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A STUDY ON THE COMPOSITION AND ANTIOXIDANT POTENTIAL FROM COFFEE PARCHMENT RESIDUE

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INTRODUCTION

Coffee is one of the main commodities produced and marketed worldwide. *Coffea arabica coffee* and *C. canephora* production in 2017 was 44.97 million bags of 60 kilos of green coffee beans. In the dry or natural processing method, the cherries are dried and then mechanically misaligned. During this process, the coffee beans are detached from the pericarp (bark, pulp and parchment). Based on dry weight, these residues account for about 12% of the cherry (ripe grain), and for each tonne of harvested coffee fruit, about 0.18 tonnes of this coffee residue. However, easy distribution logistics, since it is a dry residue that can be easily collected and stored, makes the use of this by-product a promising alternative for the development of new products with high added value. In this way, the proper characterization of the material appears as the first step to explore the use of this material.

OBJECTIVE

This study proposes to determine the composition of moisture, fat, dietary fiber, carbohydrates, protein, cellulose content, hemicellulose, lignin, total ashes, extractives, and antioxidant activity of agroindustrial residue from dry coffee processing. This approach adds value to the agroindustrial by products of important plant supply chains, such as coffee cultivation.

MATERIAL AND METHODS

- **Sample** ➡ Residue obtained from the dry coffee processing of the Arabica coffee beans (São José do Vale do Rio Preto, Rio de Janeiro).

Agroindustrial residue

Sample ground and fractionated

Characterization of the material

Chemical Composition Determination

- Moisture
- Ashes
- Extractives
- Cellulose
- Hemicellulose
- Lignin

National Renewable Energy Laboratory (NREL)

- Fat content
- Protein
- Nitrogen
- Carbohydrate
- Dietary fiber

Antioxidant Potential

- Free radical scavenging activity (DPPH) assay
- Radical cation decolorization ($ABTS^{\cdot+}$) assay

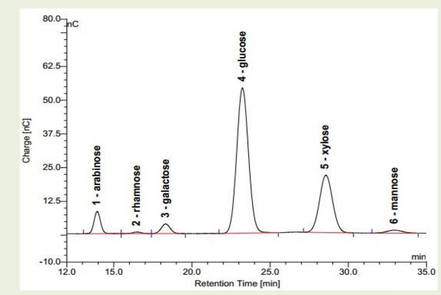
RESULTS AND DISCUSSION

- **Chemical Composition Determination**

The Table 1 shows the cellulose content, hemicellulose, lignin, total ashes, extractives, fat, protein, carbohydrates and total dietary fiber and carbohydrates of agroindustrial residue from dry coffee processing. The agroindustrial residue is rich in sugars polymerized into cellulose and hemicellulose structures. Hemicellulose is composed by four sugars, xylose being the most abundant, followed by arabinose and few quantities of mannose and galactose. Extractives, as well as, lignin is also a fraction present in a significant amount. Low fat content was present in this residue. Otherwise, protein was present in more amounts in these materials.

Table 1 - Chemical composition of coffee processing solid residue.

Chemical components	Composition (g/100 g dry material)
Cellulose (Glucose)	26.24 ± 0.19
Hemicellulose	18.67 ± 0.17
Arabinose	3.04 ± 0.05
Mannose	0.90 ± 0.02
Galactose	1.42 ± 0.02
Xylose	13.31 ± 0.18
Lignin	23.02 ± 0.50
Ashes	7.23 ± 0.70
Extractives	21.69 ± 0.86
Fat	0,82
Protein	6.67
Nitrogen	1.16
Carbohydrates	2.36
Total dietary fiber	75.45



- **Antioxidant potential**

The antioxidant activities of the extracts in terms of DPPH and ABTSþ radicals scavenging are shown in Table 2.

Table 2 - Antioxidant potential of coffee processing solid residue.

Antioxidant potential	Composition
DPPH (µmol TE/g dry material)	21.21 ± 0.94
ABTS (µmol Trolox/g dry material)	97.61 ± 6.89

CONCLUSION

A complete chemical characterization of the *Coffea arabica* parchment agroindustrial residue from the dry coffee processing was performed in this study. CP is sugar-rich lignocellulosic materials composed also of high levels lignin, and total dietary fibers. The residue has interesting antioxidant potential, which open up possibilities for their reutilization. Therefore, the results of this research show the importance of characterizing abundant residues as an essential step to find out potential uses and destinies for their subsequent valorization.