

## **Extraction of Phenolic Compounds from Biomass Waste Using Natural Deep Eutectic Solvent (NADES)**

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### **Structured Abstract**

**Background:** Conventionally, organic solvents, are commonly utilized for chemical or bioactive compounds extraction especially from plants. However, the use of organic solvent can cause toxicity not only to human but also to the environment. Therefore, alternative method using green solvent such as Natural Deep Eutectic Solvent (NADES) is imperative in order to overcome these problems.

**Methods:** Natural Deep Eutectic Solvent (NADES) is a eutectic mixture produced by the mixing of natural chemicals in a specified molar ratio. In this study, different chemical combinations and molar ratios of hydrogen donor (HBD) and hydrogen bond acceptor (HBA) were examined in order to determine the best combination of NADES to effectively extract phenolic compounds from biomass waste namely, pineapple peel and lemongrass leaves. The Folin Ciocalteu technique and UV-Vis spectroscopy were used to determine the total phenolic content of the extracted solution which was then further characterized using Fourier transform infrared spectroscopy (FTIR).

**Results:** The best NADES combination was choline chloride and ascorbic acid at 1: 2 molar ratios with the highest amount of phenolic content (TPC) for both pineapple peel and lemongrass leaves of 13609.399 mg GAE/L and 10174.384 mg GAE/L, respectively. However, the least TPC was obtained from the combination of sucrose and ascorbic acids at 1: 1 molar ratio with the concentrations of 2508.829 mg GAE/L (pineapple peels) and 232.8649 mg GAE/L (lemongrass leaves).

**Conclusion:** All the NADES combination with specified molar ratio were able to extract phenolic compounds from the biomass due to interaction of hydrogen bonding with the phenolic compounds. The overall findings of this experiment point out to NADES as an effective substitute of traditional organic solvents in the extraction of phenolic compounds which could be useful especially in food and pharmaceuticals industries.

**Keywords:** Natural Deep Eutectic Solvent, NADES, Phenolic compounds, Biomass, Deep Eutectic solvent (DES).

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