

EXTRACTION OF BIOACTIVE COMPOUNDS FROM *EPILOBIUM PARVIFLORUM* USING SUBCRITICAL FLUIDS



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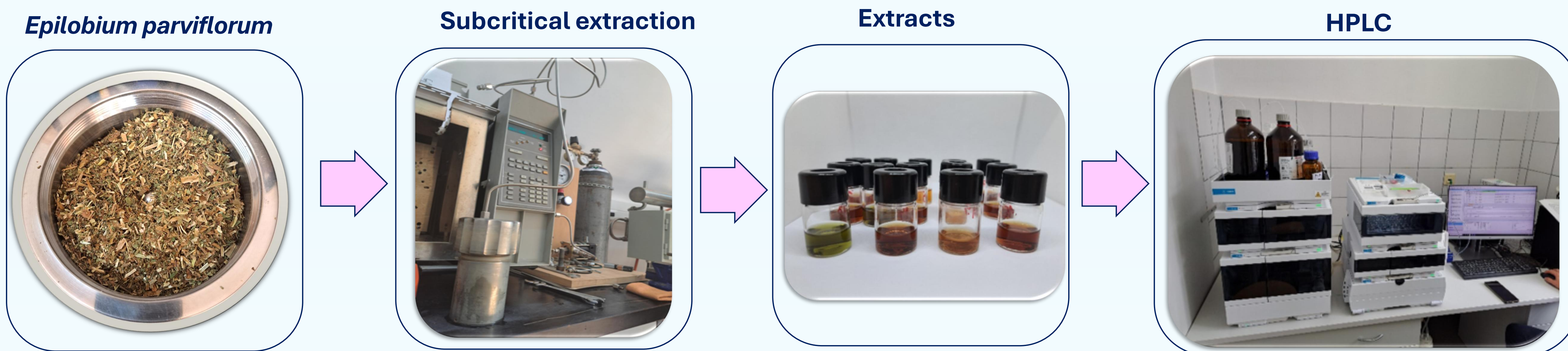
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INTRODUCTION

Epilobium parviflorum is a herbaceous perennial plant with small, pale pink flowers that has long been used in traditional herbal preparations. It contains various **bioactive compounds**, which contribute to its diverse biological activities. Due to growing interest in the sustainable recovery of such compounds, **supercritical fluids** have attracted attention as alternative **extraction media**. Among these, **water** and **ethanol** are the most widely used solvents because of their **low toxicity**, **availability**, and **ability to extract a broad range of phytochemicals**. Under subcritical conditions, changes in the properties of water and ethanol enhance the extraction and transformation of bioactive compounds, promoting **the recovery of phenolic compounds** from *Epilobium parviflorum*.



METHODOLOGY



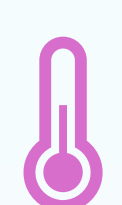
EXPERIMENTAL DESIGN

SOLVENT



96 % Ethanol
48 % Ethanol/water
100 % Water

TEMPERATURE RANGE



130 °C - 190 °C

REACTION TIME

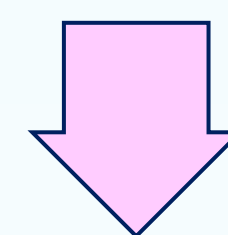


5 - 25 min

MATERIAL/SOLVENT RATIO

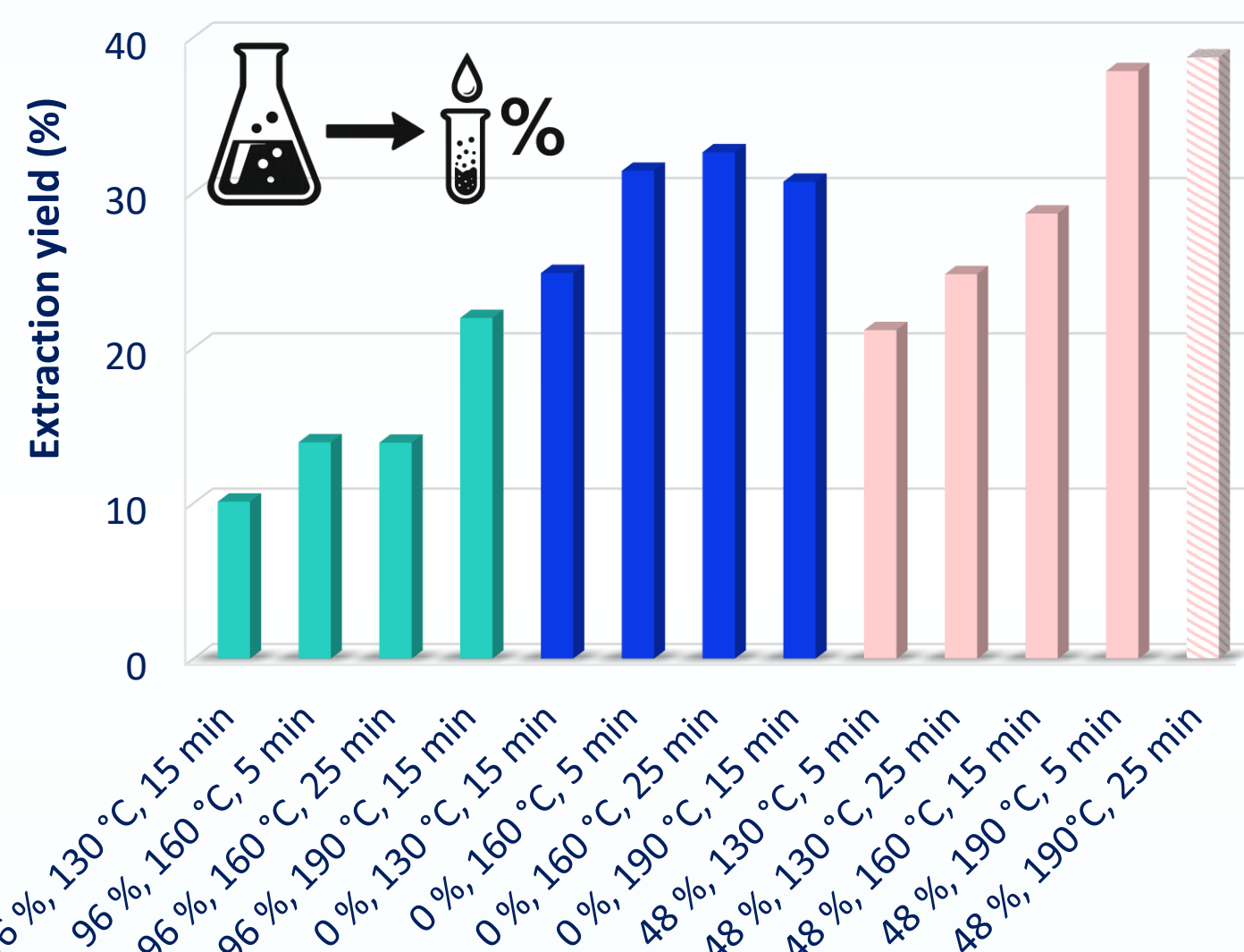


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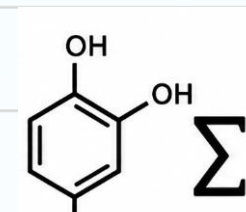
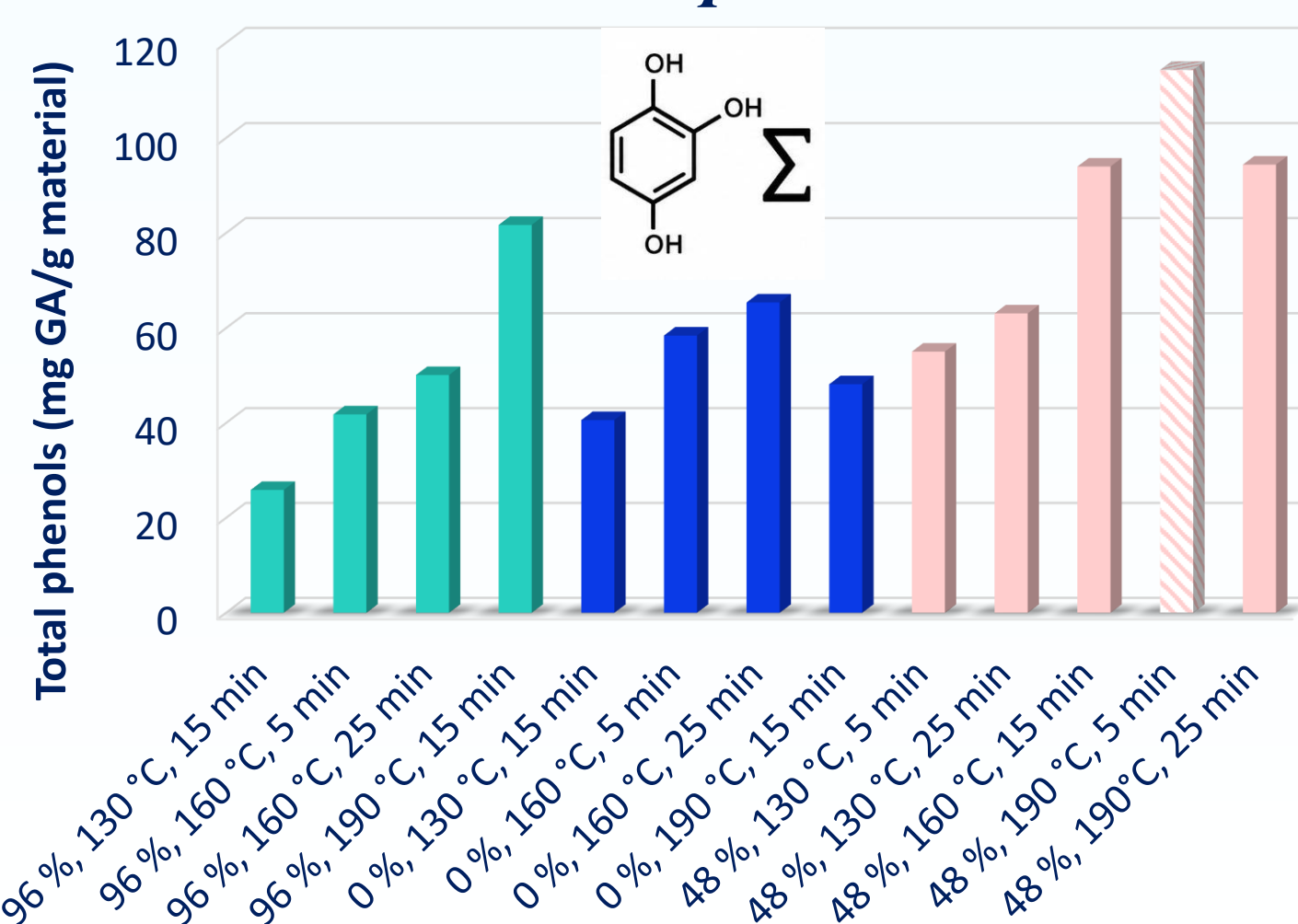
RESULTS

Extraction yield

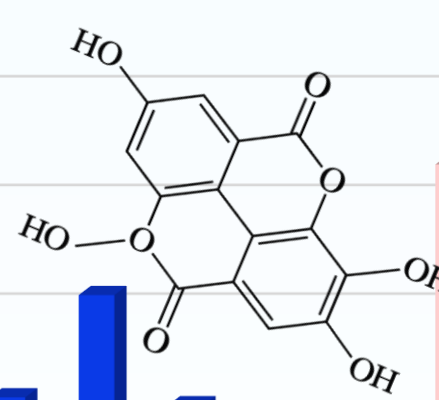
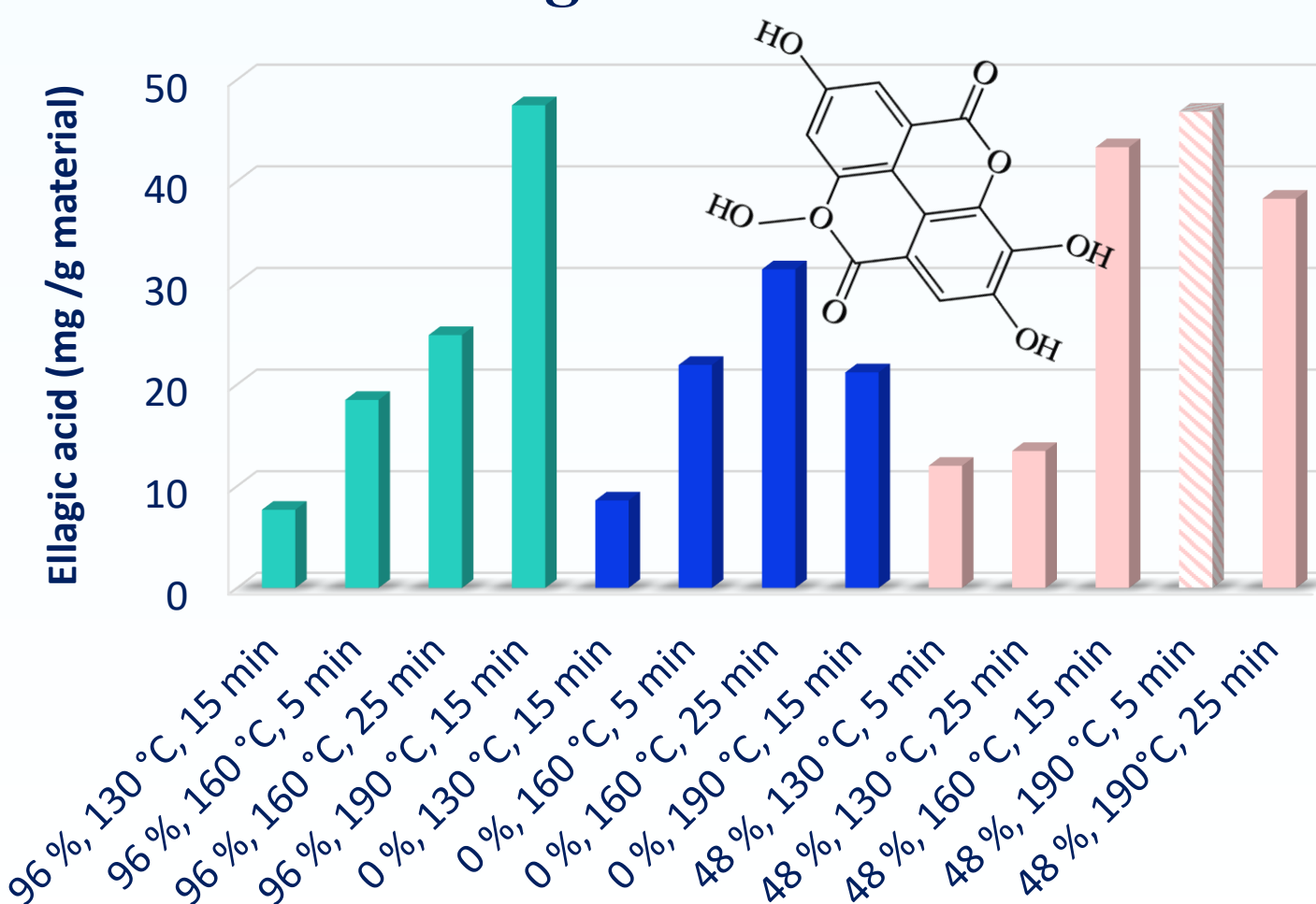


Figures: Extraction yield, extraction efficiency of phenolic compounds and antioxidant activity of extracts in dependency of solvent composition (volume fraction of ethanol in aqueous solution), temperature and time.

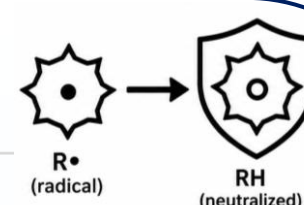
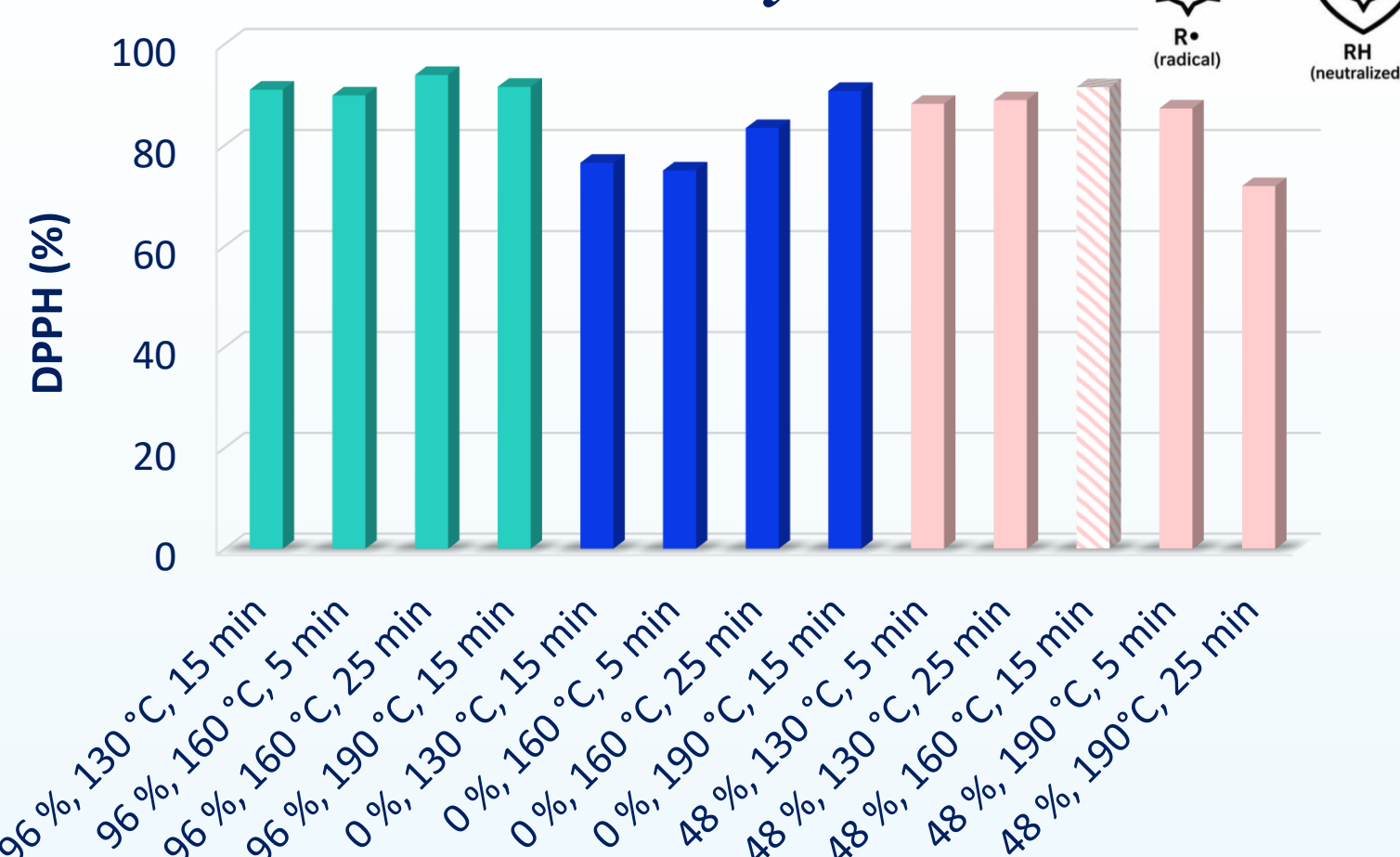
Total phenols



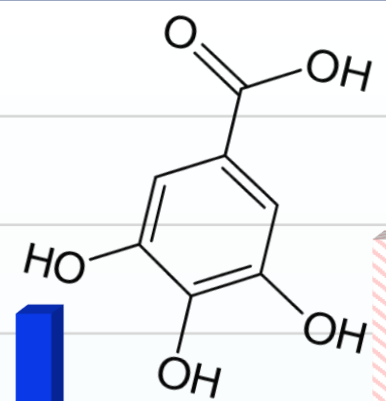
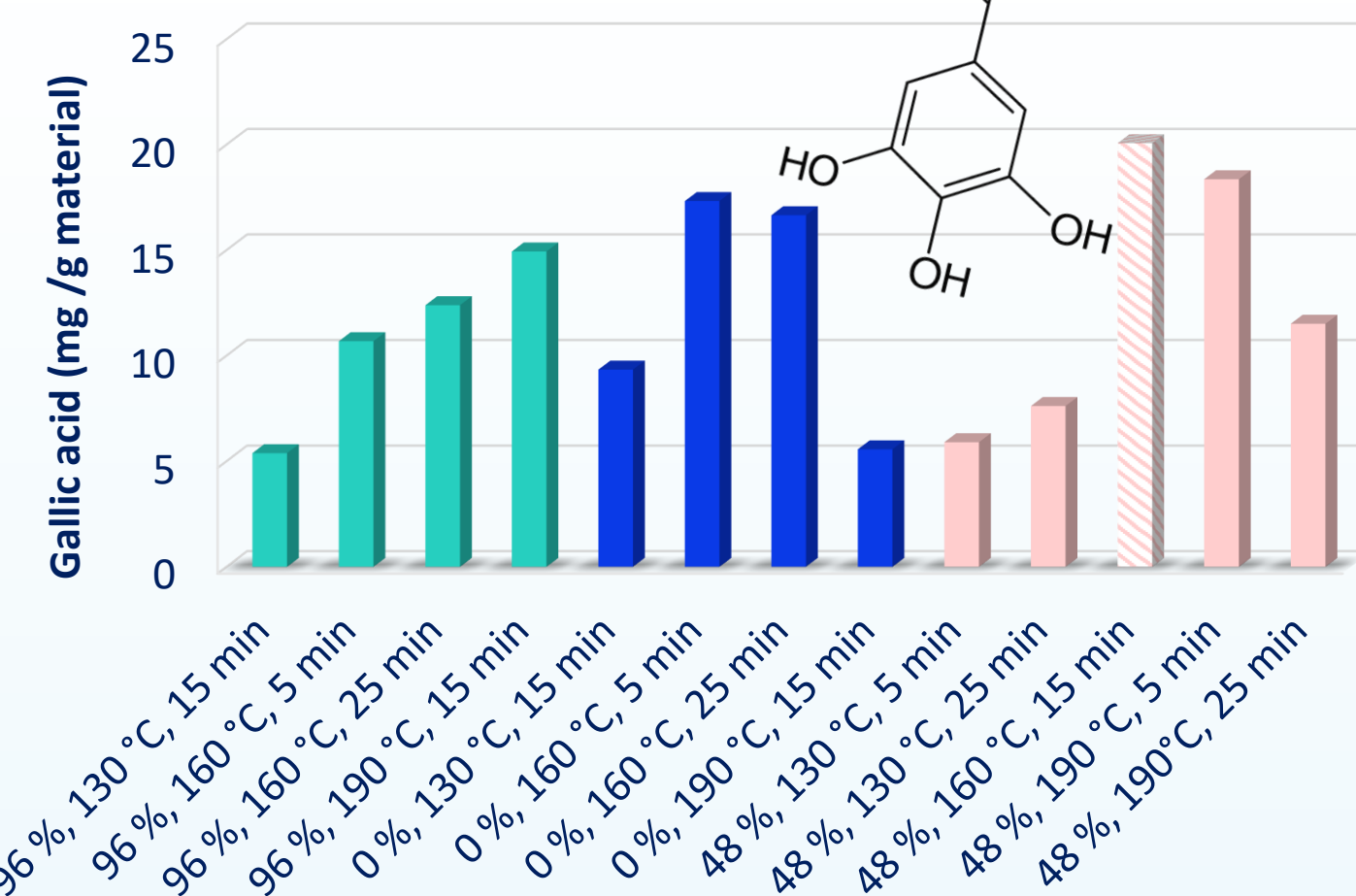
Ellagic acid



Antioxidant activity



Gallic acid



CONCLUSION

- ❖ All extracts are rich in various polyphenols and exhibit high antioxidant activity.
- ❖ The ethanol–water mixture proved to be the most suitable solvent, producing the highest extraction yield (38.7 %), extraction efficiency of total phenolic compounds (114.3 mg GA/g material), and gallic acid (20.1 mg/g material).
- ❖ In contrast, ethanol resulted in the highest extraction efficiency of ellagic acid (47.5 mg/g material) and exhibited the highest antioxidant activity (93.8 %).

- ❖ The highest extraction temperature (190 °C) also promoted the formation of 5-hydroxymethylfurfural, an important platform chemical.
- ❖ *E. parviflorum* extracts show potential as natural antioxidants and functional ingredients in food and pharmaceutical products.
- ❖ Subcritical fluid extraction proved to be an effective method for recovering bioactive compounds from *E. parviflorum*, with the extraction conditions significantly influencing process selectivity and extract composition.

ACKNOWLEDGEMENT

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