Analysis of chemical parameters of Cascara Coffea arabica regarding the different post-harvest processing

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INTRODUCTION

Agro-food waste (AFW) currently becoming a global issue with significant environmental and economic ramifications. AFW could be classified as food waste created during or before processing and food waste created after processing (Kour et al., 2023). The coffee industry is a significant contributor to producing coffee co-products (Murthy and Naidu, 2012). Harvesting and processing of coffee cherries generate large amounts of coffee co-products that are typically non-used, and this fact has a negative effect on the environment causing ecological problems in the respective coffee-producing countries (Dorsey and Jones, 2017).

MATERIAL AND METHODS

For this research, Cascara samples of Coffea arabica were obtained from different post-harvest processes. A detailed description of the samples is shown in Table 1. An extract from Cascara samples was used to measure the parameters. For the determination pH, equipment pH 70 portable pH-meter (XS Instruments, Italy) was used, Dry matter was determine using instrument by a moisture analyzer brand KERN DAB 100- 3 (KERN & SOHN GmbH, Balingen, Germany). TAC was determined using the radical-scavenging method by Brand-Williams (1995) with DPPH radical -2,2-diphenyl-1-picrylhydrazyl (Sigma-Aldrich). TPC was determined by Folin–Ciocalteu reagent method according to Fu et al. (2011). For summarizing our results was used descriptive analysis, Anova Duncan test and REGWQ, LDA (XLSTAT New York, USA).

ID	Cultivar	Date of harvest	Post- harvest process	Altitude	Geographical origin	Variety
1	*C. arabica*	2020	Dry	1300 mamsl	Ranama	M
2				1300 – 1800 mamsl	Costa Rica	C
3			Fully washed	1650 mamsl	Panama	C
4				1500 mamsl	Costa Rica	M

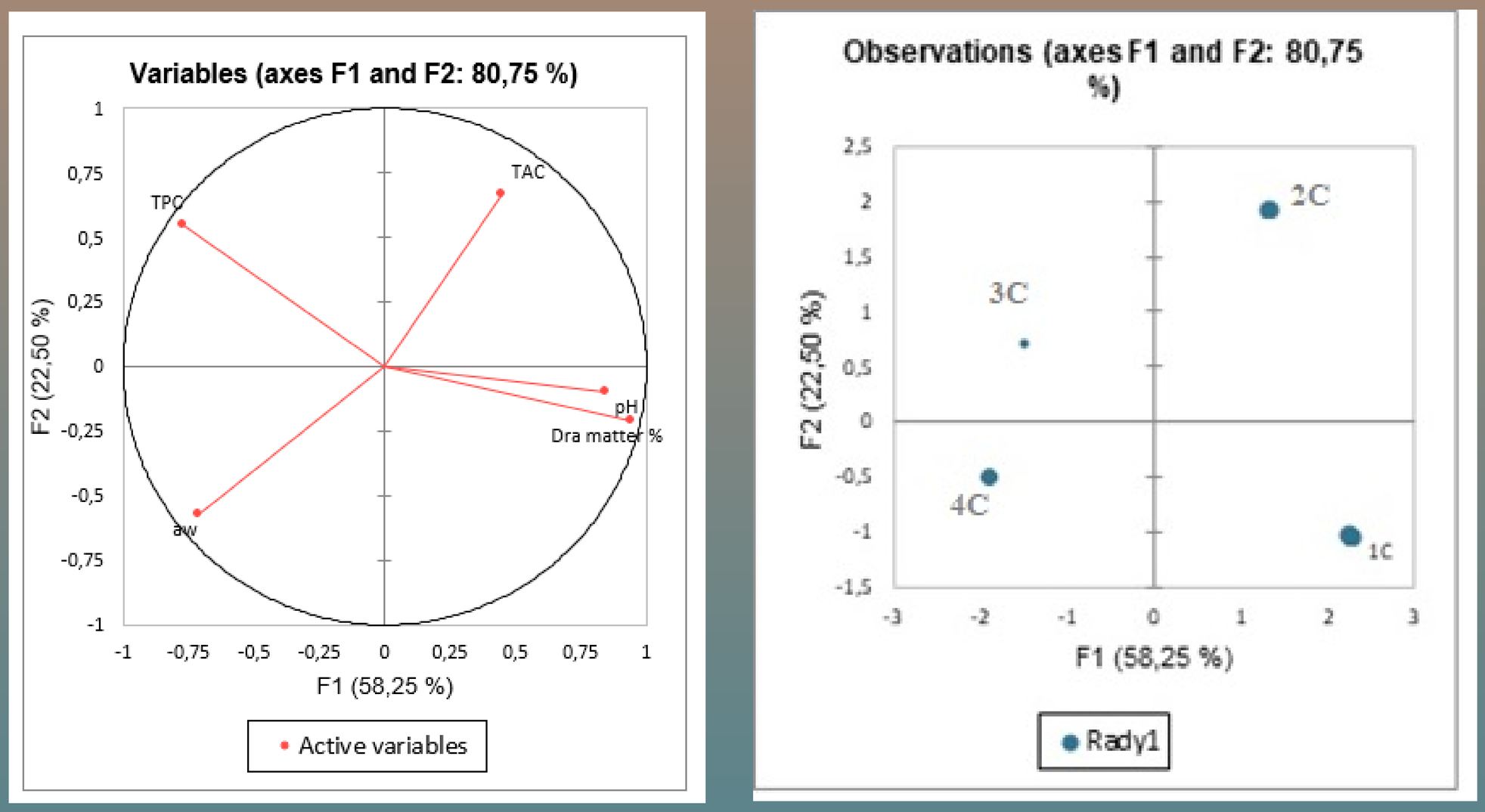

Fig 1. LDA map

RESULTS AND DISCUSSION

As we can see in Figure 1, the most significant differences between individual groups are observable in all parameters. Based on our results, we can say that Cascara beverage is a source of TAC and TPC. Statistical analysis showed the differences affected by according to the method of processing based on the determined parameters. The aw and TPC were significantly observed in samples 3C, and 4C (method fully washed). On the other hand, TAC, pH, and dry matter were significantly observed in the samples processed by the dry method. Based on these results we can say that post-harvest processing can influence chemical parameters. Samples number 1, and 2 are processed by the dry method, and sample 3,4 was processed by the fully washed post-harvest method. The measured pH values of Cascara of different post-harvest processing show that samples processed dry method was a higher value of pH than samples processed fully washed method. Also, we can observe significant differences between samples regarding using the method. Based on the value of dry matter our observation is that samples processed fully washed method has lower value of dry matter that samples processed dry method. Water activity was significantly higher for samples that were processed fully washed method.

CONCLUSION

The samples of cascara obtained from different post-harvest processing showed significantly different contents of phenolic compounds and antioxidant capacity. Among the assessed samples, fully washed samples had the highest total polyphenol content. On the other hand, dry processing samples had a significant amount of TAC. Cascara underutilized by-product of coffee production can be valorized by producing a functional antioxidant beverage containing polyphenols. The results of this study information that cascara can be used in meat product production or to provide animal feed with a base on the content of TAC and TPC.

Acknowledgments: This research has been supported by The Ministry of Education, Science, Research and Sport of the Slovak Republic, grant VEGA 1/0734/20, KEGA 024SPU-4/2021

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