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INTRODUCTION

- Coffee beans production is 10.5 mi tonnes/year.¹
- More by-products than coffee beans are produced.²
- These are potentially harmful to the environment.²
- They should be transformed into raw-materials.³

OBJECTIVE

To expand the knowledge on the metabolite composition of a wide range of by-products and wastes generated in the coffee production chain.

METHODOLOGY

Sample collection, drying and milling

Two-liquid phase extraction method development for metabolite profiling

15 polar extracts

14 non-polar extracts

Side-by-side comparison of samples by HPTLC

Tentative identification of polar metabolites by UHPLC-PAD/UV-ESI-QTOF-MS/MS

Tentative identification of non-polar metabolites by CG-MS

Development and validation of a new UHPLC-UV and extraction procedure for quantification purposes

Quantification of major bioactive compounds in all samples

RESULTS AND DISCUSSION

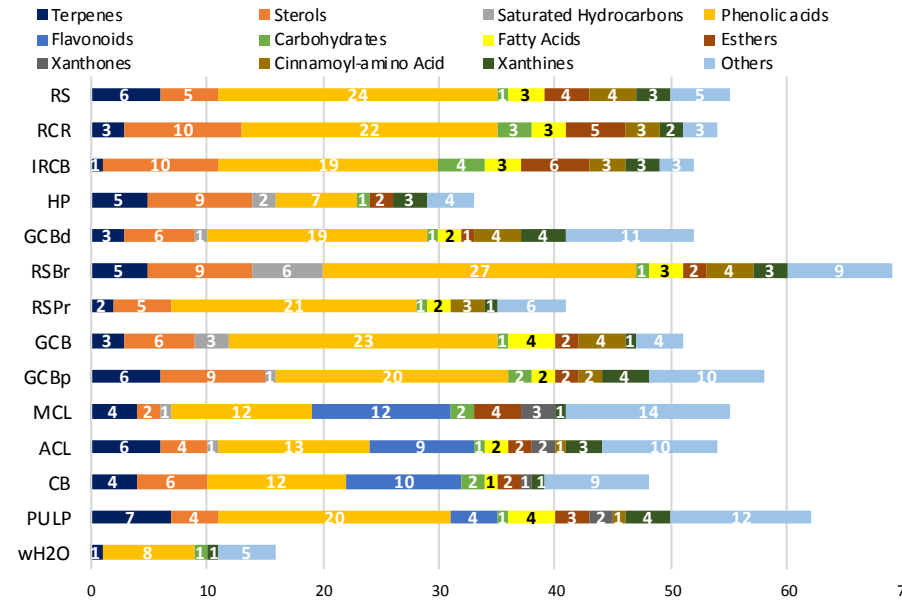
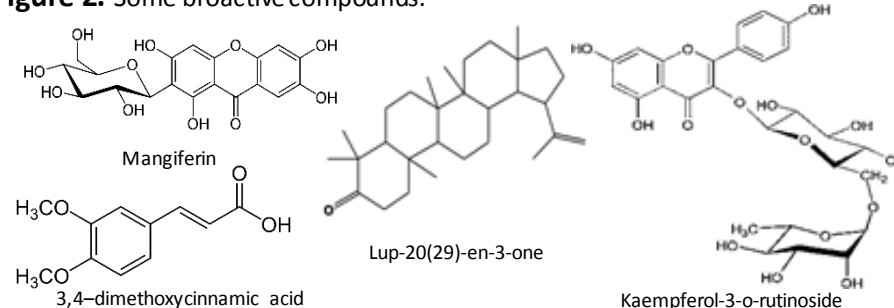


Figure 1. Number of compounds identified by class in : Roasted silverskin (RS); Roasted coffee residue (RCR); Improper roasted coffee beans (IRCB); Roasted silverskin pelleted by a Brambat drum (RSBr) or by a Probat drum (RSPr); Defective green coffee beans (GCBd); Green coffee beans powder (GCBp); Husk and parchment (HP); Green coffee bagasse (GCB); Mature and Aged coffee leaf (MCL and ACL); Branches (CB); Coffee pulp (PULP) and wasted water (wH2O).

Figure 2. Some bioactive compounds:



- Eight by-products showed caffeine (53.0-6.8 mg.g⁻¹) and/or chlorogenic acid (72.9-10.1 mg.g⁻¹) content comparable to coffee beans.

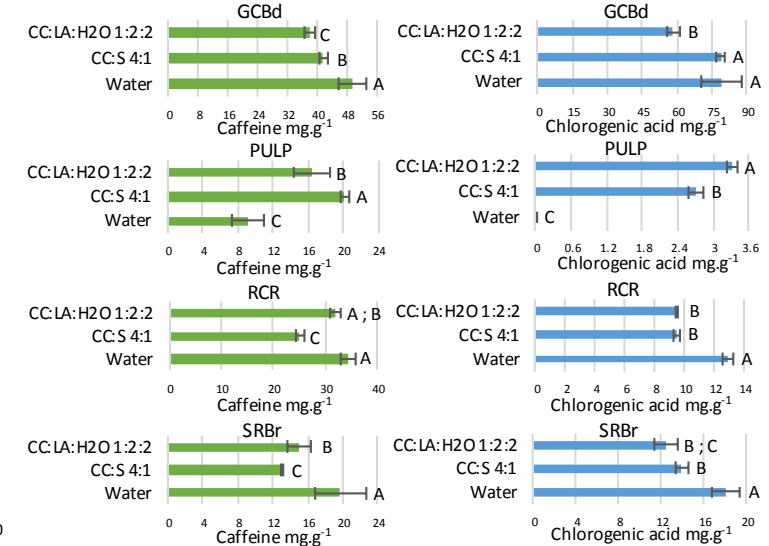


Figure 3. Performance of extractions of caffeine (green) and chlorogenic acid (blue) in four representative by-products with different hydrophilic solvents.

CONCLUSION

Such by-products are a source of a wide range of bioactive compounds and could be explored with potential economic and certainly environmental benefits.

REFERENCES

1. International Coffee Organization, 2021.
2. Santos et al. (2021). Trends Food Sci. Technol, 111.
3. Perlatti et al. (2014). Chem. Biol. Technol. Agric. 1, 5.

ACKNOWLEDGMENT

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