**What is Mahkotadewa?**

Mahkotadewa is a popular herbal medicine in Indonesia, known for its various health benefits. Here is a summary of its constituents and some of its applications:

### Constituents of Mahkotadewa

<table>
<thead>
<tr>
<th>Compound</th>
<th>Content</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caffeine</td>
<td>12.5%</td>
<td>Tea</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>5.3%</td>
<td>Cosmetics</td>
</tr>
<tr>
<td>Phenols</td>
<td>3.4%</td>
<td>Food</td>
</tr>
<tr>
<td>Alkaloids</td>
<td>2.1%</td>
<td>Medicine</td>
</tr>
</tbody>
</table>

### Pharmacological effects

- Controlling Cancer
- Impotency, hemorrhoids
- Diabetes mellitus, allergies
- Liver, heart diseases
- Kidney disorders, blood disease
- Rheumatism, high blood pressure
- Stroke, migraine
- Venous skin disease

**Objective of this research**

- Define Useful Component in Mahkotadewa
- Extraction of Mangiferin & A component from Mahkotadewa using subcritical water

### Analysis

**LCMS chromatograph**

- Column: C18, 5 μm x 25 cm x 4.6 mm
- Injection mode: APES negative & positive mode
- Drying gas flow: 20 mL/min
- Drying gas temperature: 250°C
- Capillary voltage: 4.5 kV

**HPLC chromatograph**

- Column: C18, 5 μm x 25 cm x 4.6 mm
- Detector: UV 255 nm
- Flow rate: 1.0 mL/min
- Injection volume: 20 μL
- Mobile phase: ACN (12%), Water(98 %), THF (0.1 %), Acetic acid (0.1 %)

### Experiment

**Extraction condition**

- Temperature: 50 – 150°C
- Extraction time: 1 – 7 hr
- Pressure: 7- 40 bar

**Apparatus**

- Loading Mahkotadewa 30 g in the extractor
- Introducing water in the extracted through 1st pressure & 2nd pressure
- Filling water in the extractor
- Setting temperature
- Setting pressure
- Extraction for 1 hr
- Stopping to reach solution 10 %
- Filtering & Analyzing

**Method**

1. Load Mahkotadewa 30 g into the extractor
2. Introduce water into the extractor through 1st and 2nd pressure
3. Fill water in the extractor
4. Set the temperature
5. Set the pressure
6. Extract for 1 hour
7. Stop extraction to reach a solution of 10%
8. Filter and analyze

**Subcritical Water Extraction**

- P: 4.5-440 bar (Pr = 0.02-2.0)
- T: 100 – 374°C (Tr = 0.2-1.0)

- It is also sometimes referred to as superheated water or pressurized hot water

### Results and discussion

**Mangiferin Extraction**

- Extraction yield of 22.5 mg/g at 30 bar, 100°C, 5 hr

**A-Component Extraction**

- Extraction yield of 42.6 mg/g at 480 bar, 150°C, 5 hr

### Conclusions

1. *Phaleria macrocarpa* (Scheff.) plant confirmed to contain mangiferin & A – Component by LCMS.
2. Extraction yield of mangiferin and A-component increased with increase in pressure and temperature.
   - Optimum extraction yields of mangiferin is 22.5 mg/g at 30 bar, 100°C, 5hr
   - Optimum extraction yields of A-component is 42.8 mg/g at 40 bar, 150°C, 5hr
3. Degradation occurred at extraction time greater than 5 hr at 100°C and 300 bar.

**Phaleria macrocarpa** and A-Mahkotadewa plant confirmed to contain mangiferin & A – Component by LCMS. Extraction yield of mangiferin and A-component increased with increase in pressure and temperature. Optimum extraction yields of mangiferin is 22.5 mg/g at 30 bar, 100°C, 5hr Optimum extraction yields of A-component is 42.8 mg/g at 40 bar, 150°C, 5hr Degradation occurred at extraction time greater than 5 hr at 100°C and 300 bar.