L A M P I R A N

Lampiran 1. Pembuatan dapar fosfat pH 7

NaH_2PO_4:

Kertas timbang	= 0,2690 g
Kertas timbang + NaH_2OP_4	= 1,0784 g
Kertas timbang + sisa	= 0,2697 g
Berat NaH_2OP_4 tertimbang	= 0,8087 g

Na_2HPO_4:

Kertas timbang	= 0,2766 g
Kertas timbang + Na_2HPO_4	= 2,1280 g
Kertas timbang + sisa	= 0,2772 g
Berat Na_2HPO_4 tertimbang	= 1,8508 mg

Aquadest ad 500 mL

Lampiran 2. Perhitungan Ammonium Sulfat

Tabel ammonium sulfat (gram) yang ditambahkan pada setiap liter enzim (Scopes, 1987)

		S2 (%)																
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
	0	27	55	84	113	144	176	208	242	277	314	351	390	430	472	516	561	608
	5		27	56	85	115	146	179	212	246	282	319	357	397	439	481	526	572
	10			28	57	86	117	149	182	216	251	287	325	364	405	447	491	537
	15				28	58	88	119	151	185	219	255	292	331	371	413	430	501
	20					29	59	89	121	154	188	223	260	298	337	378	421	465
	25						29	60	91	123	157	191	227	265	304	344	386	429
	30							30	61	92	126	160	195	232	270	309	351	393
S1	35								30	62	94	128	163	199	236	275	316	358
(%)	40									31	63	96	130	166	202	241	281	322
	45										31	64	97	132	169	206	245	286
	50											32	65	99	135	172	210	250
	55												33	66	101	138	175	215
	60													33	67	103	140	179
	65														34	69	105	143
	70															34	70	107
	75																35	72
	80																	36

Lampiran 3. Kurva kalibrasi

1. **Penimbangan BSA:**

   Kertas timbang = 0,2670 g

   Kertas timbang + BSA = 0,3178 g

   Kertas timbang + sisa = 0,2672 g

   Berat BSA tertimbang = 50,6 mg

2. **Larutan stok:**

   50,6 mg BSA dilarutkan dalam aquadest ad 50 ml sehingga diperoleh konsentrasi 1000 ppm

3. **Seri konsentrasi:**

   1) 20 ppm

      V1 x C1 = V2 x C2

      V1 x 1000 ppm = 10 ml x 20 ppm

      V1 = 0,2 ml

   2) 40 ppm

      V1 x C1 = V2 x C2

      V1 x 1000 ppm = 10 ml x 40 ppm

      V1 = 0,4 ml

   3) 60 ppm

      V1 x C1 = V2 x C2

      V1 x 1000 ppm = 10 ml x 60 ppm

      V1 = 0,6 ml

   4) 80 ppm

      V1 x C1 = V2 x C2

      V1 x 1000 ppm = 10 ml x 80 ppm

      V1 = 0,8 ml

   5) 100 ppm

      V1 x C1 = V2 x C2

      V1 x 1000 ppm = 10 ml x 100 ppm

      V1 = 1 ml

   6) 120 ppm

      V1 x C1 = V2 x C2

      V1 x 1000 ppm = 10 ml x 120 ppm

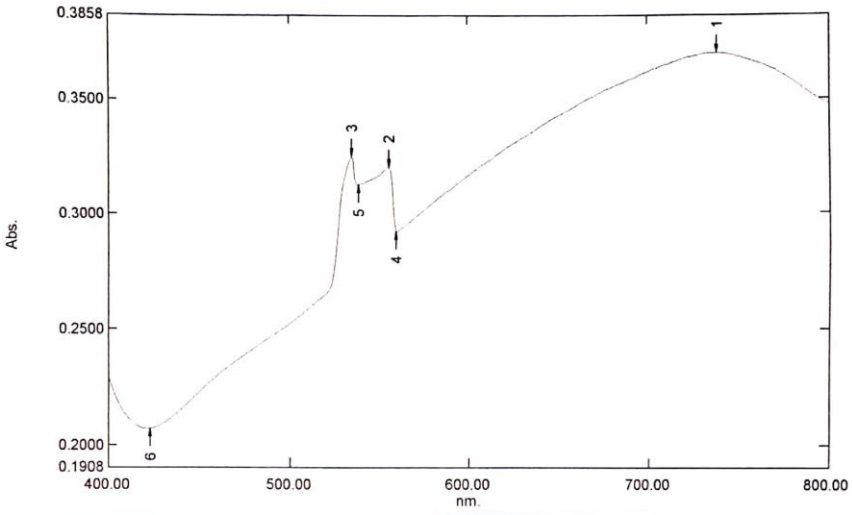
      V1 = 1,2 ml

4. Penetapan panjang gelombang maksimum

Spectrum Peak Pick Report

09/09/2020 10:58:48 AM

Data Set: File_200909_105630 - RawData



No.	P/V	Wavelength	Abs.	Description
1	↑	739.00	0.3696	
2	↑	556.00	0.3206	
3	↑	535.00	0.3250	
4	↓	560.00	0.2926	
5	↓	539.00	0.3130	
6	↓	423.00	0.2070	

[Measurement Properties]
Wavelength Range (nm.): 400.00 to 800.00
Scan Speed: Medium
Sampling Interval: 1.0
Auto Sampling Interval: Disabled
Scan Mode: Single

[Instrument Properties]
Instrument Type: UV-1800 Series
Measuring Mode: Absorbance
Slit Width: 1.0 nm
Light Source Change Wavelength: 340.0 nm
S/R Exchange: Normal

[Attachment Properties]
Attachment: None

[Operation]
Threshold: 0.0010000
Points: 4
InterPolate: Disabled
Average: Disabled

[Sample Preparation Properties]
Weight:
Volume:
Dilution:
Path Length:
Additional Information:

5. Penetapan *operating time* (OT)

Kinetics Data Print Report

09/09/2020 12:18:36 PM

Time (Minute)	RawData ...
1.000	0.346
2.000	0.346
3.000	0.346
4.000	0.347
5.000	0.347
6.000	0.345
7.000	0.344
8.000	0.345
9.000	0.344
10.000	0.344
11.000	0.344
12.000	0.344
13.000	0.344
14.000	0.344
15.000	0.344
16.000	0.344
17.000	0.344
18.000	0.344
19.000	0.344
20.000	0.344
21.000	0.344
22.000	0.344
23.000	0.344
24.000	0.343
25.000	0.343
26.000	0.343
27.000	0.343
28.000	0.343
29.000	0.343
30.000	0.343
31.000	0.343
32.000	0.342
33.000	0.342
34.000	0.342
35.000	0.342
36.000	0.342
37.000	0.342
38.000	0.342
39.000	0.342
40.000	0.341
41.000	0.341
42.000	0.341
43.000	0.341
44.000	0.341
45.000	0.340

6. Kurva kalibrasi

Konsentrasi (ppm)	Absorbansi
20	0,227
40	0,365
60	0,465
80	0,581
100	0,663
120	0,778

A = 0,1367

B = 0,1076x

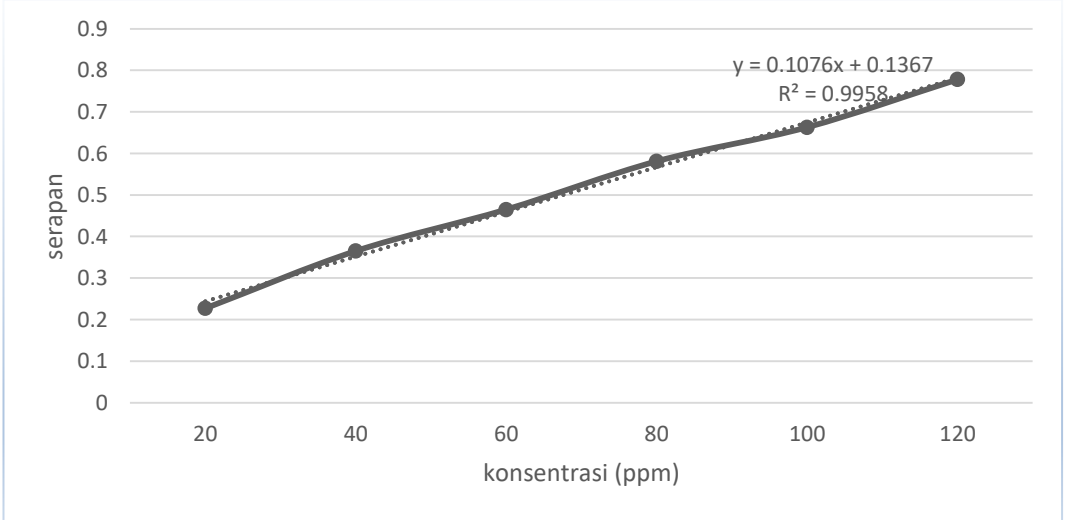
R = 0,9958

y=0,1076x + 0,1367

Keterangan :

x = konsentrasi (ppm)

y = serapan



Lampiran 4. Pengukuran kadar protein dengan metode Lowry

1. **Pembuatan reagen Lowry**

   Lowry A: 2 g Na_2CO_3 dilarutkan dalam 100 ml NaOH 0,1N

   Lowry B: 5 ml $CuSO_4$. $5H_2O$ 1% ditambahkan dalam 5 ml larutan NaK tartrat 2%

   Lowry C: 2 ml larutan Lowry B ditambahkan dengan 100 ml larutan Lowry A

   Lowry D: folin phenol ciocalteau diencerkan dengan aquadest 1:1

2. **Penimbangan bahan**

   Na_2CO_3:

   Kertas kosong = 0,2725 g

   Kertas + Na_2CO_3 = 2,2792 g

   Kertas + sisa = 0,2727 g

   Berat tertimbang = 2,0065 g

   NaK tartrat:

   Kertas kosong = 0,2627 g

   Kertas + NaK tartrat = 0,3650 g

   Kertas + sisa = 0,2635 g

   Berat tertimbang = 0,1015 g

   $CuSO_4$:

   Kertas kosong = 0,2634 g

   Kertas + $CuSO_4$ = 0,3250 g

   Kertas + sisa = 0,2640 g

   Berat tertimbang = 0,061 g

3. **Pengukuran absorbansi sampel ekstrak kasar enzim SOD buah tomat**

Sampel	Abs 1	Abs 2	Abs 3	Rata-rata
Ekstrak kasar enzim SOD buah tomat	0,748	0,747	0,746	0,747

4. Perhitungan kadar protein total ekstak kasar enzim SOD buah tomat

y= 0,1076x + 0,1367

1) 0,748= 0,1076x + 0,1367

$x = \frac{0,748-0,1367}{0,1076}$

$x = \frac{0,6113}{0,1076}$

x = 5,681 ppm

kadar 1 $= \frac{5,681\ mg}{1000\ ml} \times \frac{6,5\ ml}{1\ ml}$

= 0,03693 mg/mL

2) 0,747= 0,1076x + 0,1367

$x = \frac{0,747-0,1367}{0,1076}$

$x = \frac{0,6103}{0,1076}$

x = 5,672 ppm

kadar 1 $= \frac{5,672\ mg}{1000\ ml} \times \frac{6,5\ ml}{1\ ml}$

= 0,03687 mg/mL

3) 0,746= 0,1076x + 0,1367

$x = \frac{0,746-0,1367}{0,1076}$

$x = \frac{0,6093}{0,1076}$

x = 5,663 ppm

kadar 1 $= \frac{5,663\ mg}{1000\ ml} \times \frac{6,5\ ml}{1\ ml}$

= 0,03681 mg/Ml

Lampiran 5. Pengujian aktivitas SOD menggunakan metode WST-1

UNIVERSITAS GADJAH MADA
PUSAT STUDI PANGAN DAN GIZI
Alamat : Gedung PAU-UGM, Jalan Teknika Utara, Barek, Yogyakarta 55281, Phone/Fax. (0274) 589242
http://cfns.ugm.ac.id, E-mail : cfns@ugm.ac.id

LAPORAN HASIL UJI

(Analysys Certificate)
No.PSPG/182/X/2020

Nomor Pengujian *(Analysis Report Number)*	: PS/352/X/2020
Nama Pelanggan *(Name of client)*	: **Meinanda Dyah Prameswari**
Alamat dan Telpon Pelanggan *(Address and phon of client)*	:
Nama dan Bentuk Sampel	: Padatan
Uji yang diminta *(Analysys requested)*	: SOD
Tanggal Penerimaan sampel	: 29 September 2020
Tanggal diserahkan ke lab.	: 29 September 2020
Metode Uji *(Analysis Method)*	:
Hasil Uji *(Analysis Result)*	:

No.	Kode sampel	Hasil Analisis
		SOD %
1.	Ekstrak Kasar Enzim SOD Tomat	89,06 89,38

Yogyakarta, 20 Oktober 2020
Publik Servis PSPG – UGM

Sriyono
NIP. 19630226200711001

1. Absorbansi blanko

Blanko	Absorbansi
1	0,173
2	0,037
3	0,109

2. Absorbansi sampel

Sampel	Abs 1	Abs 2	Rata-rata
Ekstrak kasar enzim SOD buah tomat	0,044	0,047	0,0455

3. Perhitungan %inhibisi

%inhibisi 1 $= \frac{(blank1 - blank\ 3) - (sampel - blank2)}{(blank1 - blank3)}$ x 100%

$= \frac{(0{,}173 - 0{,}109) - (0{,}044 - 0{,}037)}{(0{,}173 - 0{,}109)}$ x 100%

= 89,06%

%inhibisi 2 $= \frac{(blank1 - blank\ 3) - (sampel - blank2)}{(blank1 - blank3)}$ x 100%

$= \frac{(0{,}173 - 0{,}109) - (0{,}047 - 0{,}037)}{(0{,}173 - 0{,}109)}$ x 100

= 84,38%

Lampiran 6. Efisiensi penjerapan

Formula	Absorbansi	Kadar (ppm)	Kadar (mg/mL)	%EP	Rata-rata (%)
1	0,342	1,9079	0,0124	66,39	65,58
	0,348	1,9637	0,0128	65,31	
	0,350	1,9823	0,0129	65,04	
2	0,247	1,0251	0,0066	81,95	79,89
	0,260	1,1459	0,0081	78,05	
	0,261	1,1552	0,0075	79,69	
3	0,301	1,5269	0,0099	73,17	72,72
	0,305	1,5641	0,0101	72,63	
	0,306	1,5734	0,0102	72,36	

Contoh perhitungan kadar:

y= 0,1076x + 0,1367

0,247= 0,1076x + 0,1367

$x = \frac{0,247-0,1367}{0,1076}$

x = 1,0251 ppm

kadar 1 $= \frac{1,0251\ mg}{1000\ ml} \times \frac{6,5\ ml}{1\ ml}$

= 0,00666 mg/mL

%Efisiensi Penjerapan $= \frac{0,0369-0,00666}{0,0369} \times 100\%$

= 81,95%

Lampiran 7. Ukuran Partikel dan Indeks Polidispersitas

Percobaan 1.

Size Distribution Report by Number

v2.2

Malvern

Sample Details

Sample Name:	Kitosan -NaTPP 1
SOP Name:	mansettings.nano
General Notes:	

File Name:	Meinanda 2020.dts	**Dispersant Name:**	Asam Asetat
Record Number:	1	**Dispersant RI:**	1,370
Material RI:	1,30	**Viscosity (cP):**	1,2200
Material Absorbtion:	0,100	**Measurement Date and Time:**	22 Oktober 2020 14:45:30

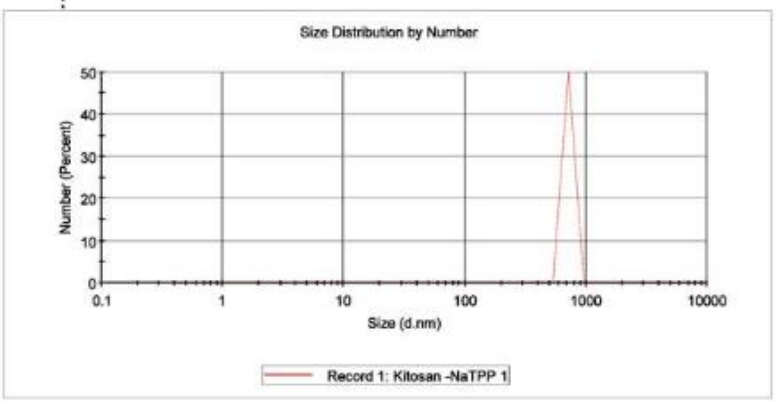
System

Temperature (°C):	20,0	**Duration Used (s):**	70
Count Rate (kcps):	138,2	**Measurement Position (mm):**	4,65
Cell Description:	Disposable sizing cuvette	**Attenuator:**	7

Results

			Size (d.n...	% Number:	St Dev (d.n...
Z-Average (d.nm):	742,5	**Peak 1:**	716,2	100,0	74,29
PdI:	0,152	**Peak 2:**	0,000	0,0	0,000
Intercept:	1,16	**Peak 3:**	0,000	0,0	0,000

Result quality : Refer to quality report



Percobaan 2.

Size Distribution Report by Number

v2.2

Malvern

Sample Details

Sample Name:	Kitosan -NaTPP 2
SOP Name:	mansettings.nano
General Notes:	

File Name:	Meinanda 2020.dts	**Dispersant Name:**	Asam Asetat
Record Number:	2	**Dispersant RI:**	1,370
Material RI:	1,30	**Viscosity (cP):**	1,2200
Material Absorbtion:	0,100	**Measurement Date and Time:**	22 Oktober 2020 14:48:04

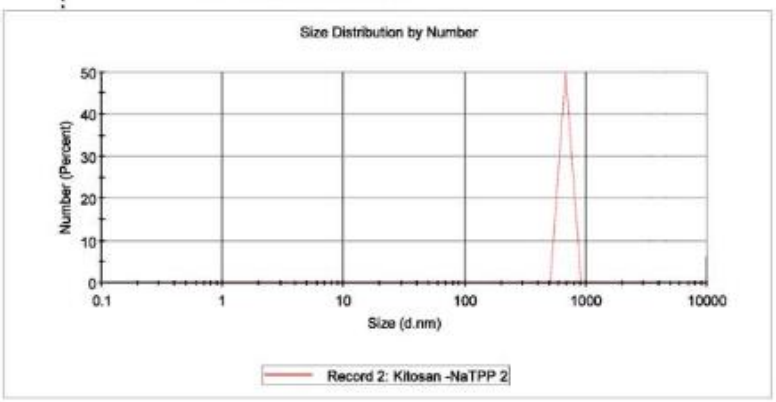
System

Temperature (°C):	20,0	**Duration Used (s):**	70
Count Rate (kcps):	138,5	**Measurement Position (mm):**	4,65
Cell Description:	Disposable sizing cuvette	**Attenuator:**	7

Results

			Size (d.n...	% Number:	St Dev (d.n...
Z-Average (d.nm):	773,5	**Peak 1:**	559,0	100,0	579,8
PdI:	0,265	**Peak 2:**	0,000	0,0	0,000
Intercept:	1,01	**Peak 3:**	0,000	0,0	0,000

Result quality : **Refer to quality report**



Percobaan 3.

Size Distribution Report by Number

v2.2

Malvern

Sample Details

Sample Name:	Kitosan -NaTPP 3
SOP Name:	mansettings.nano
General Notes:	

File Name:	Meinanda 2020.dts	**Dispersant Name:**	Asam Asetat
Record Number:	3	**Dispersant RI:**	1,370
Material RI:	1,30	**Viscosity (cP):**	1,2200
Material Absorbtion:	0,100	**Measurement Date and Time:**	22 Oktober 2020 14:50:38

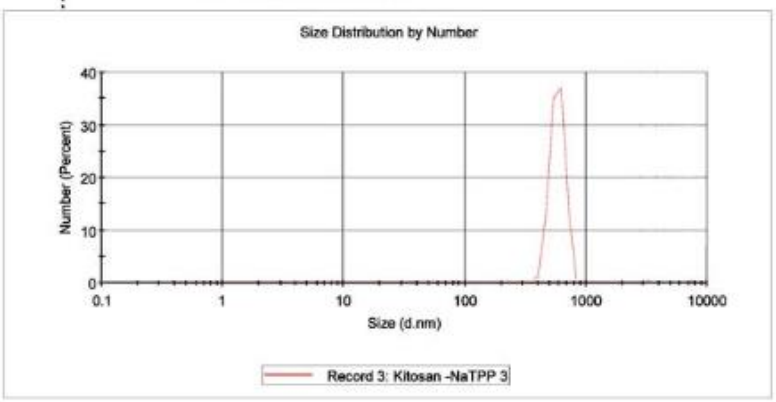
System

Temperature (°C):	20,0	**Duration Used (s):**	70
Count Rate (kcps):	89,7	**Measurement Position (mm):**	4,65
Cell Description:	Disposable sizing cuvette	**Attenuator:**	7

Results

			Size (d.n...	% Number:	St Dev (d.n...
Z-Average (d.nm):	619,5	**Peak 1:**	519,9	100,0	701,8
PdI:	0,451	**Peak 2:**	0,000	0,0	0,000
Intercept:	0,960	**Peak 3:**	0,000	0,0	0,000

Result quality : **Refer to quality report**



Lampiran 8. Zeta Potensial

Percobaan 1.

Zeta Potential Report

v2.3

Malvern

Sample Details

Sample Name: Kitosan -NaTPP 1
SOP Name: mansettings.nano
General Notes:

File Name: Meinanda 2020.dts
Record Number: 4
Date and Time: 22 Oktober 2020 14:53:25
Dispersant Name: Asam Asetat
Dispersant RI: 1,370
Viscosity (cP): 1,2200
Dispersant Dielectric Constant: 6,20

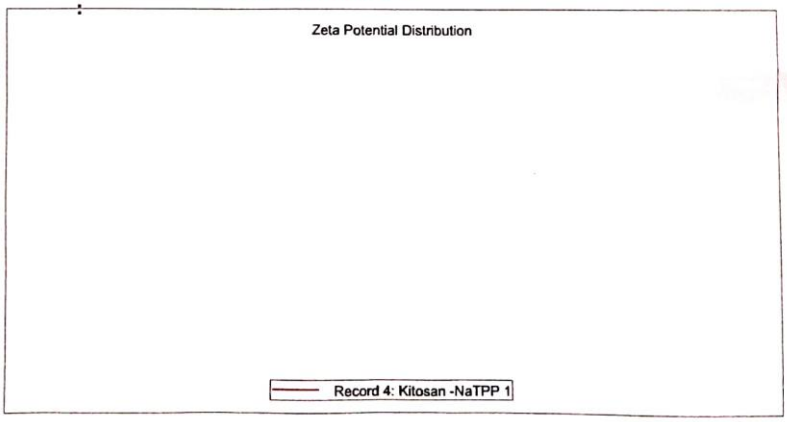
System

Temperature (°C): 25,0
Count Rate (kcps): 206,1
Cell Description: Zeta dip cell
Zeta Runs: 100
Measurement Position (mm): 4,50
Attenuator: 8

Results

			Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	25,0	**Peak 1:**	0,00	0,0	0,00
Zeta Deviation (mV):	0,00	**Peak 2:**	0,00	0,0	0,00
Conductivity (mS/cm):	5,96	**Peak 3:**	0,00	0,0	0,00

Result quality : See result quality report



Percobaan 2.

Zeta Potential Report

v2.3

Malvern

Sample Details

Sample Name:	Kitosan -NaTPP 2
SOP Name:	mansettings.nano
General Notes:	

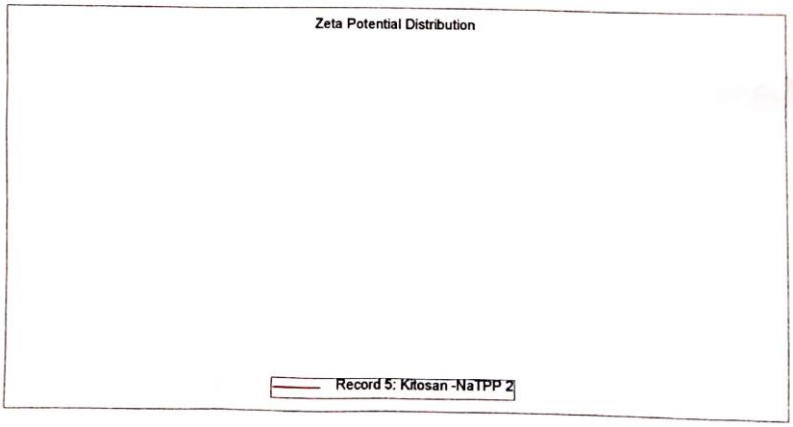
File Name:	Meinanda 2020.dts	**Dispersant Name:**	Asam Asetat
Record Number:	5	**Dispersant RI:**	1,370
Date and Time:	22 Oktober 2020 14:58:25	**Viscosity (cP):**	1,2200
		Dispersant Dielectric Constant:	6,20

System

Temperature (°C):	25,0	**Zeta Runs:**	100
Count Rate (kcps):	237,8	**Measurement Position (mm):**	4,50
Cell Description:	Zeta dip cell	**Attenuator:**	8

Results

			Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	2,01	**Peak 1:**	0,00	0,0	0,00
Zeta Deviation (mV):	0,00	**Peak 2:**	0,00	0,0	0,00
Conductivity (mS/cm):	6,73	**Peak 3:**	0,00	0,0	0,00
Result quality :	See result quality report				



Percobaan 3.

Zeta Potential Report

v2.3

Malvern

Sample Details

Sample Name: Kitosan -NaTPP 3
SOP Name: mansettings.nano
General Notes:

File Name: Meinanda 2020.dts
Record Number: 6
Date and Time: 22 Oktober 2020 15:01:06
Dispersant Name: Asam Asetat
Dispersant RI: 1,370
Viscosity (cP): 1,2200
Dispersant Dielectric Constant: 6,20

System

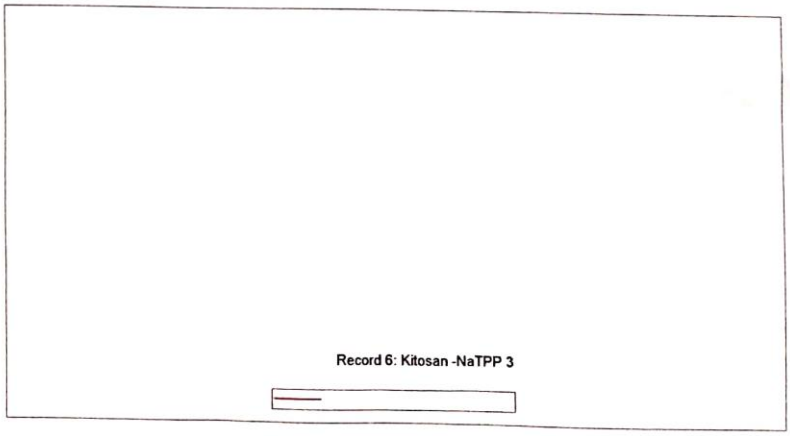
Temperature (°C): 25,0
Count Rate (kcps): 740,5
Cell Description: Zeta dip cell
Zeta Runs: 100
Measurement Position (mm): 4,50
Attenuator: 8

Results

		Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): 17,7	**Peak 1:**	0,00	0,0	0,00
Zeta Deviation (mV): 0,00	**Peak 2:**	0,00	0,0	0,00
Conductivity (mS/cm): 6,86	**Peak 3:**	0,00	0,0	0,00

Result quality : See result quality report

Zeta Potential Distribution



Lampiran 9. Hasil Enkapsulasi Ekstrak Kasar Enzim SOD

Formula 1.

Formula 2.

Formula 3.

Lampiran 10. Alat dan Bahan

pH meter

Blender

Sentrifus

Neraca analitik

Particle Size Analuzer

Lampiran 11. Hasil Determinasi Tanaman

UNIVERSITAS SETIA BUDI

UPT-LABORATORIUM

Jl. Letjen Sutoyo, Mojosongo-Solo 57127 Telp. 0271-852518, Fax. 0271-853275

Nomor : 83/DET/UPT-LAB/26.09.2020
Hal : Hasil determinasi tumbuhan
Lamp. : -

Nama Pemesan : Meinanda Dyah Prameswari
NIM : 23175215A
Alamat : Program Studi S1 Farmasi, Universitas Setia Budi, Surakarta
Nama sampel : Tomat/ *Solanum lycopersicum* L.

HASIL DETERMINASI TUMBUHAN

Klasifikasi

Kingdom : Plantae
Super Divisi : Spermatophyta
Divisi : Magnoliophyta
Kelas : Magnoliopsida
Ordo : Solanales
Famili : Solanaceae
Genus : Solanum
Species : *Solanum lycopersicum* L

Hasil Determinasi menurut Steenis, C.G.G.J.V, Bloembergen, H, Eyma, P.J. 1992 : 1b – 2b – 3b – 4b – 6b – 7b – 9b – 10b – 11b – 12b – 13b – 14a – 15b. golongan 9. 197b – 208b – 219a. familia 111. Solanaceae. 1b – 3b – 5b – 6a. 6. Solanum.1a. *Solanum lycopersicum* L. Sinonim *Lycopersicum esculentum* Mill.

Deskripsi:

Habitus : Herba pendek, tegak, naik pelan-pelan atau bersandar pada tanaman lain, sering bercabang banyak dan berbau kuat, tidak berduri atau tidak berduri tempel, tinggi 0,5 – 2,5 m. Bagian-bagian yang hijau berambut banyak, diantara rambut biasa juga rambut kelenjar.

Akar : Akar tunggang.

Batang : Batang bulat, menebal pada buku-buku, kasar dan rapuh sekali.

Daun : Daun menyirip rangkap, bulat telur memanjang, ujung runcing, yang lebih besar bergerigi, berlekuk menyirip kasar.

Bunga : Bunga terkumpul menjadi 2 baris cabang berseling yang bertangkai, sering bercelah 2 – 3, yang di atas jantan, karena perkembangan tidak sempurna dari putik; cabang berseling, yang muda ujungnya menggulung. Bunga berbilangan 5, kelopak hijau, mahkota kuning belerang, benangsari kuning. Bakal buah bulat memanjang, bentuk bola atau jorong melintang, gundul.

Buah : Buah buni, bersandar pada kelopak yang membesar, sangat berubah-ubah dalam bentuk, besar dan warnanya.

Biji : Biji bentuk pipih, kuning coklat, banyak.

Surakarta, 26 September 2020

Kepala UPT-LAB
Universitas Setia Budi

Asik Gunawan, Amdk

Penanggung jawab
Determinasi Tumbuhan

Dra. Dewi Sulistyawati. M.Sc.