

Efficient NADES Extraction of Gallic Acid as a Potent Antioxidant from Lamiaceae Plants

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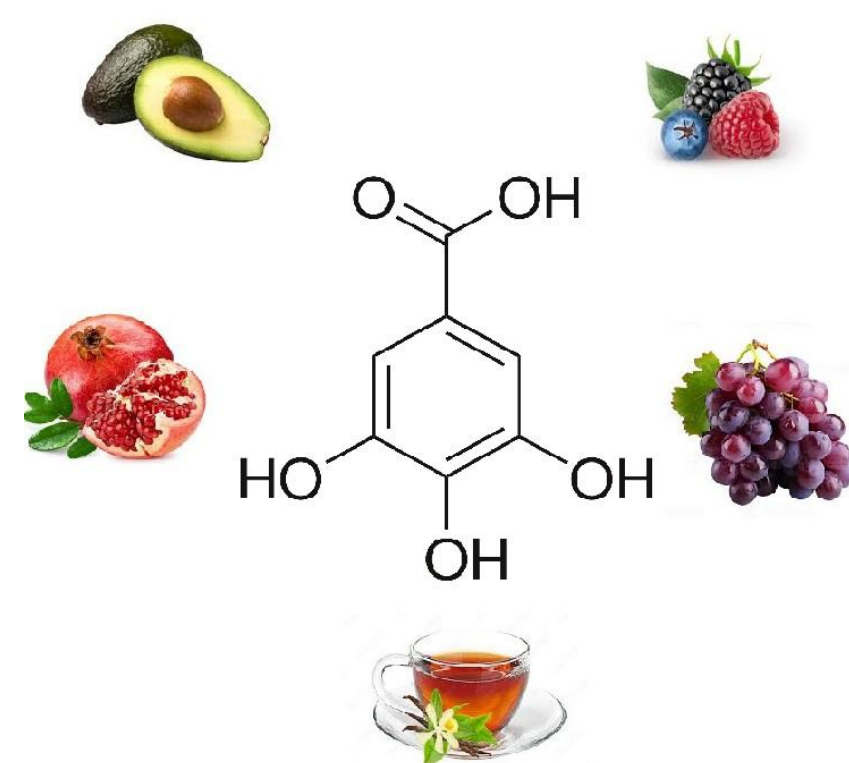
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INTRODUCTION & AIM

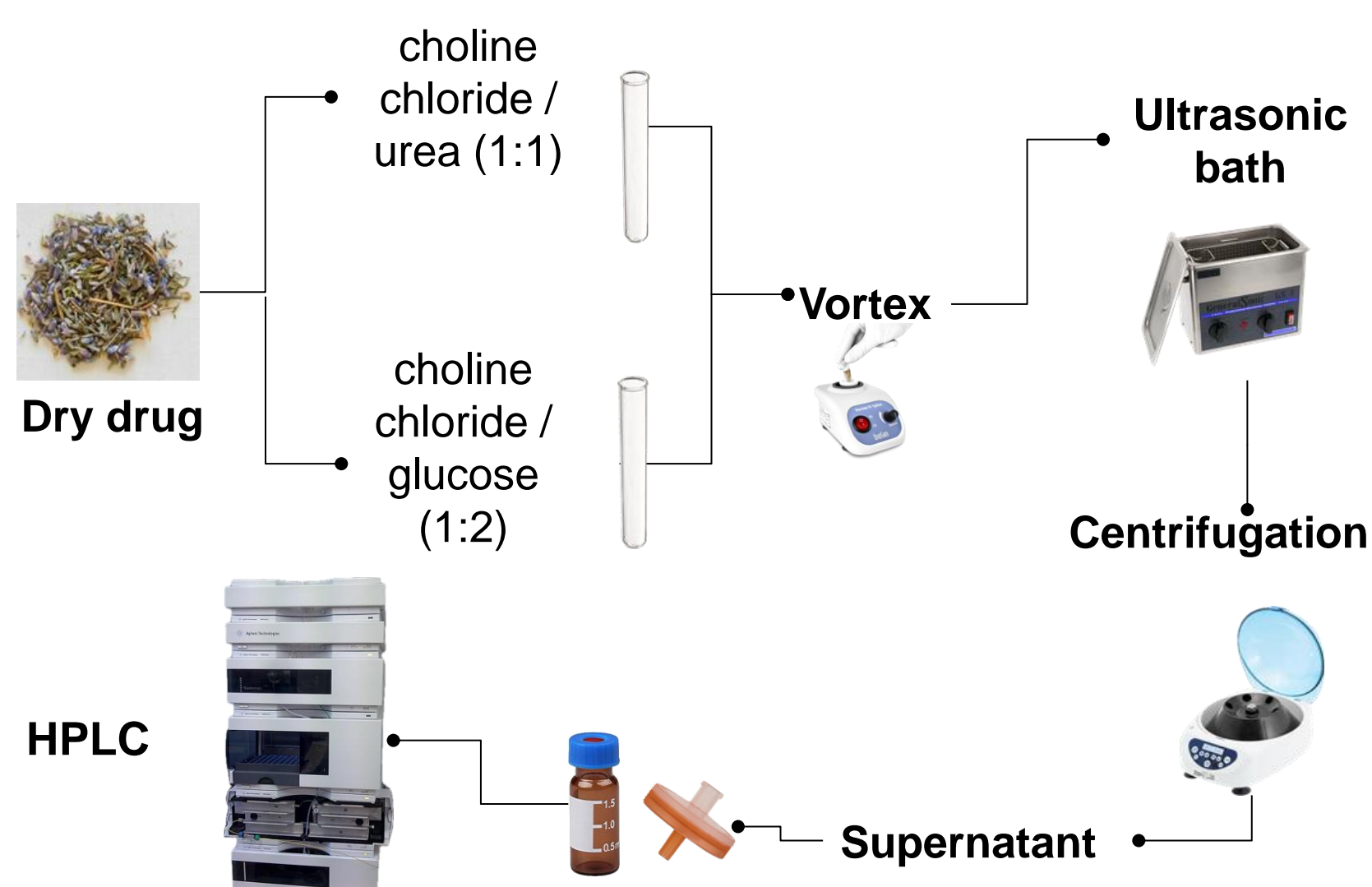
Gallic acid is a potent antioxidant known for its ability to neutralize free radicals and protect cells from oxidative stress, thereby reducing the risk of chronic diseases such as cancer, cardiovascular disorders, and neurodegenerative conditions. The isolation of gallic acid using Natural Deep Eutectic Solvents (NADES) offers significant benefits, as these solvents are eco-friendly, biodegradable, and enhance extraction efficiency. NADES also help preserve the bioactivity of gallic acid, making this method a sustainable and effective alternative for its extraction in pharmaceutical and nutraceutical applications.

This study aimed to evaluate the efficiency of gallic acid extraction from medicinal plants of the Lamiaceae family, cultivated at the Institute for Medicinal Plant Research.



METHOD

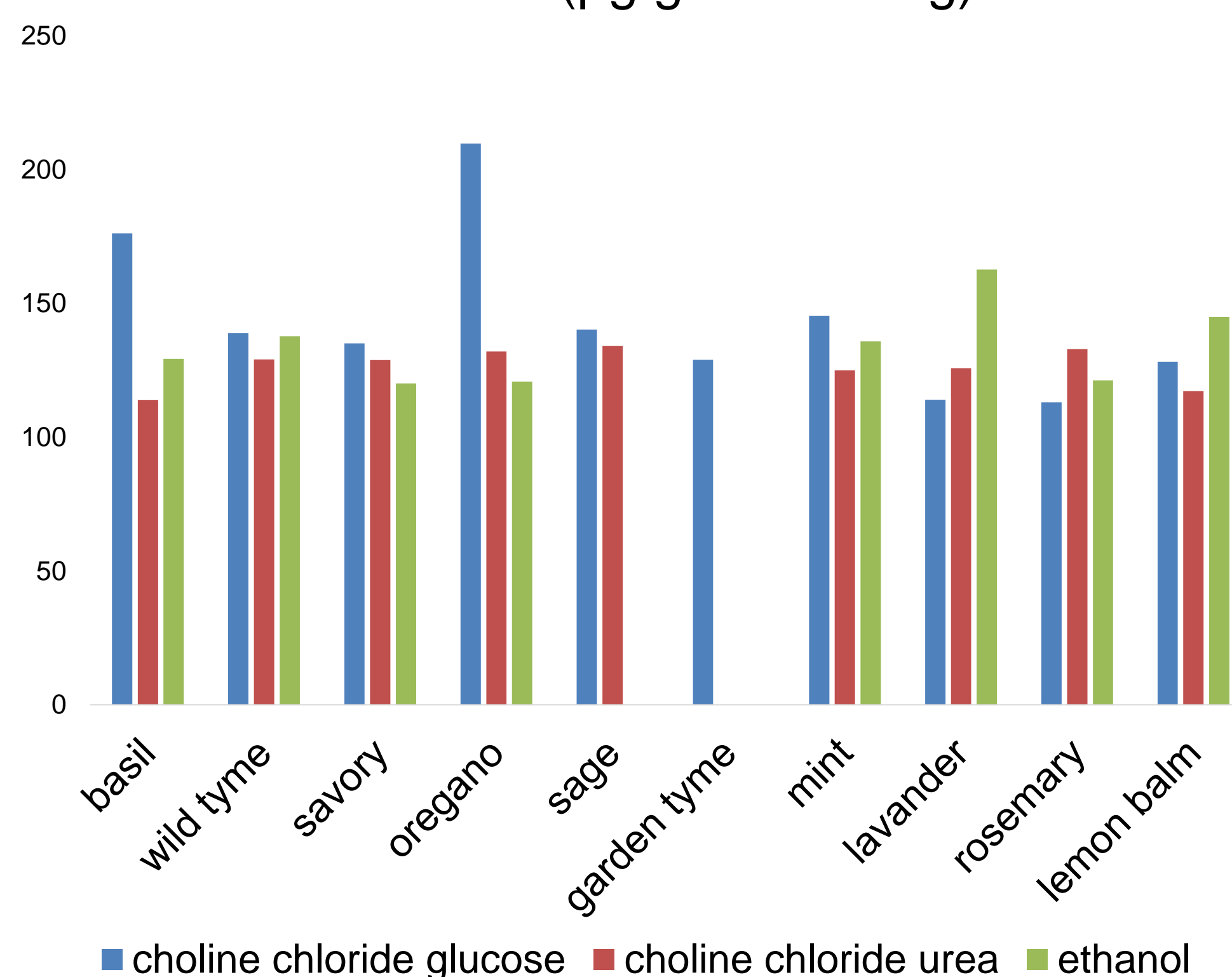
The extraction was conducted using two natural deep eutectic solvents - choline chloride/urea (1:1) and choline chloride/glucose (1:2) - as well as 70% ethanol. Ten herbal drug samples, including rosemary, lemon balm, sage, mint, lavender, oregano, savory, wild thyme, garden thyme and basil, were analyzed. Gallic acid content in the extracts was quantified via high-performance liquid chromatography (HPLC).



RESULTS & DISCUSSION

Both NADES demonstrated effective extraction of gallic acid, with choline chloride/glucose exhibiting superior performance. Gallic acid was successfully extracted using choline chloride/urea in concentrations ranging from 113.80 to 134.05 $\mu\text{g/g}$ of crude drug, while choline chloride/glucose achieved a broader range of 113.02 to 209.68 $\mu\text{g/g}$ of crude drug, with the highest yield observed in oregano. Choline chloride/glucose also outperformed ethanol extraction (120.73–144.93 $\mu\text{g/g}$ of crude drug).

Gallic acid ($\mu\text{g/g}$ crude drug)



CONCLUSION

Both choline chloride-based NADES showed significant potential as environmentally friendly solvents for extracting gallic acid from Lamiaceae plants. The results highlight the suitability of choline chloride/glucose for gallic acid extraction, with broader implications for the application of NADES in the pharmaceutical and cosmetic industries.

FUTURE WORK / REFERENCES

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