06 lipids for CSRJ-2022. Santos et al. (2021) reported values according to the ones found in the present study, where coffee pulp (wet method) has 8-12% of protein and 2-7.09% of lipids, and coffee husk (dry method) has 8-11% of protein and 0.5-3% of lipids [7]. Minerals content was average of 7.1%±0.07, 9.1%±0.57 and 4.8%±0.32 for CURJ-2020, CURJ-2022 and CURJ-2022, respectively. Durán et al. (2017) reported similar values, in which the coffee pulp shows a percentage of 2-7% of minerals, and the husk 5.4 – 6.2% [4].

Total carbohydrates calculated by Nifext including fibers, were 66.2%±0.05 for CURJ-2020, 68.1%±0.44 for CURJ-2022 and 67.8%±0.11 for CSRJ-2022. These were almost similar with the literature, Socool (2012) reported 68% of carbohydrates and dietary fiber in coffee pulp, and 71.9% in the coffee husk [8].

Conclusion

Coffee residues from both processes appear to have a favorable nutritional composition to be used as food industries with a good percentage of carbohydrates, dietary fibers and vegetable protein, being a sustainable alternative to reduce environmental impacts.

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