

## LAMPIRAN

**Lampiran 1** Perhitungan Kadar Tanin Biokoagulan menggunakan Spektrofotometer UV-Vis.

1. Perhitungan Pembuatan Larutan Induk Asam Galat 100 ppm

$$100 \text{ mg/L} = \frac{\text{massa asam galat}}{\text{volume larutan}}$$

$$100 \text{ mg/L} = \frac{\text{massa asam galat}}{0,1 \text{ L}}$$

$$\text{massa asam galat} = 10 \text{ mg}$$

$$\text{massa asam galat} = 0,01 \text{ gram}$$

2. Perhitungan Variasi Larutan Standar Asam Galat

$$M1 \times V1 = M2 \times V2$$

$$\text{Larutan Standar 2 ppm} = 100 \text{ mg/L} \times V1 = 2 \text{ mg/L} \times 10 \text{ ml}$$

$$V1 = \frac{2 \text{ mg/L} \times 10 \text{ ml}}{100 \text{ mg/L}}$$

$$V1 = 0,2 \text{ ml}$$

$$\text{Larutan Standar 4 ppm} = 100 \text{ mg/L} \times V1 = 4 \text{ mg/L} \times 10 \text{ ml}$$

$$V1 = \frac{4 \text{ mg/L} \times 10 \text{ ml}}{100 \text{ mg/L}}$$

$$V1 = 0,4 \text{ ml}$$

$$\text{Larutan Standar 6 ppm} = 100 \text{ mg/L} \times V1 = 6 \text{ mg/L} \times 10 \text{ ml}$$

$$V1 = \frac{6 \text{ mg/L} \times 10 \text{ ml}}{100 \text{ mg/L}}$$

$$V1 = 0,6 \text{ ml}$$

$$\text{Larutan Standar 8 ppm} = 100 \text{ mg/L} \times V1 = 8 \text{ mg/L} \times 10 \text{ ml}$$

$$V1 = \frac{8 \text{ mg/L} \times 10 \text{ ml}}{100 \text{ mg/L}}$$

$$V1 = 0,8 \text{ ml}$$

$$\text{Larutan Standar 10 ppm} = 100 \text{ mg/L} \times V1 = 10 \text{ mg/L} \times 10 \text{ ml}$$

$$V1 = \frac{10 \text{ mg/L} \times 10 \text{ ml}}{100 \text{ mg/L}}$$

$$V1 = 1 \text{ ml}$$

3. Perhitungan Pengenceran Variasi Biokoagulan Tanin 25 kali.

$$\text{faktor pengenceran} = \frac{\text{volume akhir}}{\text{volume awal}}$$

$$25 \text{ kali} = \frac{25 \text{ ml}}{\text{volume awal}}$$

$$\text{volume awal} = 1 \text{ ml}$$

**Lampiran 2** Perhitungan TSS Limbah Cair Tahu setelah Pengolahan dengan Biokoagulan Tanin.

$$\text{mg TSS per liter} = \frac{(A - B) \times 1000}{\text{Volume Contoh Uji, mL}}$$

$$\text{mg TSS per liter (awal)} = \frac{(648,9 \text{ mg} - 626,9 \text{ mg}) \times 1000}{50 \text{ mL}} = 440 \text{ mg/L}$$

$$\text{mg TSS per liter (10ml/L)} = \frac{(653,5 \text{ mg} - 640,2 \text{ mg}) \times 1000}{50 \text{ mL}} = 266 \text{ mg/L}$$

$$\text{mg TSS per liter (20ml/L)} = \frac{(659,1 \text{ mg} - 645,9 \text{ mg}) \times 1000}{50 \text{ mL}} = 264 \text{ mg/L}$$

$$\text{mg TSS per liter (30ml/L)} = \frac{(653,3 \text{ mg} - 640,6 \text{ mg}) \times 1000}{50 \text{ mL}} = 254 \text{ mg/L}$$

$$\text{mg TSS per liter (40ml/L)} = \frac{(636,7 \text{ mg} - 624,2 \text{ mg}) \times 1000}{50 \text{ mL}} = 246 \text{ mg/L}$$

$$\text{mg TSS per liter (50ml/L)} = \frac{(653,9 \text{ mg} - 643,6 \text{ mg}) \times 1000}{50 \text{ mL}} = 206 \text{ mg/L}$$

$$\text{mg TSS per liter (60ml/L)} = \frac{(641,7 \text{ mg} - 625 \text{ mg}) \times 1000}{50 \text{ mL}} = 334 \text{ mg/L}$$

### Lampiran 3 Dokumentasi Penelitian

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Proses pengeringan ampas teh hijau



Proses penghalusan ampas teh hijau

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Penimbangan ampas teh halus untuk maserasi



Proses maserasi

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Penimbangan ampas teh hijau untuk ekstraksi



Proses ekstraksi ampas teh hijau

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Penimbangan asam galat untuk larutan baku analisis kadar tanin dengan Spektrofotometer UV-Vis



Pembuatan larutan standar untuk analisis kadar tanin dengan Spektrofotometer UV-Vis

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Pengendapan koagulasi



Pengukuran pH



Pengukuran TSS

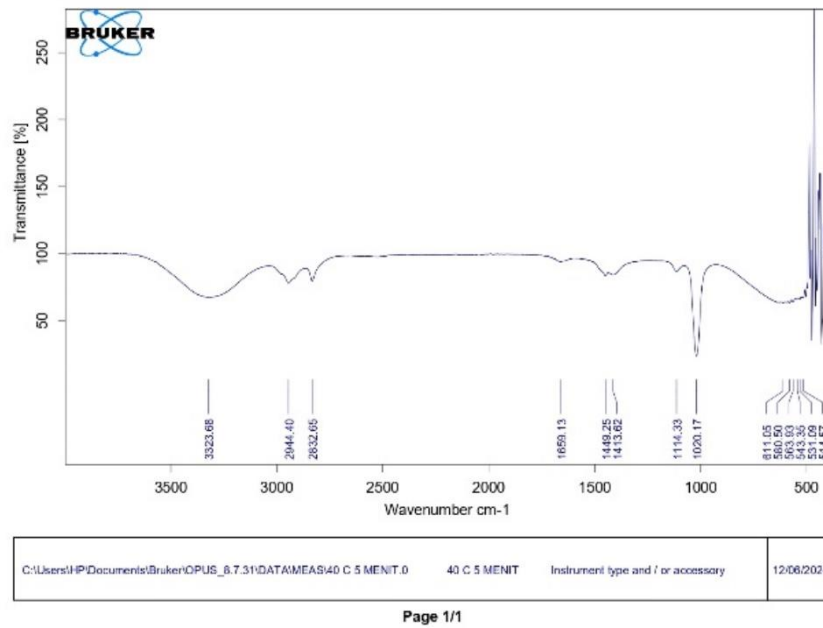


Pengukuran COD

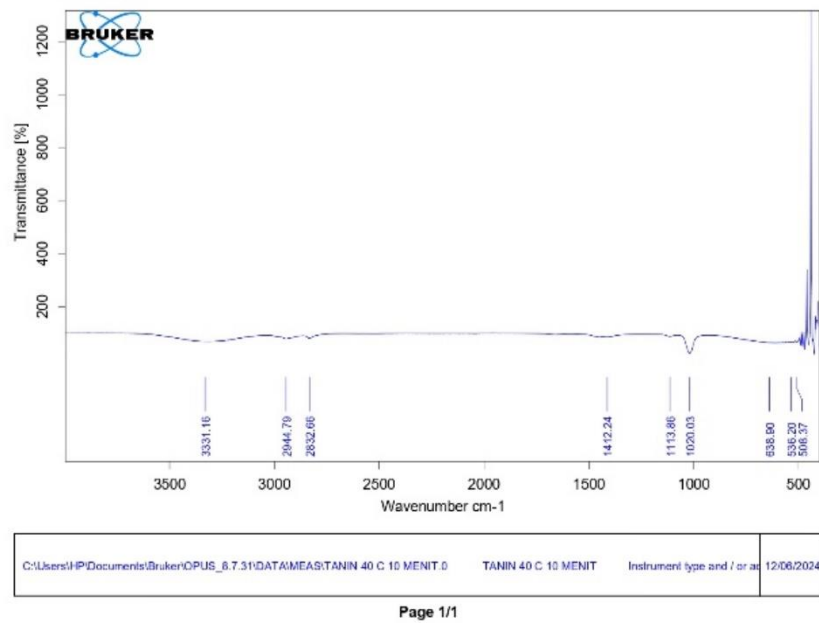
## Lampiran 4 Hasil Uji Laboratorium

### 1. Hasil Analisis FTIR di Lab. Politeknik Negeri Cilacap

#### Sampel T4 - 5



#### Sampel T4 - 10



## 2. Hasil Analisis FTIR di Lab. Terpadu UIN Sunan Kalijaga Yogyakarta

Sampel T5 – 5

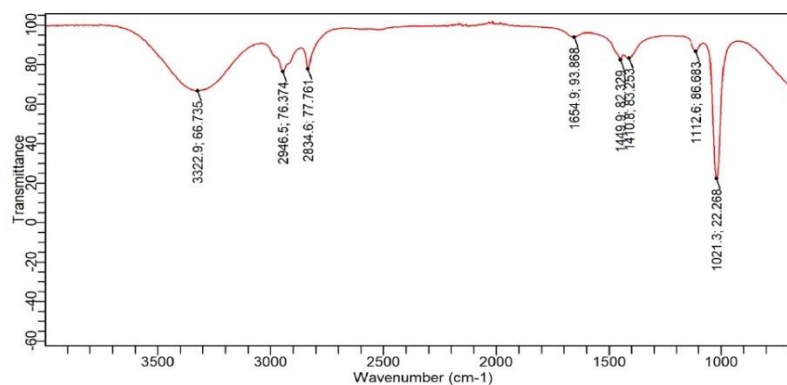


LABORATORIUM KIMIA  
LABORATORIUM TERPADU  
UIN SUNAN KALIJAGA  
YOGYAKARTA



Sample ID: FTIR\_011\_NABHAN  
SHAFA\_BIOKOAGULAN TANIN 50°C 5 MENIT  
Sample Scans: 12  
Background Scans: 12  
Resolution: 4  
System Status: Good  
File Location: C:\Users\Public\Documents\Agilent\MicroLab\Results\FTIR\_011\_NABHAN  
SHAFA\_BIOKOAGULAN TANIN 50°C 5 MENIT\_2024-06-21T13:53-11.a2r

Method  
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User: admin  
Date/Time: 06/21/2024 1:53:11 PM  
Range: 4000 - 650  
Apodization: Happ-Genzel



Peak Number	Wavenumber (cm <sup>-1</sup> )	Intensity
1	1021.29057	22.26837
2	1112.61034	86.68326
3	1410.79737	83.25342
4	1449.93442	82.32871
5	1654.93800	93.86795
6	2834.64043	77.76138
7	2946.46056	76.37407

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8	3322.92168	66.73512
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Sampel T5 – 10

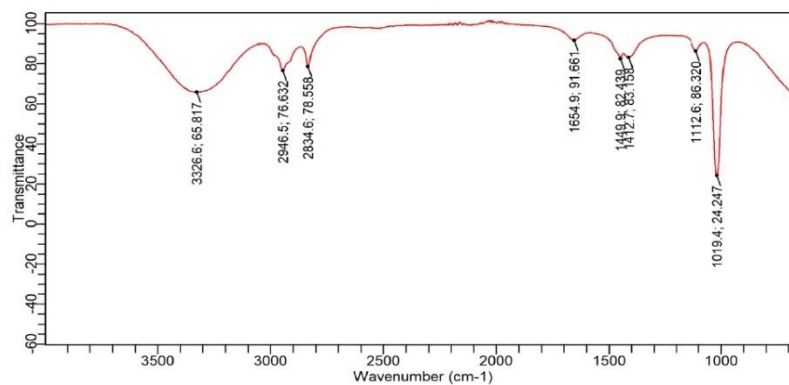
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LABORATORIUM KIMIA  
LABORATORIUM TERPADU  
UIN SUNAN KALIJAGA  
YOGYAKARTA



Sample ID: FTIR\_012\_NABHAN      Method  
SHAFA\_BIOKOAGULAN TANIN 50°C 10 MENIT      Name: C:\Users\Public\Documents\Agilent\MicroLab\Methods\Biokoagulan tanin.a2m  
User: admin  
Sample Scans: 12      Date/Time: 06/21/2024 2:00:50 PM  
Background Scans: 12      Resolution: 4      Range: 4000 - 650  
System Status: Good      Apodization: Happ-Genzel  
File Location: C:\Users\Public\Documents\Agilent\MicroLab\Results\FTIR\_012\_NABHAN  
SHAFA\_BIOKOAGULAN TANIN 50°C 10 MENIT\_2024-06-21T14-00-50.a2r



Peak Number	Wavenumber (cm <sup>-1</sup> )	Intensity
1	1019.42690	24.24671
2	1112.61034	86.32018
3	1412.66104	83.15819
4	1449.93442	82.43876
5	1654.93800	91.66144
6	2834.64043	78.55828
7	2946.46056	76.63184

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8	3326.64902	65.81728
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Sampel T6 – 5

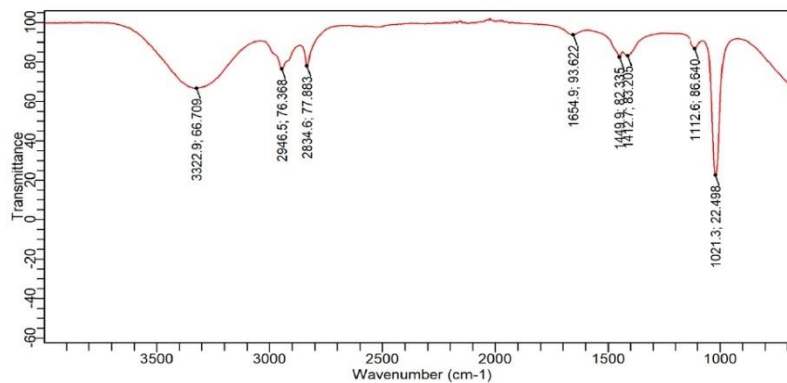


LABORATORIUM KIMIA  
LABORATORIUM TERPADU  
UIN SUNAN KALIJAGA  
YOGYAKARTA



Sample ID: FTIR\_013\_NABHAN  
SHAFA\_BIOKOAGULAN TANIN 60°C 5 MENIT  
Sample Scans: 12  
Background Scans: 12  
Resolution: 4  
System Status: Good  
File Location: C:\Users\Public\Documents\Agilent\MicroLab\Results\FTIR\_013\_NABHAN\_SHAFA\_BIOKOAGULAN TANIN 60°C 5 MENIT\_2024-06-21T14-08-21.a2r

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User: admin  
Date/Time: 06/21/2024 2:08:21 PM  
Range: 4000 - 650  
Apodization: Happ-Genzel



Peak Number	Wavenumber (cm <sup>-1</sup> )	Intensity
1	1021.29057	22.49836
2	1112.61034	86.63989
3	1412.66104	83.20481
4	1449.93442	82.33520
5	1654.93800	93.62223
6	2834.64043	77.88338
7	2946.46056	76.36769

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8	3322.92168	66.70914
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Sampel T6 – 10

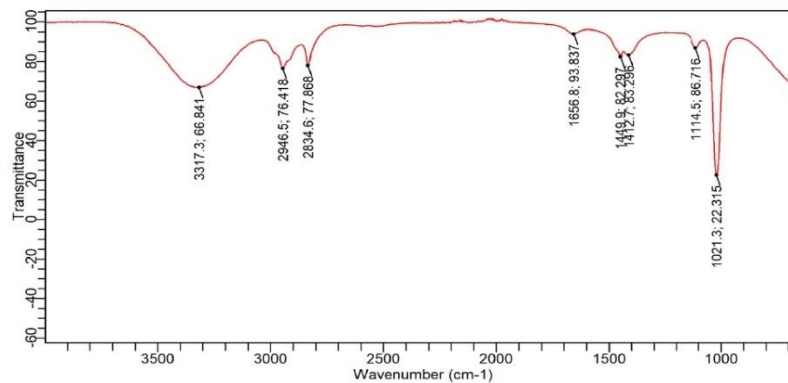


LABORATORIUM KIMIA  
LABORATORIUM TERPADU  
UIN SUNAN KALIJAGA  
YOGYAKARTA



Sample ID: FTIR\_014\_NABHAN  
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Sample Scans: 12  
Background Scans: 12  
Resolution: 4  
System Status: Good  
File Location: C:\Users\Public\Documents\Agilent\MicroLab\Results\FTIR\_014\_NABHAN\_SHAFA\_BIOKOAGULAN TANIN 60°C 10 MENIT\_2024-06-21T14-14-28\_a2r

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User: admin  
Date/Time: 06/21/2024 2:14:28 PM  
Range: 4000 - 650  
Apodization: Happ-Genzel



Peak Number	Wavenumber (cm <sup>-1</sup> )	Intensity
1	1021.29057	22.31495
2	1114.47401	86.71640
3	1412.66104	83.29639
4	1449.93442	82.29689
5	1656.80167	93.83720
6	2834.64043	77.86778
7	2946.46056	76.41793

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8	3317.33068	66.84113
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### 3. Diagram Hasil Standar Baku Asam Galat Analisis Spektrofotometer UV-Vis

