

## Green Synergy: A Novel Deep Eutectic Solvent in Eco-Friendly Air-Assisted Solidified Floating Drop Microextraction for Ultrasensitive Lead Determination

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**Table S1. The GFAAS parameters**

Parameter	Value
Wavelength	283.5 nm
Sample volume	20 µL
Lamp current	10 mA
Slit width	0.5 nm
Ar flow rate	0.3 L/min.
Mode of measurement	Peak Hight

**Table S2. The used program for heating by normal gas**

Step	Temperature (°C)	TIME (s)	Flow rate (L/min.)
1.	90	5.0	0.3
2.	90	10.0	0.3
3.	120	5.0	0.3
4.	120	10.0	0.3

5.	400	5.0	0.3
6.	400	1.0	0.3
7.	400	2.0	0.0
8.	2100	0.9	0.0
9.	2100	2.0	0.0
10.	2100	2.0	0.3

**Table S3. Criteria and scoring scheme for the PPI.**

No	Criteria Scoring	Options Score
1	Nature of Method Quantitative (10), Semiquantitative (6) Qualitative (4)	10
2	Design of Experiment QbD optimization 10 Screening 5 No design 0	10
3	AI integration Advanced AI Integration (10) Moderate AI Integration (7) Basic AI Integration (3) No AI Integration (0)	10
4	Validation Fully Validated (10), Partial (5), Not validated (0)	10
5	Sensitivity Picogram (10), Nanogram (8), Microgram (5), >Microgram (2)	10
6	Availability of reagent Commercially available at a low cost, 10  Available at high cost or not commercially available, requires synthesis 5	10
7	Availability of instrument and Cost of analysis per sample All instruments are available at a low cost of 10 One special instrument needed with high/medium cost, 5 More instruments are needed at a high-cost 0	10
8	Maintenance frequency and instrument lifetime Long lifespans and minimal maintenance 10 Moderate maintenance 5 Frequent repairs or replacement 0	10
9	Time of Analysis (Throughput) $\geq 25$ samples/h (10), $\leq 12$ samples/ h (5)	10
10	Sample Reusability Yes (10), No (0)	10
<b>Total</b>		<b>100</b>

**Table S4. EI index criteria**

Options	Score
Sample preparation	100
Instrumentation	100
Reagent score	100
Waste score	100
<b>EPPI Total Score = (EI Score <math>\times</math> 0.5) + (PPI <math>\times</math> 0.5)</b>	

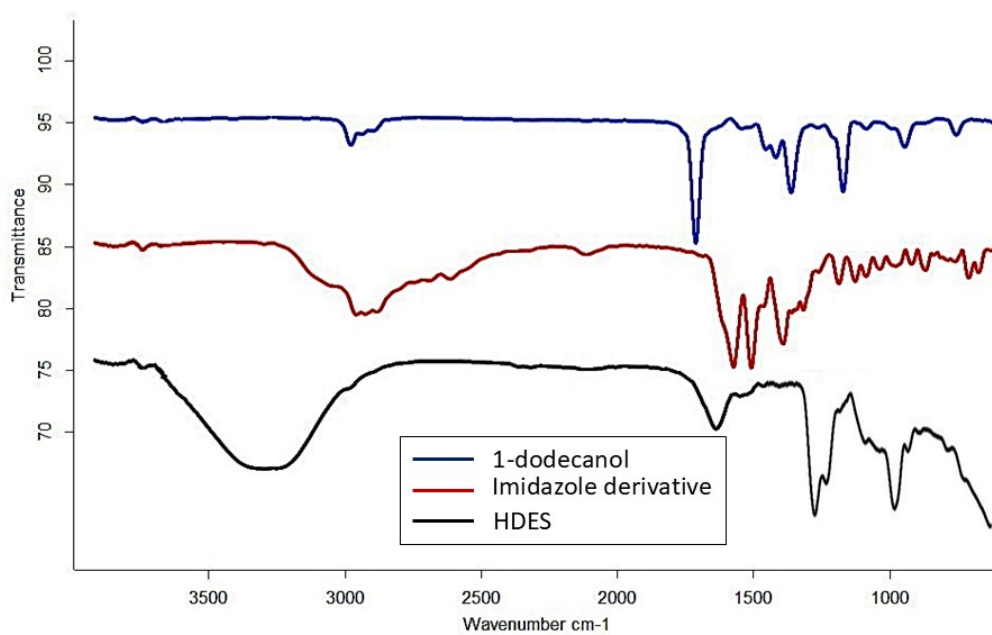


Figure S1: The FTIR spectra for HDES components

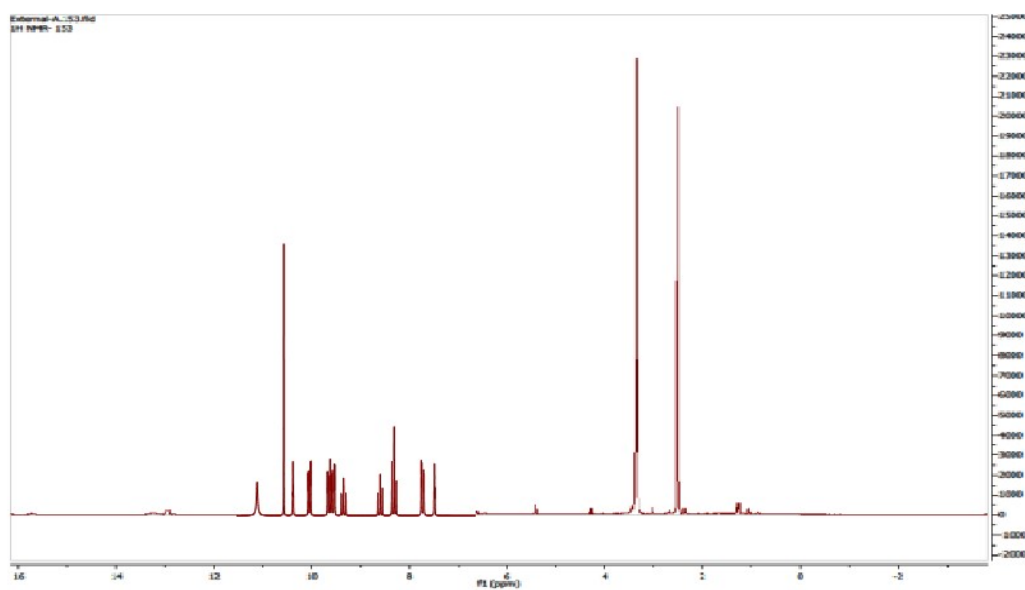


Figure S2: The <sup>1</sup>H NMR spectrum for a novel imidazole derivative, 2,2'-(1H-benzo[d]imidazole-1,2-diyl) diphenol (BIP)

**The calculated report from the EPPI software.**

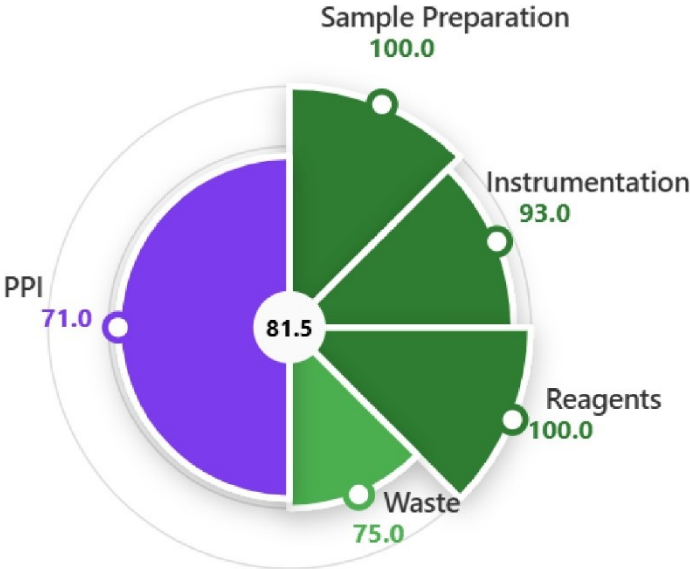
# Environmental, Practicality, and Performance Index (EPPI)

Date: 24/20/25 / 1/17

Component	Score
Sample Preparation	100.0
Instrumentation	93.0
Reagent	100.0
Waste	75.0
PPI	71.0
Total	81.5



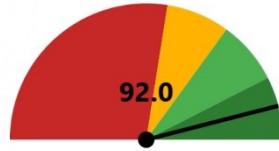
Component Distribution Chart



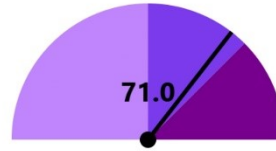
# Results Summary

## EI & PPI Indexes

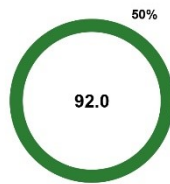
### Environmental Impact Index



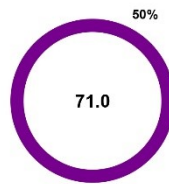
### Performance Practicality Index (PPI)



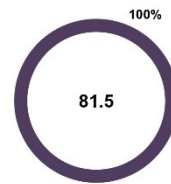
**TOTAL SCORE: 81.5 - Highly Recommended**



Environmental Index (EI)



Performance Practicality Index (PPI)



EPPI Score

### EPPI Components



Category	Score	Weight
Environmental Index (EI)	92.0	50%
Performance Practicality Index (PPI)	71.0	50%
<b>TOTAL SCORE</b>	<b>81.5</b>	<b>100%</b>
Sample Preparation	100.0	-
Instrumentation	93.0	-
Reagents	100.0	-
Waste	75.0	-

### Environmental Index (EI) Interpretation

- 85-100: Ideal green
- 70-84: Green Method
- 55-69: Acceptable green
- <55: Unsustainable Non-Green Method with Serious Impact

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### Performance Practicality Index (PPI) Interpretation

- 75-100: Excellent
- 50-74: Acceptable
- <50: Impractical

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