

# Microwave-assisted extraction of coffee byproducts-derived polysaccharides suitable for paper coating

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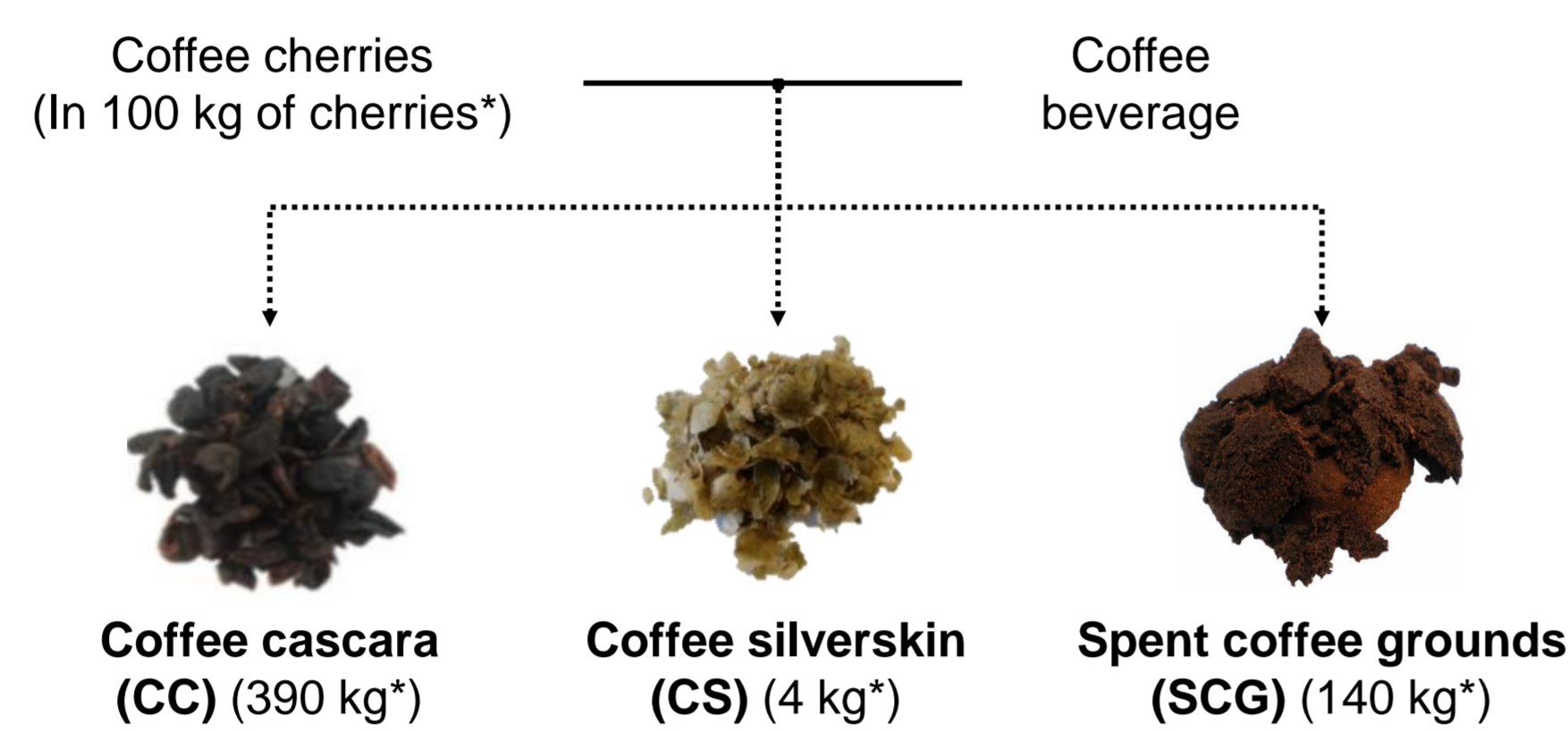
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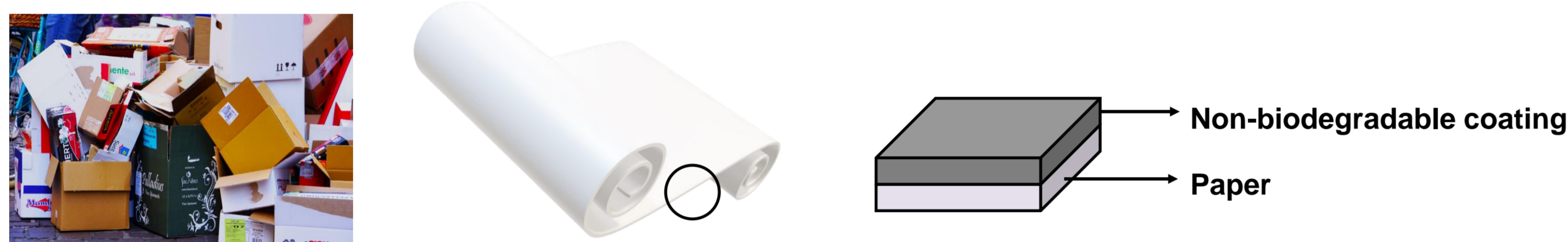
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## Thesis contextualization

Coffee industry byproducts are worldwide generated and often discarded, wasting valuable biomolecules as polysaccharides, lipids, and phenolics [1].



On the other hand, paper-based materials are often coated with non-biodegradable coatings, compromising their recyclability and biodegradability.

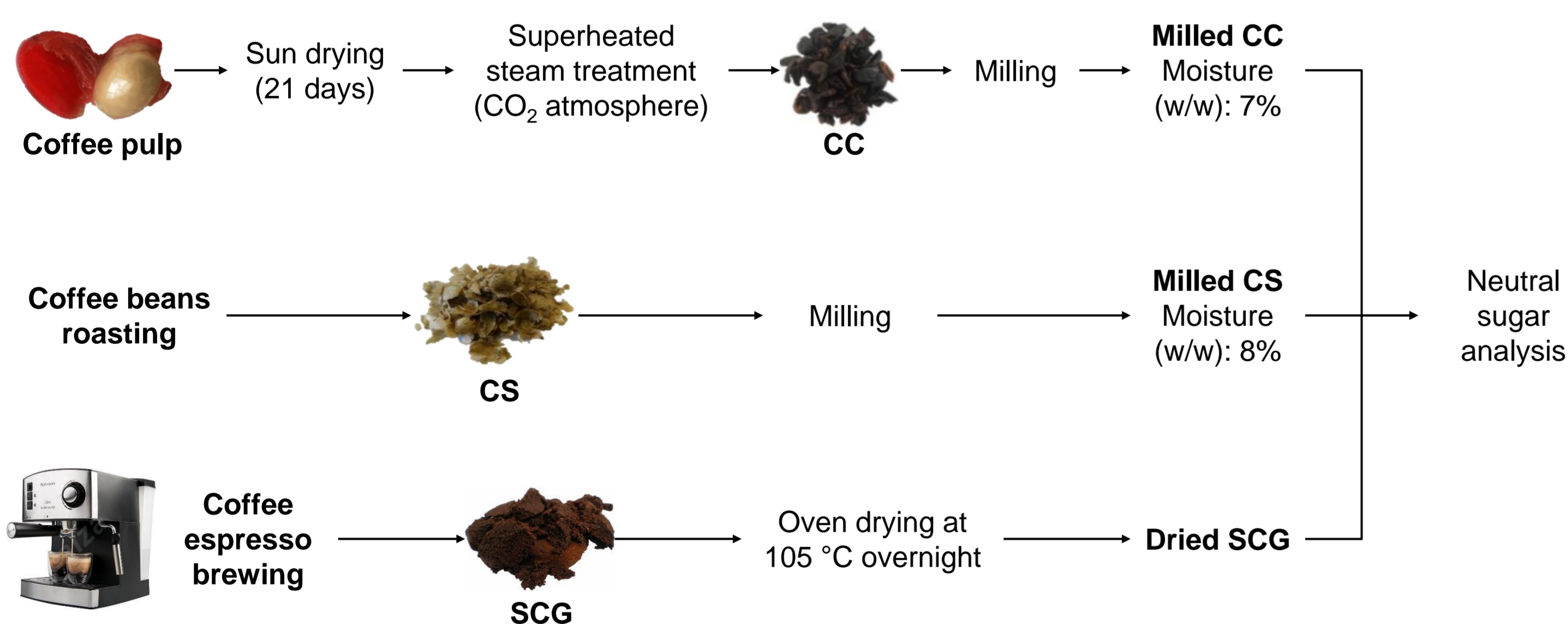


During this Doctoral Thesis, the feasibility of using coffee industry byproducts as sources of biomolecules of interest for developing biodegradable paper coatings will be studied, following a circular economy.

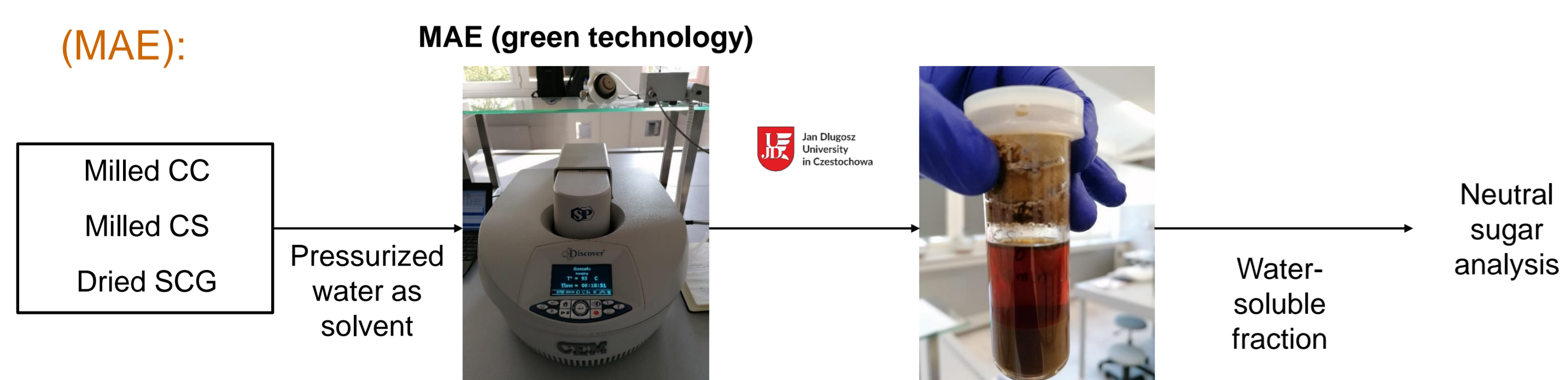
## Methodologies

**Research challenge 1: Definition of methodologies to obtain coffee byproducts-derived biomolecules suitable to develop biodegradable coating formulations.**

• **Sugar profile determination of coffee byproducts:**



• **Recovery of polysaccharides-based extracts using microwave-assisted extraction (MAE):**

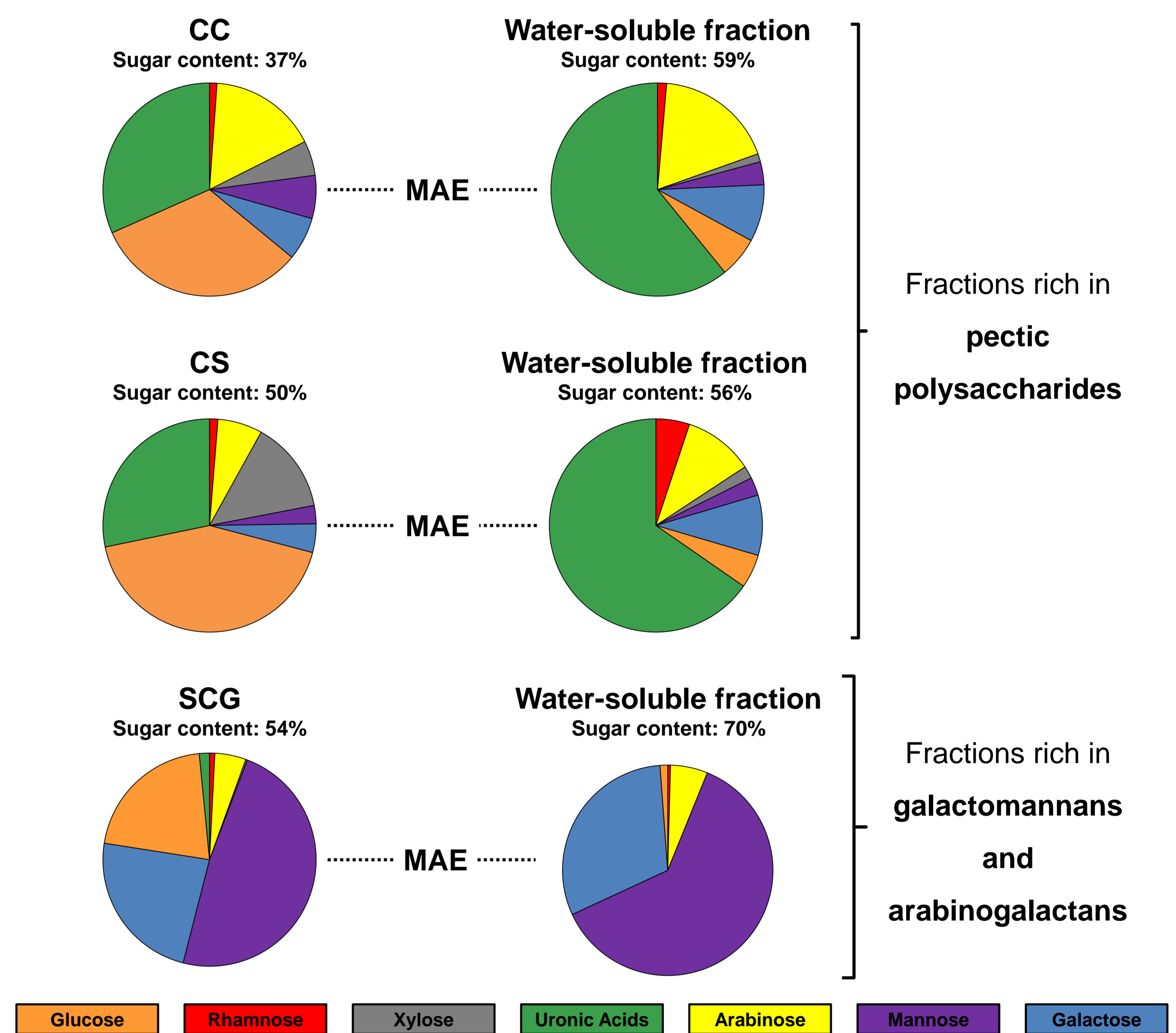


**Research challenge 2: Establishment of a scientific basis for the development of biodegradable coffee byproducts-based bioplastics.**

**Research challenge 3: Feasibility of using formulations based on biodegradable coffee byproducts on paper coating.**

Future work

## Results and discussion



## Conclusions and future perspectives

- MAE revealed to be a proper methodology to extract polysaccharides from coffee byproducts.
- Water-soluble fractions rich in galactomannans and arabinogalactans were obtained from SCG. Pectic polysaccharides-rich fractions were recovered from CC and CS.
- The ability of using these polysaccharides to develop bioplastic formulations suitable for paper coating will be evaluated, thus opening an opportunity to valorise coffee byproducts while minimizing the ecological footprint of paper-based materials.

## References

1. Oliveira, G.; Passos, C.P.; Ferreira, P.; Coimbra, M.A.; Gonçalves, I. Coffee by-products and their suitability for developing active food packaging materials. *Foods* **2021**, *10*, 683.
2. Passos, C.P.; Rudnitskaya, A.; Neves, J.M.M.G.C.; Lopes, G.R.; Evtuguin, D. V.; Coimbra, M.A. Structural Features of Spent Coffee Grounds Water-Soluble Polysaccharides: Towards Tailor-Made Microwave Assisted Extractions. *Carbohydr. Polym.* **2019**, *214*, 53–61.

## Acknowledgements

