

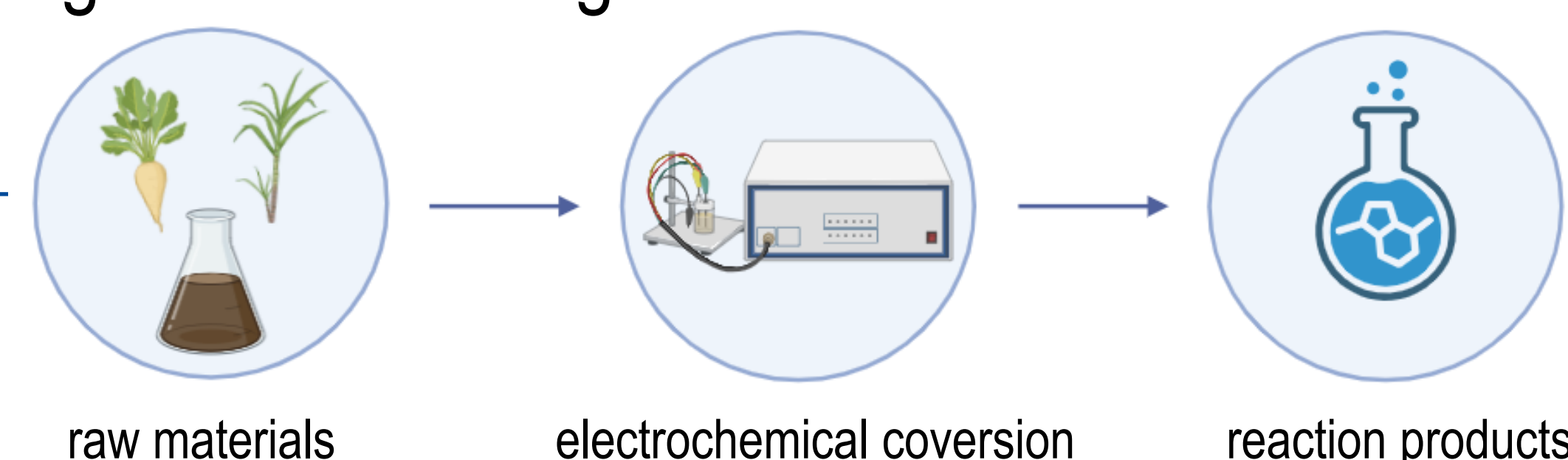
# Analysis of molasses for electrochemical conversions

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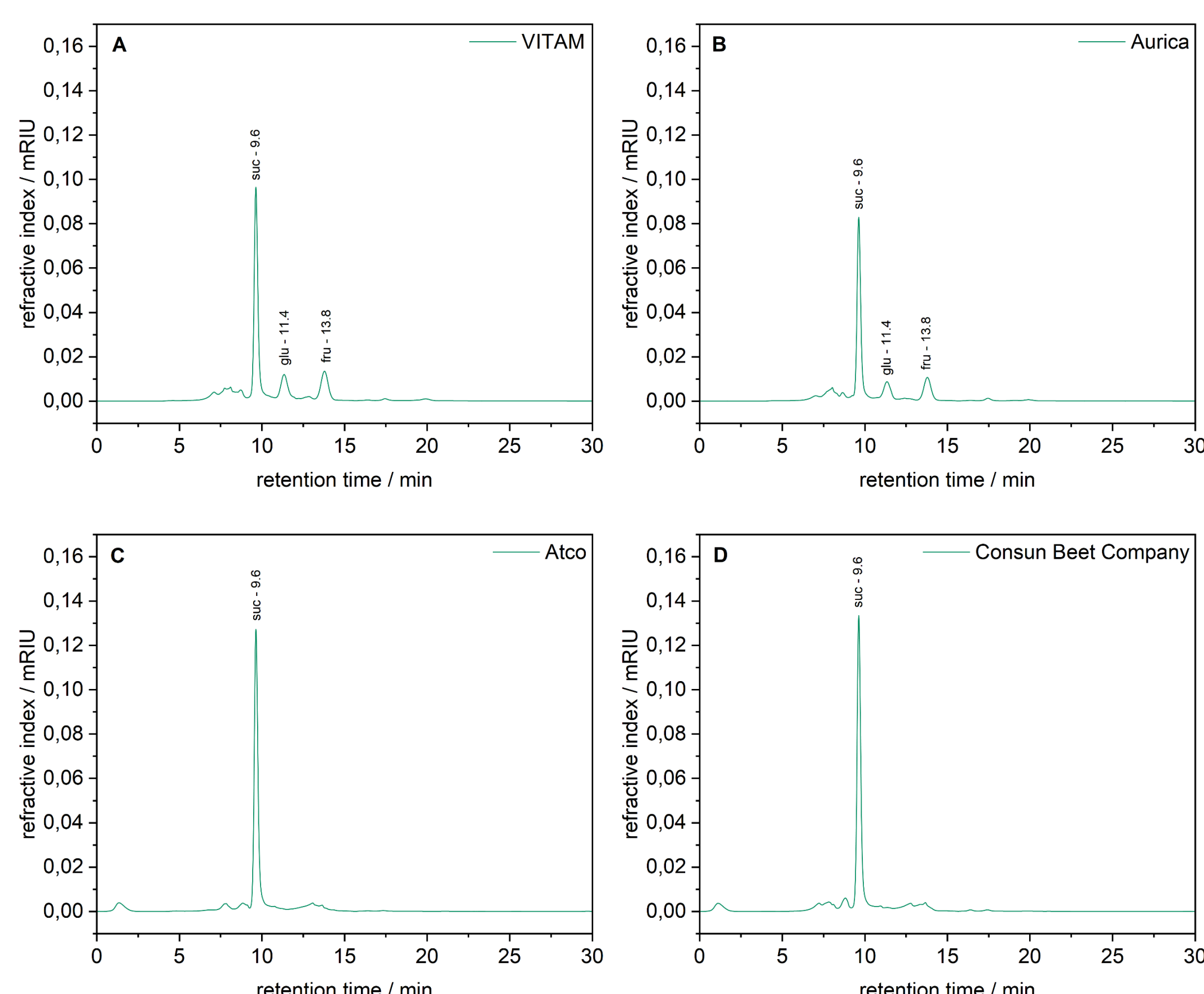
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Molasses, a by-product of sugar production, is mainly used as animal feed but also shows promising potential as a sustainable feedstock for electrochemical conversions into valuable chemicals. To assess its suitability for such processes, the composition of the different molasses must be analyzed. Understanding the composition is crucial, as impurities can affect reaction efficiency and product selection. This study analyzes the composition of sugar cane and sugar beet molasses to evaluate their suitability for such processes.



## Analytical Characterization

- focus on the three main sugars (sucrose, fructose, glucose)
- four different samples: two sugar cane molasses (VITAM, AURICA); two sugar beet molasses (ATCO, CONSUN BEET)



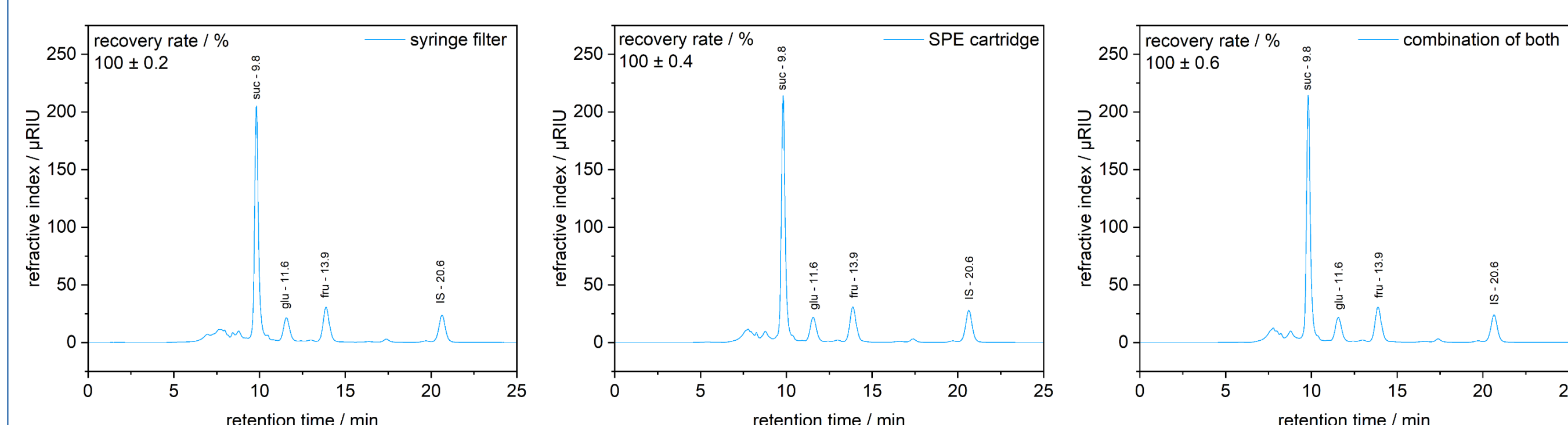
Determination of sugars in four different molasses samples. Chromatographic conditions: column, HyperRez XP Carbohydrate Ca<sup>2+</sup> 300 x 7.7 mm; temperature, 80 °C; eluent, ultra pure water; flowrate, 0.6 ml min<sup>-1</sup>; detector, refractive index.

Parameter	A	B	C	D
Dry matter / mg	97.0	77.6	92.1	100.4
Total sugar / % DM	80.6	78.7	79.1	74.8
Sucrose / % DM	56.7	59.8	79.1	74.8
Glucose / % DM	10.5	8.2	-	-
Fructose / % DM	13.4	10.8	-	-

## Sample Pretreatment

molasses → dilution → pretreatment

- syringe filter 0.45 µm
- SPE cartridge – STRATA C18-M
- combination of both



Effect of sample pretreatments on the VITAM molasses sample. Chromatographic conditions: column, HyperRez XP Carbohydrate Ca<sup>2+</sup> 300 x 7.7 mm; temperature, 80 °C; eluent, ultra pure water; flowrate, 0.6 ml min<sup>-1</sup>; detector, refractive index.

## Summary

- 4 molasses samples analyzed and characterized
- reproducible sample preparation developed
- sugar beet: higher sucrose; sugar cane: more monosaccharides

## Outlook

- electrochemical screening
- analysis of electrochemical conversion products
- development of purification steps
- evaluation of economic and ecological value

## References:

[1] A. Palmonari et al. *J. Dairy Sci.* 2020, 103, 6244.

[2] W. Xu et al. *Int. J. Food Prop.* 2015, 18, 547.

[3] H. Lou et al. *J. Mater. Chem. A* 2025, 13, 1067.

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