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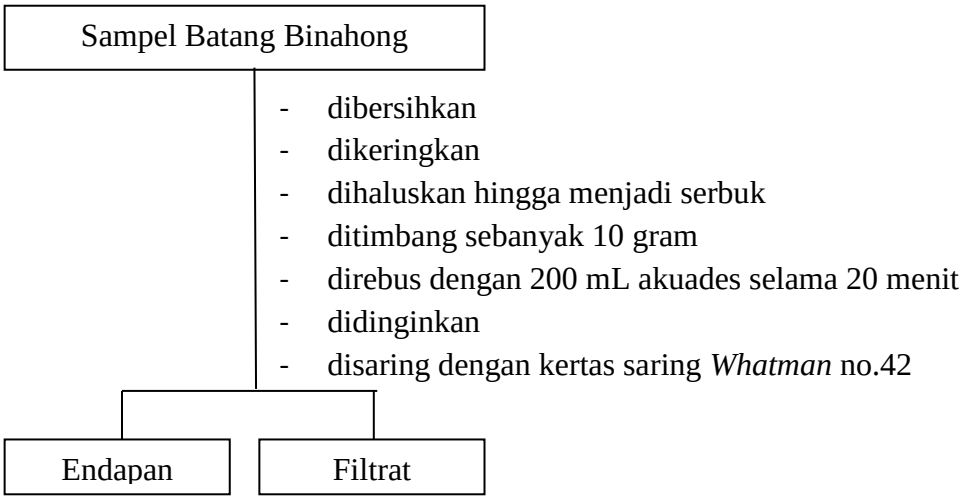
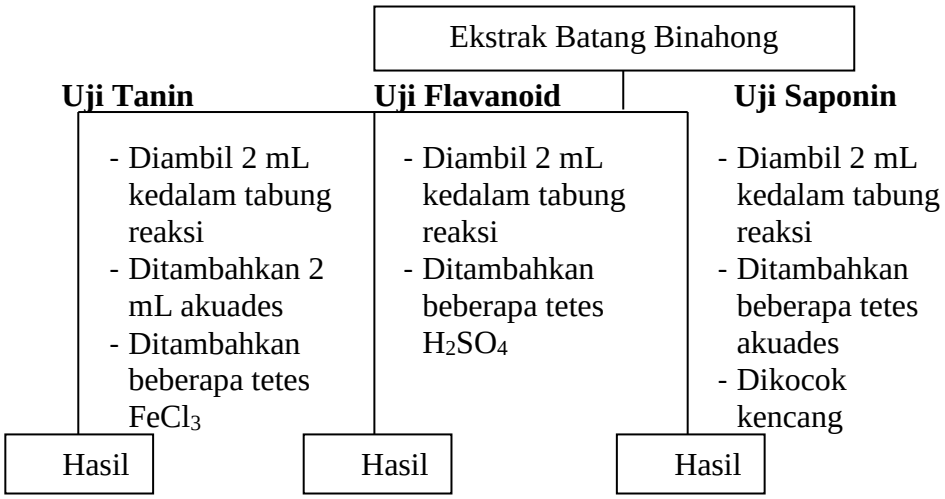
Lampiran 1. Bagan kerja preparasi sampel



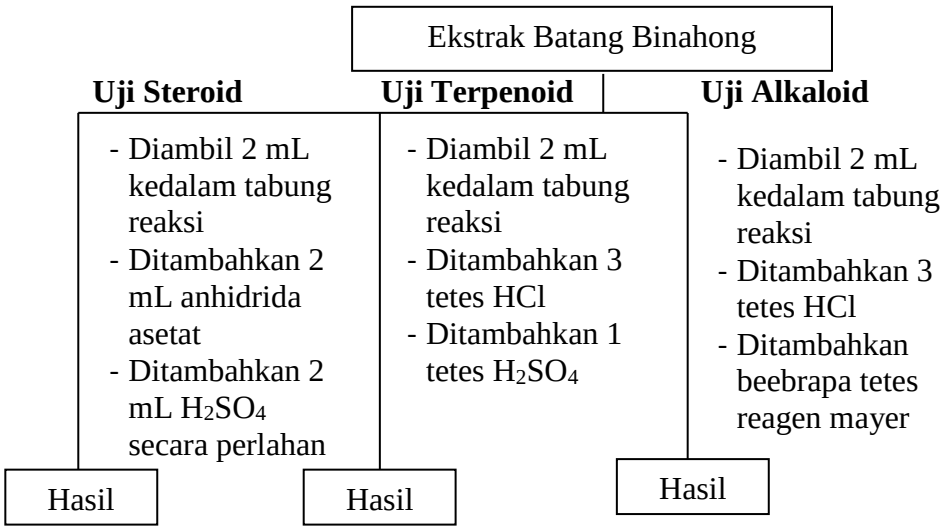
Lampiran 2. Bagan Kerja Uji Fitokimia



Catatan : 1. Hasil positif uji tannin ditandai dengan terbentuknya endapan hijau

2. Hasil positif flavonoid ditandai dengan terbentuknya endapan oranye

3. Hasil positif saponin ditandai dengan terbentuknya busa yang banyak

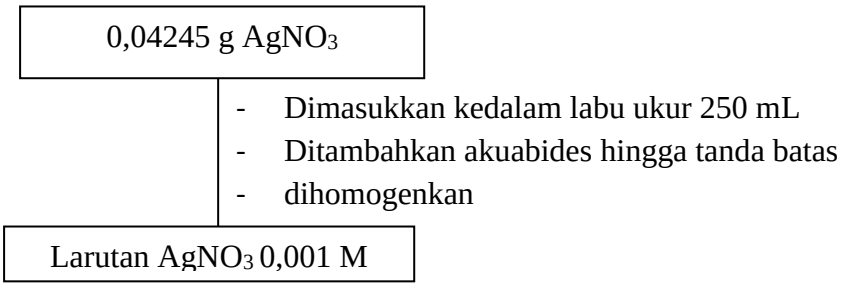


Catatan :

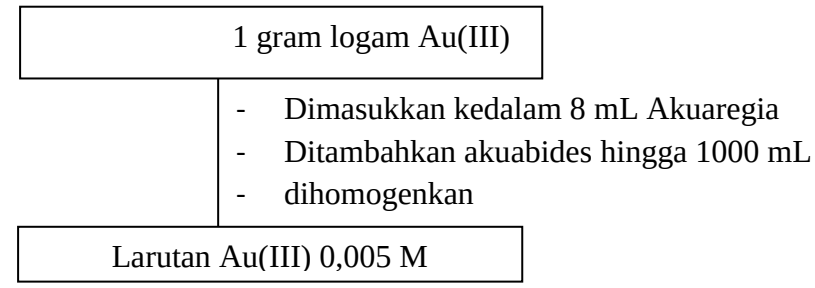
1. Hasil positif steroid ditandai dengan perubahan warna dari ungu menjadi biru
2. Hasil positif terpenoid ditandai dengan terbentuknya warna merah pada lapisan antarmuka
3. Hasil positif alkaloid ditandai dengan terbentuknya endapan berwarna krim kekuningan

Lampiran 3. Pembuatan Larutan

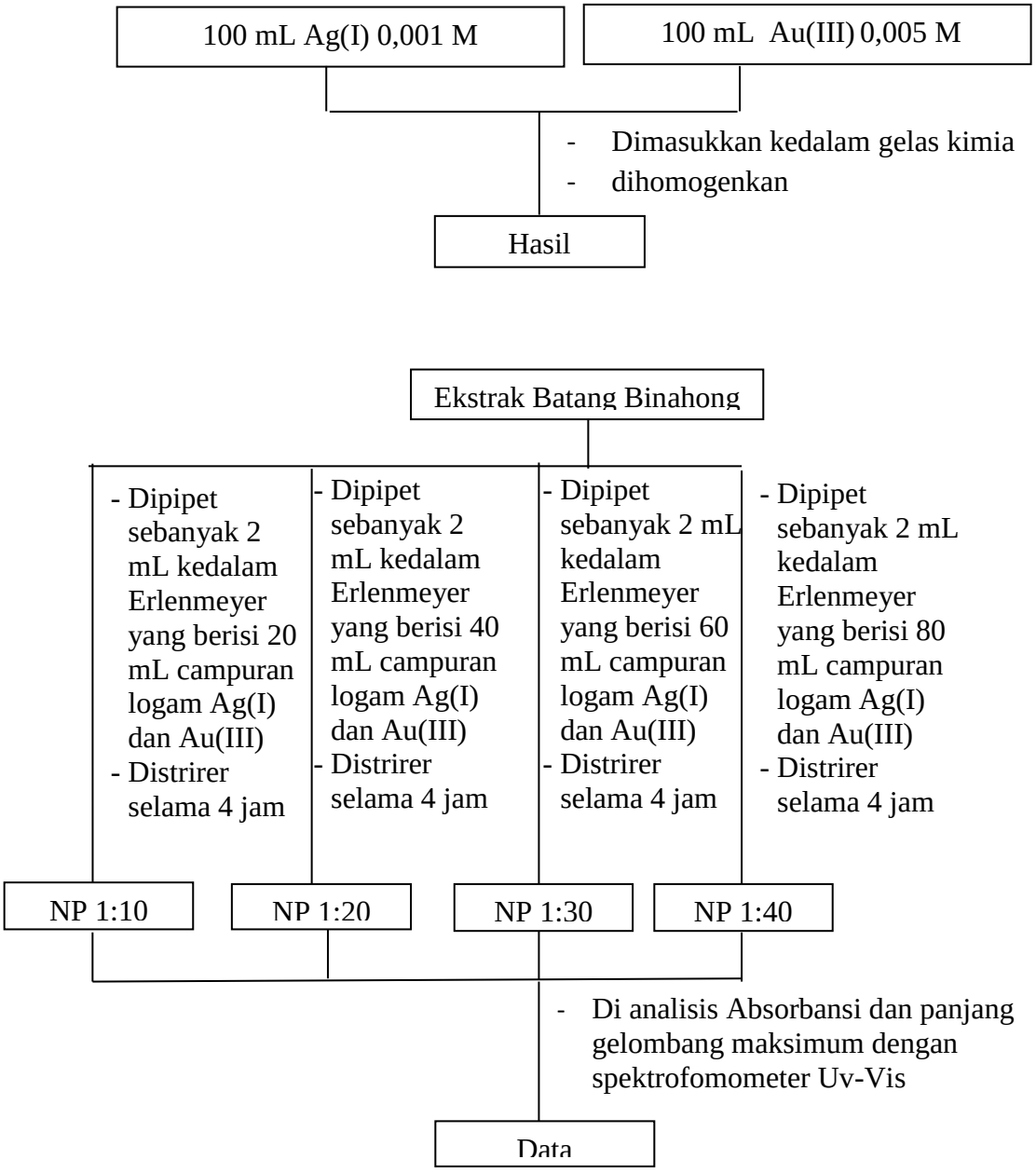
a. Pembuatan Larutan Ag(I) dalam $AgNO_3$ 0,001 M



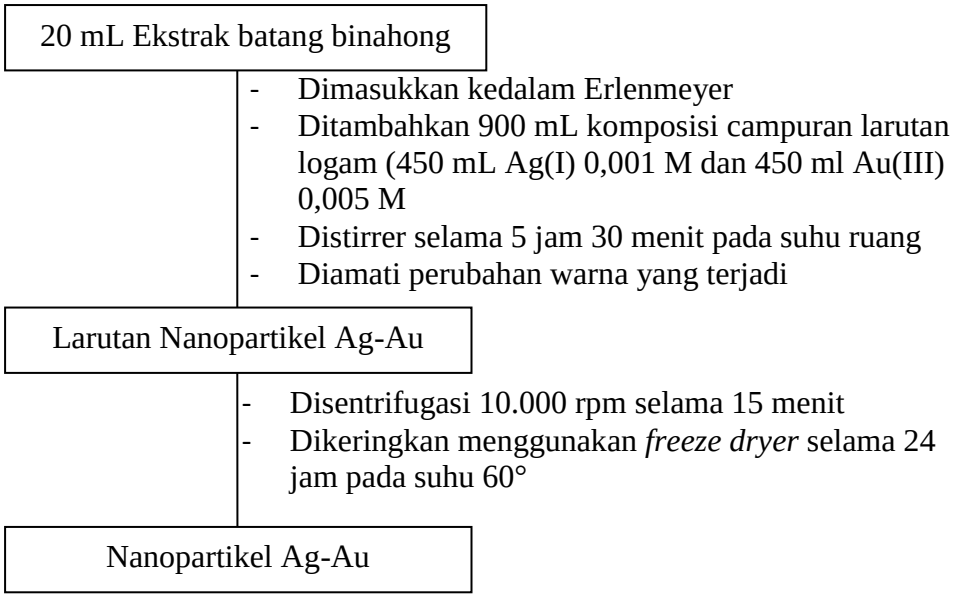
a. Pembuatan Larutan Au 0,005 M



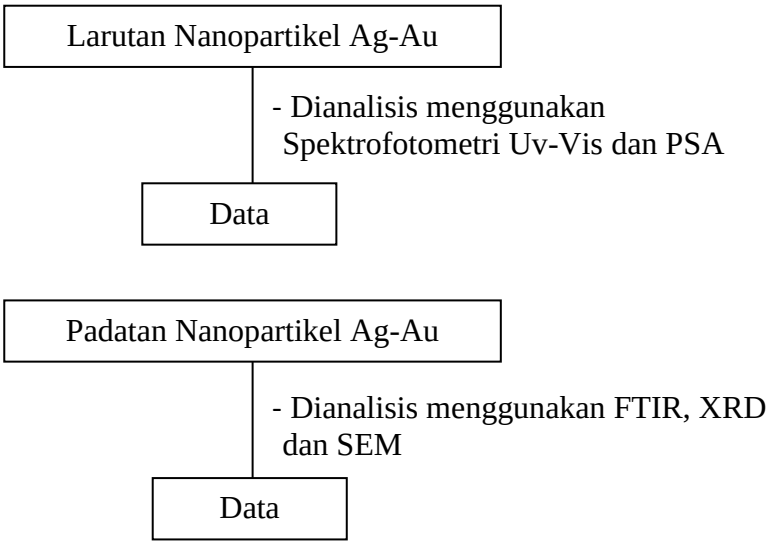
Lampiran 4. Bagan kerja Optimasi Komposisi Ekstrak dan Logam



Lampiran 5. Bagan kerja Sintesis Nanopartikel Ag-Au

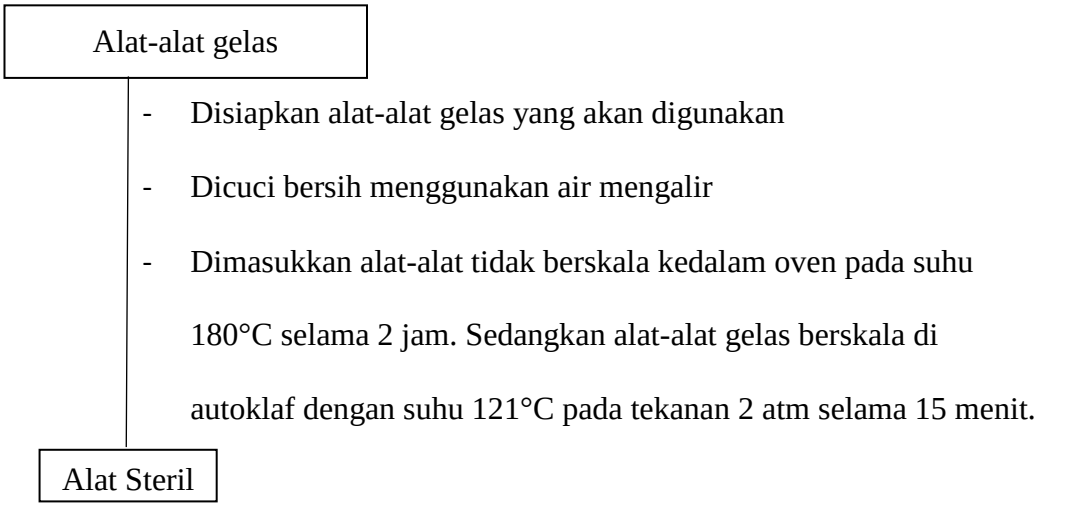


Lampiran 6. Bagan Kerja Karakterisasi Nanopartikel Bimetal Ag-Au

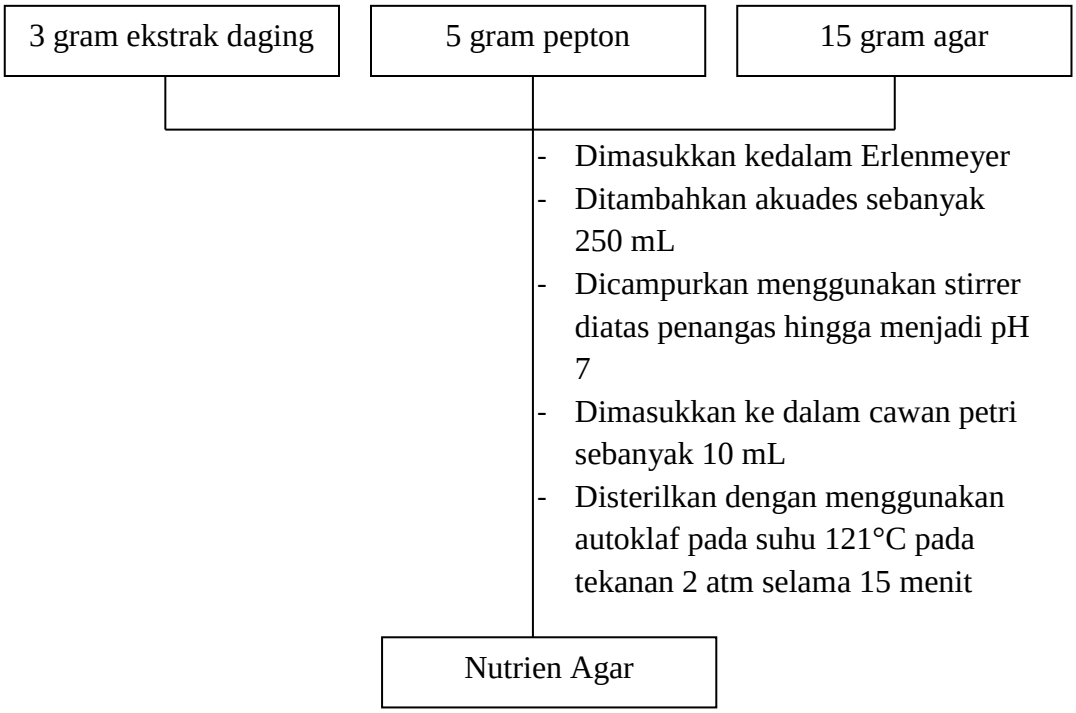


Lampiran 7. Bagan Kerja Uji Bioaktifitas Antibakteri

a) Sterilisasi Alat



b) Pembuatan Medium Nutrien Agar



a) Pembiakan Bakteri Uji

Isolat bakteri uii

- Diambil sebanyak 1-2 ose
- Diinokulasi dengan cara digoreskan pada medium NA secara aseptis
- Diinkubasi pada suhu 37°C selama 18-24 jam

Hasil

Catatan : isolat bakteri uji yang digunakan adalah bakteri *Escherichia coli* dan *Staphylococcus aureus*

b) Uji antibakteri

Media NA

- Diberi suspensi bakteri uji yang telah dibandingkan kekeruhannya dengan standar 0,5 McFarland dengan cara bakteri dioleskan dan diratakan pada media NA
- Ditanamkan bor gabus pada media yang telah padat dan diatur jaraknya agar daerah pegamatan tidak bertumpu
- Diangkat Pencadang dan media agar dirapikan menggunakan spatula steril sehingga terbentuk sumur-sumur
- Ditetesi pada masing-masing sumuran dengan akuabides kontrol negatif, 2,5 g *ampicilin* yang telah dilarutkan dengan 50 mL akuabides sebagai kontrol positif, dan nanopartikel Ag-Au sebanyak 0,1 g yang dilarutkan dengan 2 mL akuabides, masing-masing dipipet sebanyak 100 µL
- Diinkubasi pada suhu 37 °C selama 1 x 24 jam
- Diukur diameter daerah hambat antibakteri menggunakan jangka sorong

Hasil

Catatan : Bakteri uji yang digunakan adalah bakteri *Escherichia coli* dan *Staphylococcus aureus*

Lampiran 8. Hasil Karakterisasi PSA

2021.08.06 13:22:34

HORIBA Scientific

HORIBA SZ-100 for Windows [Z Type] Ver2.20

SZ-100

Ag-Au Np_4020.nsz

Measurement Results

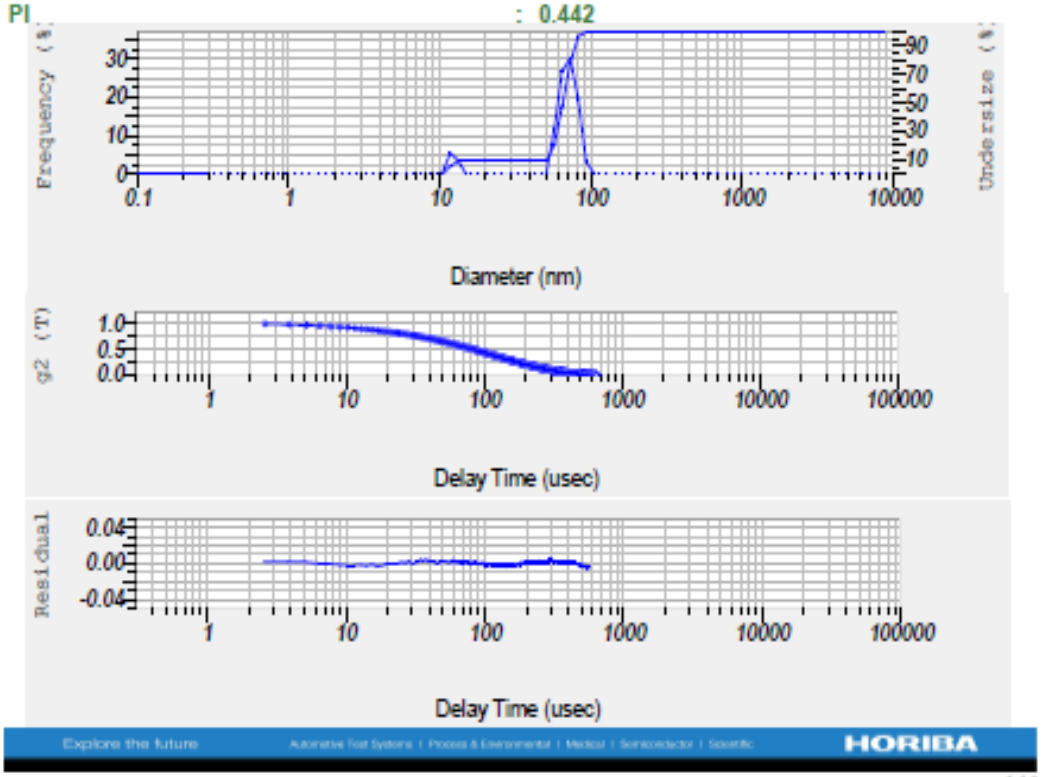
Date	: 05 August 2021 12:01:08
Measurement Type	: Particle Size
Sample Name	: Ag-Au Np
Scattering Angle	: 90
Temperature of the Holder	: 24.9 deg. C
Dispersion Medium Viscosity	: 0.897 mPa.s
Transmission Intensity before Meas.	: 11657
Distribution Form	: [Standard]
Distribution Form(Dispersity)	: Polydisperse
Representation of Result	: Scattering Light Intensity
Count Rate	: 274 kCPS

Calculation Results

Peak No.	S.P.Area Ratio	Mean	S. D.	Mode
1	0.09	11.5 nm	0.7 nm	11.4 nm
2	0.91	66.9 nm	8.5 nm	67.5 nm
3	—	— nm	— nm	— nm
Total	1.00	62.0 nm	17.7 nm	67.5 nm

Cumulant Operations

Z-Average	: 51.5 nm
PI	: 0.442



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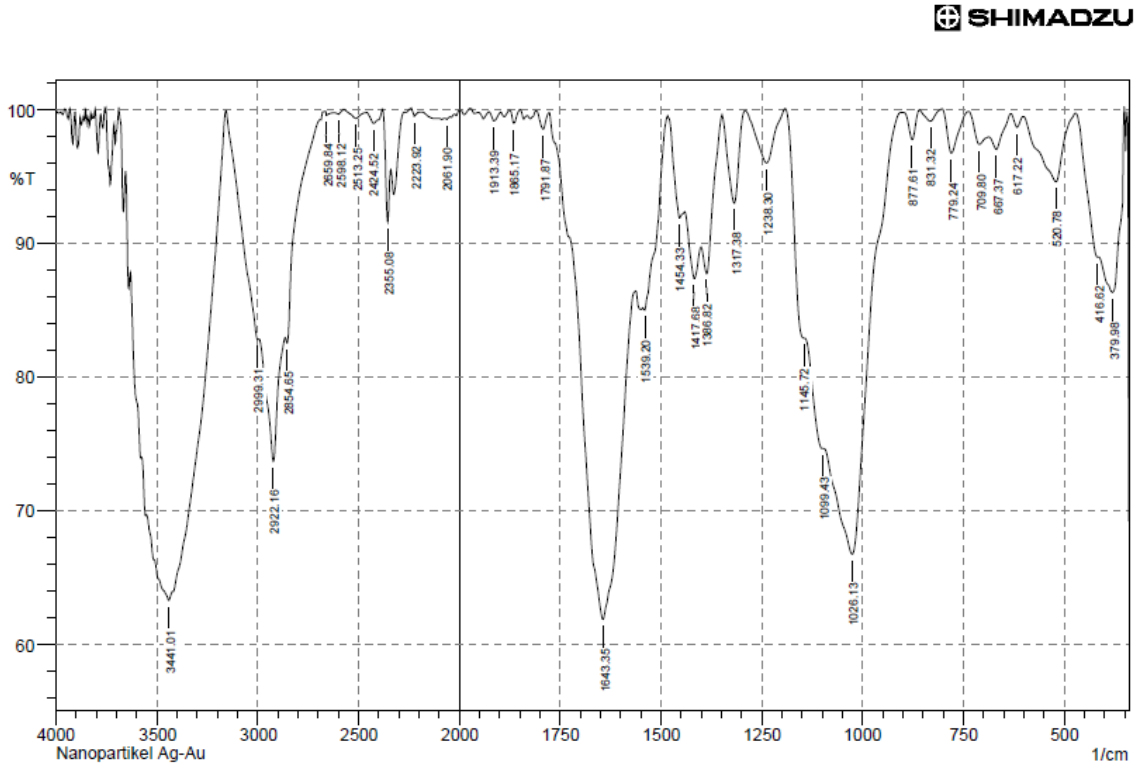
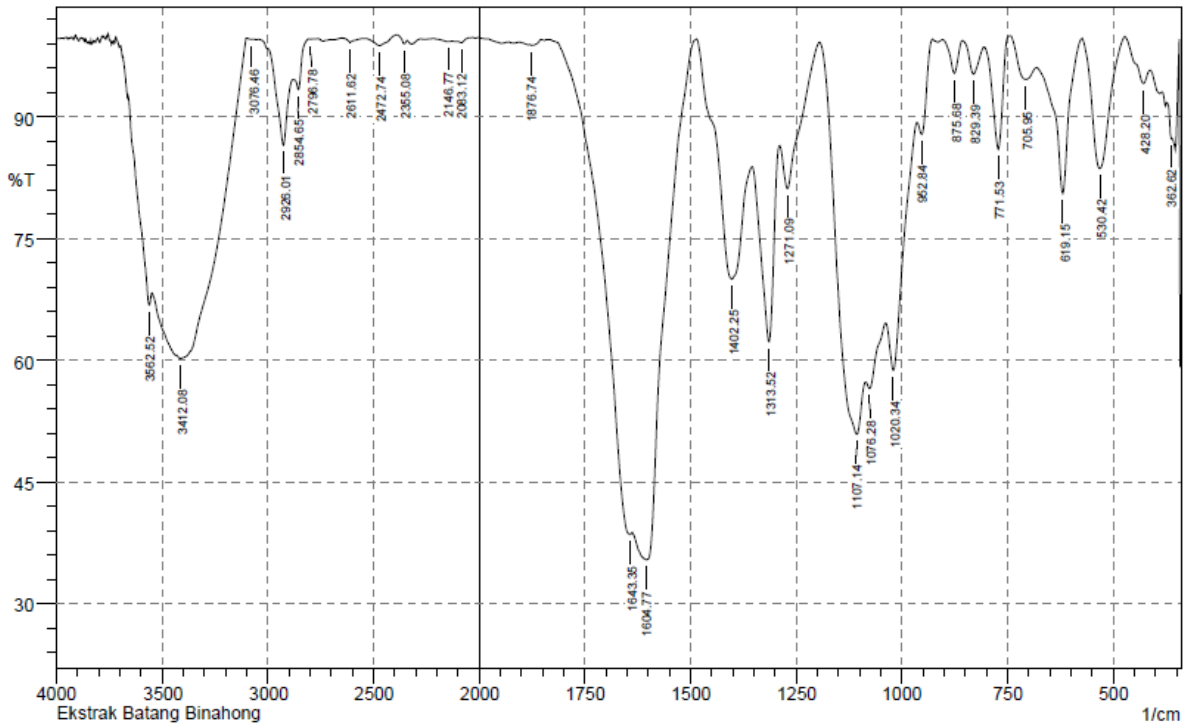
Lampiran 9. Hasil Karakterisasi FTIR



No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	379.98	86.317	8.629	412.77	351.04	3.153	1.665
2	416.62	88.947	0.384	470.63	414.7	1.511	0.058
3	520.78	94.592	5.042	599.86	472.56	1.648	1.429
4	617.22	98.667	0.918	632.65	601.79	0.116	0.06
5	667.37	97.003	1.566	686.66	632.65	0.453	0.173
6	709.8	97.389	1.439	736.81	686.66	0.393	0.152
7	779.24	96.733	3.252	802.39	736.81	0.426	0.413
8	831.32	99.118	0.896	858.32	802.39	0.105	0.109
9	877.61	97.753	2.129	898.83	858.32	0.185	0.163
10	1026.13	66.736	17.046	1095.57	904.61	18.498	6.544
11	1099.43	74.623	0.679	1143.79	1095.57	5.156	0.13
12	1145.72	82.898	0.689	1192.01	1143.79	2.065	0.109
13	1238.3	96	4.002	1290.38	1192.01	0.838	0.837
14	1317.38	92.996	6.782	1348.24	1290.38	0.911	0.853
15	1386.82	87.723	4.608	1400.32	1350.17	1.685	0.486
16	1417.68	87.351	3.357	1440.83	1402.25	1.927	0.329
17	1454.33	91.884	2.483	1483.26	1442.75	0.972	0.211
18	1539.2	84.993	1.065	1543.05	1485.19	2.34	0.323
19	1643.35	61.861	29.607	1776.44	1562.34	23.194	16.237
20	1791.87	98.532	1.288	1809.23	1776.44	0.111	0.086
21	1865.17	98.965	0.996	1874.81	1849.73	0.054	0.05
22	1913.39	99.141	0.677	1924.96	1897.95	0.064	0.043
23	2061.9	99.272	0.115	2073.48	2044.54	0.081	0.006
24	2223.92	99.499	0.532	2237.43	2189.21	0.054	0.046
25	2355.08	91.586	5.639	2380.16	2339.65	0.858	0.456
26	2424.52	98.967	0.931	2457.31	2380.16	0.223	0.195
27	2513.25	99.335	0.565	2573.04	2457.31	0.179	0.131
28	2598.12	99.647	0.236	2623.19	2573.04	0.048	0.022
29	2659.84	99.569	0.294	2661.77	2623.19	0.052	0.02
30	2854.65	82.534	1.123	2862.36	2694.56	5	0.074
31	2922.16	73.659	9.227	2993.52	2864.29	13.285	2.747
32	2999.31	82.776	0.449	3157.47	2995.45	6.905	0.23
33	3441.01	63.279	1.134	3512.37	3423.65	17.038	0.5

Date/Time; 8/12/2021 2:31:25 PM
No. of Scans;

SHIMADZU



	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	362.62	87.317	0.816	372.26	360.69	0.555	0.001
2	428.2	94.13	2.727	472.56	412.77	0.919	0.352
3	530.42	83.652	16.175	572.86	472.56	3.493	3.426
4	619.15	80.595	17.531	678.94	574.79	3.927	2.957
5	705.95	94.649	3	744.52	680.87	1.049	0.489
6	771.53	86.027	13.389	804.32	746.45	1.681	1.516
7	829.39	95.289	3.736	856.39	804.32	0.61	0.392
8	875.68	95.394	4.079	902.69	856.39	0.467	0.362
9	952.84	87.866	4.3	962.48	927.76	1.159	0.34
10	1020.34	58.768	11.702	1037.7	964.41	10.634	2.057
11	1076.28	56.54	2.037	1083.99	1039.63	9.778	0.251
12	1107.14	50.896	14.691	1193.94	1085.92	19.288	6.06
13	1271.09	81.188	7.681	1288.45	1195.87	4.485	1.467
14	1313.52	62.307	23.196	1354.03	1290.38	8.526	4.095
15	1402.25	70.031	19.469	1485.19	1355.96	11.204	6.086
16	1604.77	35.452	16.583	1637.56	1487.12	32.597	5.077
17	1643.35	38.544	2.07	1830.45	1637.56	26.104	-13.752
18	1876.74	98.836	0.058	1880.6	1874.81	0.028	0.001
19	2083.12	99.162	0.331	2102.41	2050.33	0.135	0.033
20	2146.77	99.288	0.143	2212.35	2127.48	0.204	0.025
21	2355.08	99.037	0.626	2389.8	2339.65	0.092	0.048
22	2472.74	98.827	1.075	2540.25	2389.8	0.402	0.353
23	2611.62	99.183	0.554	2650.19	2540.25	0.219	0.089
24	2796.78	99.591	0.046	2804.5	2785.21	0.032	0.002
25	2854.65	93.41	2.97	2881.65	2804.5	1.189	0.202
26	2926.01	86.538	9.46	3041.74	2881.65	4.211	2.17
27	3076.46	99.591	0.011	3103.46	3074.53	0.044	0.003
28	3412.08	60.246	2.693	3431.36	3103.46	44.912	9.324
29	3562.52	66.858	3.996	3658.96	3550.95	12.161	1.214

Comment;

Ekstrak Batang Binahong

Date/Time; 3/17/2021 12:43:07 PM

No. of Scans;

Resolution;

Apodization;

Lampiran 10. Hasil Karakterisasi XRD

*** Basic Data Process ***

Group : Standard
Data : AgNp#Anni

Strongest 3 peaks

no.	peak no.	2Theta (deg)	d (A)	I/I1	FWHM (deg)	Intensity (Counts)	Integrated Int (Counts)
1	7	32.2714	2.77173	100	0.84570	186	8264
2	18	64.4092	1.44537	63	0.47350	117	2817
3	15	46.2400	1.96176	57	0.80000	106	4396

Peak Data List

peak no.	2Theta (deg)	d (A)	I/I1	FWHM (deg)	Intensity (Counts)	Integrated Int (Counts)
1	20.4100	4.34779	3	0.62000	6	214
2	21.4400	4.14118	5	0.44000	9	281
3	21.9200	4.05157	3	0.00000	6	0
4	27.8750	3.19808	47	0.91000	87	4343
5	29.9066	2.98529	3	0.38670	6	148
6	30.6300	2.91642	3	0.42000	6	206
7	32.2714	2.77173	100	0.84570	186	8264
8	37.0000	2.42764	7	0.52000	13	560
9	38.1900	2.35468	41	1.38000	77	4869
10	39.2800	2.29181	13	0.52000	24	813
11	39.8200	2.26197	3	0.00000	6	0
12	43.0800	2.09805	4	0.44000	8	258
13	44.0439	2.05434	55	0.47790	103	2396
14	44.9250	2.01608	8	0.83000	15	674
15	46.2400	1.96176	57	0.80000	106	4396
16	54.8483	1.67248	15	0.76330	28	1192
17	57.4400	1.60302	14	0.80000	26	1109
18	64.4092	1.44537	63	0.47350	117	2817
19	65.4400	1.42507	4	0.44000	8	329
20	67.3700	1.38886	5	0.62000	10	300
21	74.4400	1.27348	6	0.64000	11	461

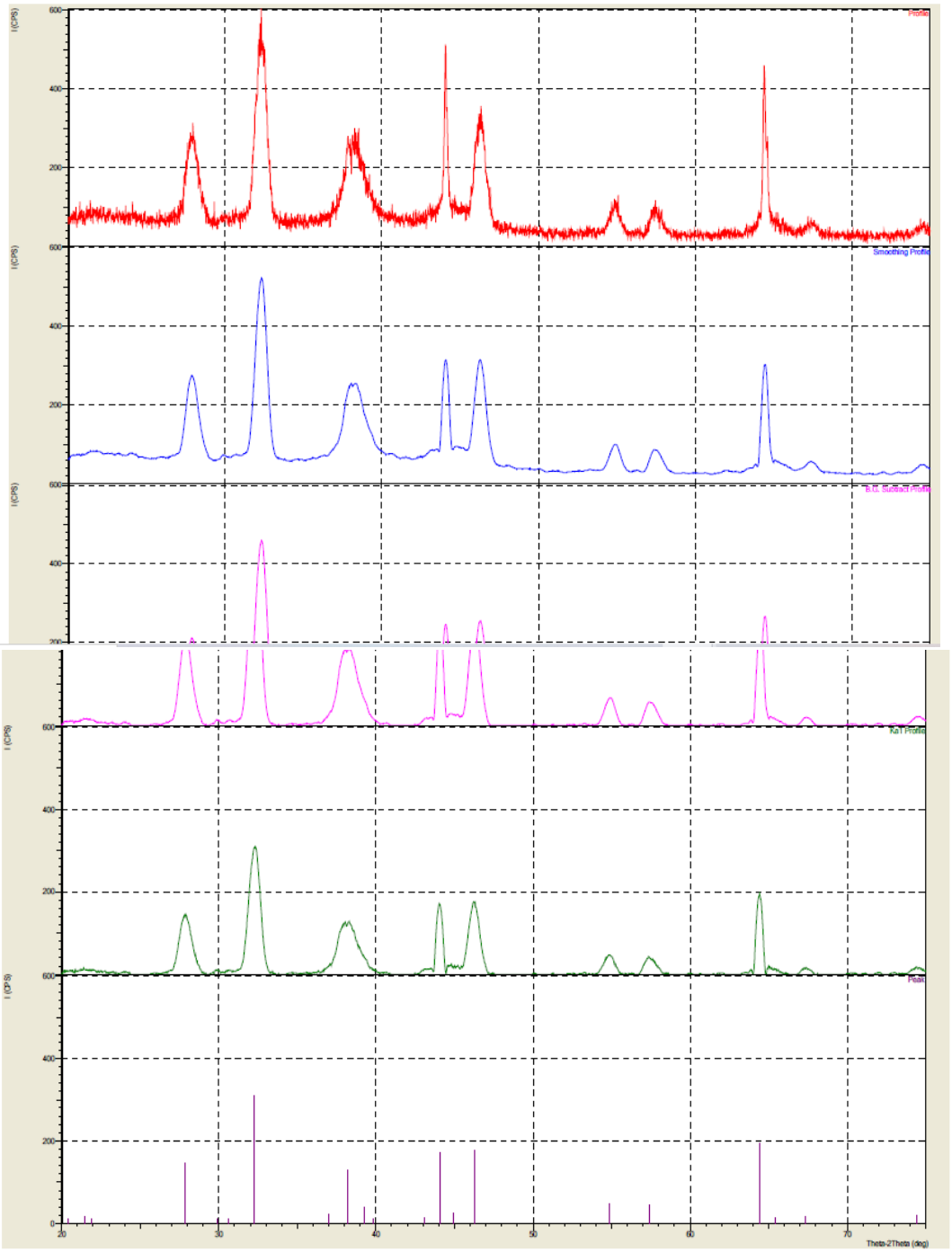
```
        ***  Basic Data Process  ***

 # Data Infomation
          Group               : Standard
          Data                : AgNp#Anni
          Sample Nmae         : serbuk
          Comment             :
          Date & Time         : 09-02-21 09:25:30

 # Measurement Condition
    X-ray tube
          target              : Cu
          voltage             : 40.0 (kV)
          current             : 30.0 (mA)
    Slits
          Auto Slit           : Used
          divergence slit     :   1.00000 (deg)
          scatter slit        :   1.00000 (deg)
          receiving slit      :   0.30000(mm)
    Scanning
          drive axis          : Theta-2Theta
          scan range          :   20.0000 - 75.0000 (deg)
          scan mode           : Continuous Scan
          scan speed          :    2.0000 (deg/min)
          sampling pitch      :    0.0200 (deg)
          preset time         :    0.60 (sec)
```

```
# Data Process Condition
    Smoothing                 [ AUTO ]
          smoothing points    : 41
    B.G.Subtruction           [ AUTO ]
          sampling points     : 47
          repeat times        : 30
    Ka1-a2 Separate           [ MANUAL ]
          Ka1 a2 ratio        : 50 (%)
    Peak Search               [ AUTO ]
          differential points : 43
          FWHM threhold       : 0.050 (deg)
          intensity threhold  : 30 (par mil)
          FWHM ratio  (n-1)/n : 2
    System error Correction   [ NO ]
    Precise peak Correction   [ NO ]
```

< Group: Standard Data: AgNp#Anni >



Lampiran 11. Perhitungan pembuatan larutan logam Ag dan Au

a. Pembuatan larutan Ag dalam $AgNO_3$ 0,001 M

Massa (gram) = Mr. Volume (mL) . Konsentrasi (M)

= 170 gr/mol x 0,25 L x 0,001 M

= 0,0425 gr

ppm $= \frac{Ar\ Ag}{Mr\ \mathrm{AgNO3}} \times \frac{mg}{L}$

$= \frac{107,8}{170} \times \frac{mg42,45}{0,25}$

$= 108,18\ \frac{mg}{L}$

$= 108,18 \times 10^{-3}\ \frac{g}{L}$

M $= \frac{ppm}{BA}$

$= \frac{108,18 \times 10-3}{107,8}$

$= 1,003 \times 10^{-3}$

= 0,001 M

b. Pembuatan larutan Au 1000 ppm

Berat atom Au = 197

Ppm $= \frac{mg}{L}$

1000 $= \frac{mg}{1}$

mg = 1000

g = 1

ppm $= \frac{1}{Ar}$

$= \frac{1}{197}$

= 0,005 M

Lampiran 12. Perhitungan Ukuran Kristal Nanopartikel Bimetal Ag-Au Berdasarkan Data XRD

$$D = \frac{K\lambda}{\beta\frac{1}{2}\cos\theta}$$

$$D = \frac{K\lambda}{\left(\frac{FWHM \times \pi}{180}\right)\cos\left(\frac{2\theta}{2}\right)}$$

Ket: D = Diameter nanopartikel
K = Konstanta (0,9)
λ = Panjang Gelombang Sinar X (0,15418)
$\beta\frac{1}{2}$ = Lebar puncak XRD pada setengah tinggi puncaknya
θ = Sudut Difraksi

a. Perhitungan D pada 2θ = 32,2714

FWHM = 0,84570

$$D = \frac{K\lambda}{\left(\frac{FWHM \times \pi}{180}\right)\cos\left(\frac{2\theta}{2}\right)}$$

$$D = \frac{0{,}9 \text{ X } 0{,}15418}{\left(\frac{0{,}84570 \times 3{,}14}{180}\right)\cos\left(\frac{32{,}2714}{2}\right)}$$

$$D = \frac{0{,}138762}{(0{,}01475276667)\cos(16{,}1357)}$$

$$D = \frac{0{,}138762}{(0{,}01475276667)\ X\ 0{,}96060617775}$$

$$D = \frac{0{,}1387620}{0{,}0141715988}$$

D = 9,79 nm

b. Perhitungan D pada 2θ = 46,2400

FWHM = 0,80000

$$D = \frac{K\lambda}{\left(\frac{FWHM \times \pi}{180}\right)\cos\left(\frac{2\theta}{2}\right)}$$

$$D = \frac{0{,}9 \text{ X } 0{,}15418}{\left(\frac{0{,}80000 \times 3{,}14}{180}\right)\cos\left(\frac{46{,}2400}{2}\right)}$$

$$D = \frac{0{,}138762}{(0{,}0139555556)\ (0{,}9196844898)}$$

D = 10,81 nm

c. Perhitungan D pada 2θ = 64,4092

FWHM = 0,47350

$$D = \frac{K\lambda}{\left(\frac{FWHM \times \pi}{180}\right) cos\left(\frac{2\theta}{2}\right)}$$

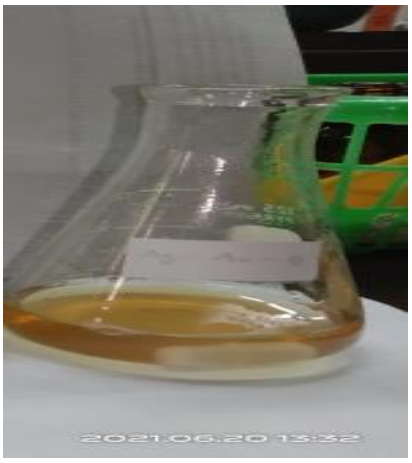
$$D = \frac{0,9 \text{ X } 0,15418}{\left(\frac{0,47350 \times 3,14}{180}\right) cos\left(\frac{64,4092}{2}\right)}$$

$$D = \frac{0,138762}{(0,00825994444)\ (0,84615038135)}$$

D = 19,85 nm

Lampiran 13. Dokumentasi Kegiatan

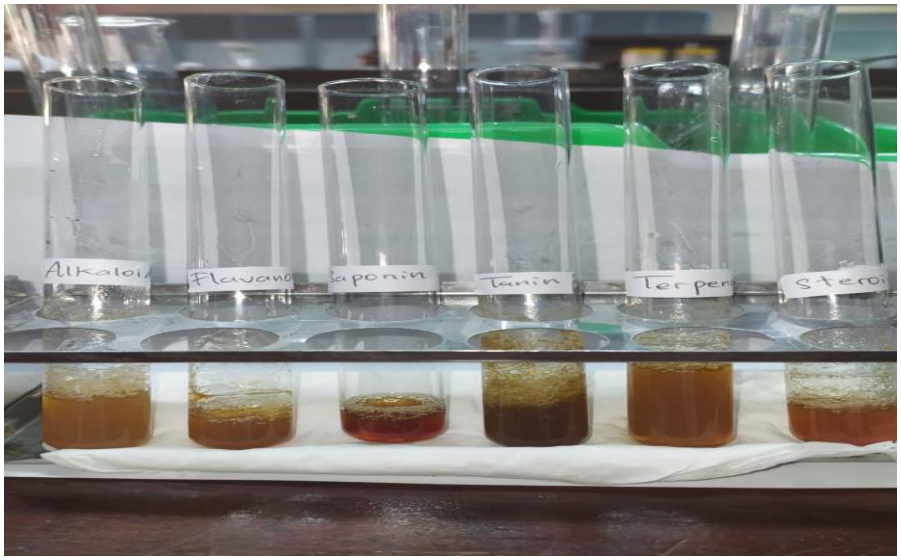

Optomasi sebelum dan setelah stirer



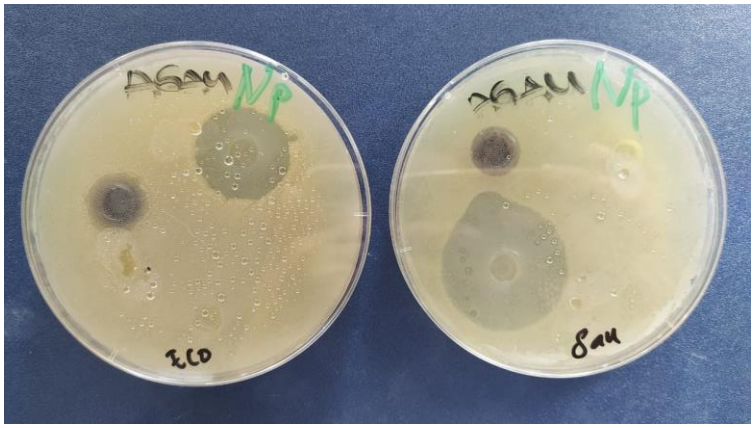

Hasil sintesis Nanopartikel bimetal Ag-Au


Sebelum dan sesudah sentifuge

Hasil *fresh drayer*



Hasil uji fitokimia



Hasil uji antibakteri