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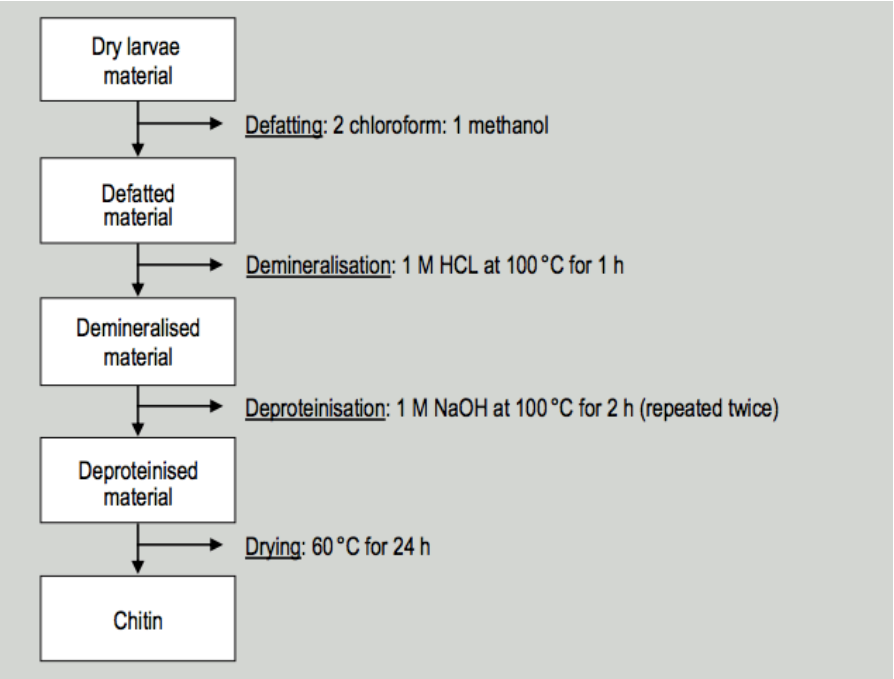
LAMPIRAN

Lampiran 1 . Metode pengukuran kitin pada maggot

Menurut Woods *et al.* (2020) metode cepat untuk mengukur kandungan kitin pada maggot menggunakan analisis gravimetri sederhana setelah perlakuan kimia dan pelarutan kandungan lainnya seperti lemak, protein dan mineral. *Larva hermetia illucens* umur 16 hari digunakan sebagai bahan sampel dengan perlakuan blansing selama 3 menit pada suhu 95 ^{O}C dan dikeringanginkan kemudian dikeringkan pada suhu 60^{O}C selama 24 jam dan diaduk hingga homogen kemudian disimpan pada plastic vakum pada suhu -40^{O}C. Metode analisis terdiri atas perlakuan penghilangan lemak dengan cara ekstraksi pelarut cepat (2:1 kloroform : metanol), dilanjutkan dengan perlakuan dengan 1 M HCL (demineralisasi) dan 1 M NaOH (deproteinisasi). Berikut merupakan alur uji kitinase pada maggot menggunakan metode gravimetric sederhana



Rumus perhitungan kandungan kitin pada maggot (Woods *et al.,* 2020)

a. Kitin % (dihilangkan lemaknya) = $\frac{A}{B}\ x\ 100$

$$= \frac{berat\ residu\ yang\ tersisa\ setelah\ demineralisasi\ \&\ deproteinisasi}{berat\ sampel\ sebelum\ demineralisasi\ \&\ deproteinisasi}$$

b. Kitin (%) = $\frac{C.(100-D)}{100}$

$$= \frac{nilai\ yang\ diperoleh\ dari\ kitin\ yang\ dihilangkan\ lemaknya\ .\ (100-\%\ lemak)}{100}$$

Lampiran 2. Rata-rata kitin pada tepung maggot sebelum fermentasi

Perlakuan	Kitin (%)
Tepung maggot sebelum fermentasi	20,312
	20,642
	20,584
Rata-rata	20,513

Perhitungan kitin pada tepung maggot sebelum fermentasi

1. Ulangan Pertama
Diketahui :
- Berat kertas saring Whatman = 0,8077 gram
- Berat kitin maggot + kertas saring Whatman setelah dikeringkan = 1,9287 gram
- Berat kitin maggot = 1,9287 – 0,8077 gram = 1,121 gram (A)
- Berat sampel sebelum demineralisasi & deproteinisasi = 5 gram (B)
- Kandungan lemak kasar tepung maggot sebelum fermentasi = 9,40% (D)

Perhitungan Kitin :

a. Kitin % (dihilangkan lemaknya) = $\frac{A}{B}$ x 100

$$= \frac{berat\ residu\ yang\ tersisa\ setelah\ demineralisasi\ \&\ deproteinisasi}{berat\ sampel\ sebelum\ demineralisasi\ \&\ deproteinisasi} X\ 100$$

$$= \frac{1{,}121}{5}\ X\ 100$$

$$= 22{,}42\ \%\quad (C)$$

b. Kitin % $= \frac{C.(100-D)}{100}$

$$= \frac{nilai\ yang\ diperoleh\ dari\ kitin\ yang\ dihilangkan\ lemaknya\ x\ (100-\%\ lemak)}{100}$$

$$= \frac{22{,}42\ x\ (100-9{,}40)}{100}$$

$$= \frac{22{,}42\ x\ 90{,}6}{100}$$

= 20,312 %

2. Ulangan Kedua
Diketahui :
- Berat kertas saring Whatman = 0,7942 gram
- Berat kitin maggot + kertas saring Whatman setelah dikeringkan = 1,9334 gram
- Berat kitin maggot = 1,9334 – 0,7942 gram = 1,1392 gram (A)
- Berat sampel sebelum demineralisasi & deproteinisasi = 5 gram (B)
- Kandungan lemak kasar tepung maggot sebelum fermentasi = 9,40% (D)

Perhitungan kitin :

a. Kitin % (dihilangkan lemaknya) = $\frac{A}{B}$ x 100

$$= \frac{berat\ residu\ yang\ tersisa\ setelah\ demineralisasi\ \&\ deproteinisasi}{berat\ sampel\ sebelum\ demineralisasi\ \&\ deproteinisasi} X\ 100$$

$$= \frac{1{,}1392}{5}\ X\ 100$$

$$= 22{,}784\%$$

b. Kitin % $= \frac{C.(100-D)}{100}$

$$= \frac{nilai\ yang\ diperoleh\ dari\ kitin\ yang\ dihilangkan\ lemaknya\ x\ (100-\%\ lemak)}{100}$$

$$= \frac{22{,}784\ x\ (100-9{,}40)}{100}$$

$$= \frac{22{,}784\ x\ 90{,}6}{100}$$

= 20,642 %

3. Ulangan Ketiga
Diketahui :

- Berat kertas saring Whatman = 0,7968 gram
- Berat kitin maggot + kertas saring Whatman setelah dikeringkan= 1,9453 gram
- Berat kitin maggot = 1,9328 – 0,7968 gram = 1,136 gram (A)
- Berat sampel sebelum demineralisasi & deproteinisasi = 5 gram (B)
- Kandungan lemak kasar tepung maggot sebelum fermentasi = 9,40% (D)

Perhitungan Kitin :

a. Kitin % (dihilangkan lemaknya) $= \frac{A}{B}$ x 100

$= \frac{berat\ residu\ yang\ tersisa\ setelah\ demineralisasi\ \&\ deproteinisasi}{berat\ sampel\ sebelum\ demineralisasi\ \&\ deproteinisasi} X\ 100$

$= \frac{1,136}{5}\ X\ 100$

$= 22,72\%$

b. Kitin % $= \frac{C.(100-D)}{100}$

$= \frac{nilai\ yang\ diperoleh\ dari\ kitin\ yang\ dihilangkan\ lemaknya\ x\ (100-\%\ lemak)}{100}$

$= \frac{22,72\ x\ (100-9,40)}{100}$

$= \frac{22,72\ x\ 90,6}{100}$

= 20,584 %

Lampiran 3. Rata-rata kitin pada tepung maggot setelah fermentasi

Perlakuan	Kitin (%)
Tepung maggot setelah fermentasi	18,185
	18,227
	18,309
Rata-rata	18,240

Perhitungan kitin pada tepung maggot setelah fermentasi

1. Ulangan Pertama
Diketahui :

- Berat kertas saring Whatman = 0,8014 gram
- Berat kitin maggot + kertas saring Whatman setelah dikeringkan = 2,1068 gram
- Berat kitin maggot = 2,1068 – 0,8017 gram = 1,3051 gram (A)
- Berat sampel sebelum demineralisasi & deproteinisasi = 5 gram (B)
- Kandungan lemak kasar tepung maggot setelah fermentasi = 30,33% (D)

Perhitungan kitin :

a. Kitin % (dihilangkan lemaknya) = $\frac{A}{B}$ x 100

$= \frac{berat\ residu\ yang\ tersisa\ setelah\ demineralisasi\ \&\ deproteinisasi}{berat\ sampel\ sebelum\ demineralisasi\ \&\ deproteinisasi} X\ 100$

$= \frac{1,3051}{5}\ X\ 100$

= 26,102 %

b. Kitin % $= \frac{C.(100-D)}{100}$

$= \frac{nilai\ yang\ diperoleh\ dari\ kitin\ yang\ dihilangkan\ lemaknya\ x\ (100-\%\ lemak)}{100}$

$= \frac{26,102x\ (100-30,33)}{100}$

$= \frac{26,102\ x\ 69,67}{100}$

= 18,185 %

2. Ulangan Kedua
Diketahui :

- Berat kertas saring Whatman = 0,7928 gram
- Berat kitin maggot + kertas saring Whatman setelah dikeringkan = 2,1009 gram
- Berat kitin maggot = 2,1009 – 0,7928 gram = 1,3081 gram (A)
- Berat sampel sebelum demineralisasi & deproteinisasi = 5 gram (B)
- Kandungan lemak kasar tepung maggot setelah fermentasi = 30,33% (D)

Perhitungan kitin

a. Kitin % (dihilangkan lemaknya) $= \frac{A}{B}\ x\ 100$

$= \frac{berat\ residu\ yang\ tersisa\ setelah\ demineralisasi\ \&\ deproteinisasi}{berat\ sampel\ sebelum\ demineralisasi\ \&\ deproteinisasi} X\ 100$

$= \frac{1{,}3081}{5}\ X\ 100$

$= 26{,}162\%$

b. Kitin % $= \frac{C.(100-D)}{100}$

$= \frac{nilai\ yang\ diperoleh\ dari\ kitin\ yang\ dihilangkan\ lemaknya\ x\ (100-\%\ lemak)}{100}$

$= \frac{26{,}162\ x\ (100-30{,}33)}{100}$

$= \frac{26{,}162\ x\ 69{,}67}{100}$

= 18,227 %

3. Ulangan Ketiga
Diketahui :

- Berat kertas saring Whatman = 0,7920 gram
- Berat kitin maggot + kertas saring Whatman setelah dikeringkan = 2,1006 gram
- Berat kitin maggot = 2,1006 – 0,7920 gram = 1,314 gram
- Berat sampel sebelum demineralisasi & deproteinisasi = 5 gram (B)
- Kandungan lemak kasar tepung maggot setelah fermentasi = 30,33% (D)

Perhitungan Kitin

a. Kitin % (dihilangkan lemaknya) $= \frac{A}{B}$ x 100

$= \frac{berat\ residu\ yang\ tersisa\ setelah\ demineralisasi\ \&\ deproteinisasi}{berat\ sampel\ sebelum\ demineralisasi\ \&\ deproteinisasi} X\ 100$

$= \frac{1{,}314}{5}\ X\ 100$

$= 26{,}28\%$

b. Kitin % $= \frac{C.(100-D)}{100}$

$= \frac{nilai\ yang\ diperoleh\ dari\ kitin\ yang\ dihilangkan\ lemaknya\ x\ (100-\%\ lemak)}{100}$

$= \frac{26{,}28\ x\ (100-30{,}33)}{100}$

$= \frac{26{,}28\ x\ 69{,}67}{100}$

= 18,309 %

Lampiran 4. Data kecepatan pecah pakan uji selama penelitian

Kode	Ulangan	Kecepatan pecah (menit)
A	1	40
	2	35
	3	37
Rata-rata		37.33±2,52
B	1	45
	2	39
	3	38
Rata-rata		40.67±1,53
C	1	45
	2	37
	3	38
Rata-rata		40±2,00
D	1	45
	2	44
	3	46
Rata-rata		45±1,00
E	1	45
	2	40
	3	42
Rata-rata		42.33±2,51

Lampiran 5. Hasil analisis ragam kecepatan pecah pakan uji selama penelitian

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	96.933	4	24.233	6.731	.007
Within Groups	36.000	10	3.600		
Total	132.933	14			

Lampiran 6. Uji lanjut W-Tuckey kecepatan pecah pakan uji selama penelitian

(I) Dosis tepung maggot terfermentasi (%)	(J) Dosis tepung maggot terfermentasi (%)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A (0)	25	-3.33333	1.54919	.272	-8.4319	1.7652
	50	-2.66667	1.54919	.464	-7.7652	2.4319
	75	-7.66667*	1.54919	.004	-12.7652	-2.5681
	100	-5.00000	1.54919	.055	-10.0985	.0985
B (25)	0	3.33333	1.54919	.272	-1.7652	8.4319
	50	.66667	1.54919	.992	-4.4319	5.7652
	75	-4.33333	1.54919	.107	-9.4319	.7652
	100	-1.66667	1.54919	.815	-6.7652	3.4319
C (50)	0	2.66667	1.54919	.464	-2.4319	7.7652
	25	-.66667	1.54919	.992	-5.7652	4.4319
	75	-5.00000	1.54919	.055	-10.0985	.0985
	100	-2.33333	1.54919	.581	-7.4319	2.7652
D (75)	0	7.66667*	1.54919	.004	2.5681	12.7652
	25	4.33333	1.54919	.107	-.7652	9.4319
	50	5.00000	1.54919	.055	-.0985	10.0985
	100	2.66667	1.54919	.464	-2.4319	7.7652
E (100)	0	5.00000	1.54919	.055	-.0985	10.0985
	25	1.66667	1.54919	.815	-3.4319	6.7652
	50	2.33333	1.54919	.581	-2.7652	7.4319
	75	-2.66667	1.54919	.464	-7.7652	2.4319

*. The mean difference is significant at the 0.05 level.

Perlakuan	N	Subset for alpha = 0.05	
		1	2
A	3	37.3333	
C	3	40.0000	40.0000
B	3	40.6667	40.6667
D	3	42.3333	42.3333
E	3		45.0000
Sig.		.055	.055

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 7. Data dispersi padatan pakan uji selama penelitian

Kode	Ulangan	Dispersi padatan (%)
A	1	51.57
	2	45.16
	3	60.45
Rata-rata		52.39±2,46
B	1	47.24
	2	21.59
	3	31.58
Rata-rata		33.47±1,83
C	1	31.33
	2	30.89
	3	38.95
Rata-rata		33.72±4,53
D	1	27.32
	2	41.13
	3	35.50
Rata-rata		34.65±2,04
E	1	44.79
	2	24.79
	3	31.32
Rata-rata		33.64±2,24

Lampiran 8. Hasil analisis ragam dispersi padatan pakan uji selama penelitian

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	826.085	4	206.521	26.399	.000
Within Groups	78.231	10	7.823		
Total	904.316	14			

Lampiran 9. Uji lanjut W-Tuckey dispersi padatan pakan uji selama penelitian

(I) Dosis tepung maggot terfermentasi (%)	(J) Dosis tepung maggot terfermentasi (%)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A (0)	25	18.92333*	2.28373	.000	11.4074	26.4393
	50	18.67000*	2.28373	.000	11.1541	26.1859
	75	17.74333*	2.28373	.000	10.2274	25.2593
	100	18.76000*	2.28373	.000	11.2441	26.2759
B (25)	0	-18.92333*	2.28373	.000	-26.4393	-11.4074
	50	-.25333	2.28373	1.000	-7.7693	7.2626
	75	-1.18000	2.28373	.984	-8.6959	6.3359
	100	-.16333	2.28373	1.000	-7.6793	7.3526
C (50)	0	-18.67000*	2.28373	.000	-26.1859	-11.1541
	25	.25333	2.28373	1.000	-7.2626	7.7693
	75	-.92667	2.28373	.993	-8.4426	6.5893
	100	.09000	2.28373	1.000	-7.4259	7.6059
D (75)	0	-17.74333*	2.28373	.000	-25.2593	-10.2274
	25	1.18000	2.28373	.984	-6.3359	8.6959
	50	.92667	2.28373	.993	-6.5893	8.4426
	100	1.01667	2.28373	.991	-6.4993	8.5326
E (100)	0	-18.76000*	2.28373	.000	-26.2759	-11.2441
	25	.16333	2.28373	1.000	-7.3526	7.6793
	50	-.09000	2.28373	1.000	-7.6059	7.4259
	75	-1.01667	2.28373	.991	-8.5326	6.4993

*. The mean difference is significant at the 0.05 level.

Perlakuan	N	Subset for alpha = 0.05	
		1	2
B	3	33.4700	
E	3	33.6333	
C	3	33.7233	
D	3	34.6500	
A	3		52.3933
Sig.		.984	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 10. Data tingkat kekerasan pakan uji selama penelitian

Kode	Ulangan	Tingkat kekerasan (%)
A	1	98.40
	2	98.00
	3	97.60
Rata-rata		98.00±0,31
B	1	99.40
	2	98.60
	3	97.00
Rata-rata		98.33±0,87
C	1	97.40
	2	96.00
	3	97.20
Rata-rata		96.87±0,76
D	1	97.20
	2	95.40
	3	97.80
Rata-rata		96.80±0,40
E	1	94.20
	2	97.40
	3	96.40
Rata-rata		96.00±0,53

Lampiran 11. Hasil analisis ragam kekerasan pakan uji selama penelitian

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.907	4	2.727	7.304	.005
Within Groups	3.733	10	.373		
Total	14.640	14			

Lampiran 12. Uji lanjut W-Tuckey kekerasan pakan uji selama penelitian

(I) Dosis tepung maggot terfermentasi (%)	(J) Dosis tepung maggot terfermentasi (%)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A (0)	25	.33333	.49889	.959	-1.3085	1.9752
	50	1.46667	.49889	.086	-.1752	3.1085
	75	1.53333	.49889	.070	-.1085	3.1752
	100	2.33333*	.49889	.006	.6915	3.9752
B (25)	0	-.33333	.49889	.959	-1.9752	1.3085
	50	1.13333	.49889	.231	-.5085	2.7752
	75	1.20000	.49889	.191	-.4419	2.8419
	100	2.00000*	.49889	.016	.3581	3.6419
C (50)	0	-1.46667	.49889	.086	-3.1085	.1752
	25	-1.13333	.49889	.231	-2.7752	.5085
	75	.06667	.49889	1.000	-1.5752	1.7085
	100	.86667	.49889	.456	-.7752	2.5085
D (75)	0	-1.53333	.49889	.070	-3.1752	.1085
	25	-1.20000	.49889	.191	-2.8419	.4419
	50	-.06667	.49889	1.000	-1.7085	1.5752
	100	.80000	.49889	.527	-.8419	2.4419
E (100)	0	-2.33333*	.49889	.006	-3.9752	-.6915
	25	-2.00000*	.49889	.016	-3.6419	-.3581
	50	-.86667	.49889	.456	-2.5085	.7752
	75	-.80000	.49889	.527	-2.4419	.8419

*. The mean difference is significant at the 0.05 level.

Perlakuan	N	Subset for alpha = 0.05	
		1	2
E	3	96.0000	
D	3	96.8000	96.8000
C	3	96.8667	96.8667
B	3		98.0000
A	3		98.3333
Sig.		.456	.070

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 13. Data kecepatan tenggelam pakan uji selama penelitian

Kode	Ulangan	Kecepatan tenggelamm (cm/detik)
A	1	1.18
	2	1.54
	3	1.25
Rata-rata		1.32±0,19
B	1	1.25
	2	1.11
	3	1.54
Rata-rata		1.30±0,22
C	1	0.91
	2	1.11
	3	1.10
Rata-rata		1.01±0,10
D	1	0.54
	2	0.43
	3	0.41
Rata-rata		0.46±0,07
E	1	0.25
	2	0.26
	3	0.27
Rata-rata		0.26±0,01

Lampiran 14 . Hasil analisis ragam kecepatan tenggelam pakan uji selama penelitian

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.848	4	.712	35.753	.000
Within Groups	.199	10	.020		
Total	3.047	14			

Lampiran 15 . Uji lanjut W-Tuckey kecepatan tenggelam pakan uji selama penelitian

(I) Dosis tepung maggot terfermentasi (%)	(J) Dosis tepung maggot terfermentasi (%)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A (0)	25	.02333	.11522	1.000	-.3559	.4025
	50	.31667	.11522	.115	-.0625	.6959
	75	.86333*	.11522	.000	.4841	1.2425
	100	1.06333*	.11522	.000	.6841	1.4425
B (25)	0	-.02333	.11522	1.000	-.4025	.3559
	50	.29333	.11522	.156	-.0859	.6725
	75	.84000*	.11522	.000	.4608	1.2192
	100	1.04000*	.11522	.000	.6608	1.4192
C (50)	0	-.31667	.11522	.115	-.6959	.0625
	25	-.29333	.11522	.156	-.6725	.0859
	75	.54667*	.11522	.005	.1675	.9259
	100	.74667*	.11522	.001	.3675	1.1259
D (75)	0	-.86333*	.11522	.000	-1.2425	-.4841
	25	-.84000*	.11522	.000	-1.2192	-.4608
	50	-.54667*	.11522	.005	-.9259	-.1675
	100	.20000	.11522	.456	-.1792	.5792
E (100)	0	-1.06333*	.11522	.000	-1.4425	-.6841
	25	-1.04000*	.11522	.000	-1.4192	-.6608
	50	-.74667*	.11522	.001	-1.1259	-.3675
	75	-.20000	.11522	.456	-.5792	.1792

*. The mean difference is significant at the 0.05 level.

Perlakuan	N	Subset for alpha = 0.05	
		1	2
E	3	.2600	
D	3	.4600	
C	3		1.0067
B	3		1.3000
A	3		1.3233
Sig.		.456	.115

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 16. Data uji organoleptik berbagai jenis tepung maggot selama penelitian

Kode	Parameter								
	Kenampakan			Bau			Konsistensi		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
Nilai Skor	5	7	9	9	7	7	3	5	9
	5	3	7	3	7	7	3	9	7
	5	7	9	9	1	3	1	9	9
	7	7	9	9	7	5	3	5	9
	5	7	9	3	5	9	1	7	9
	5	5	9	5	9	9	1	5	7
	5	7	9	7	5	7	3	7	7
	5	3	9	3	5	9	1	3	7
	3	5	9	3	5	7	1	3	7
	5	3	9	3	9	9	1	5	9
	5	3	9	3	5	9	5	7	3
	7	5	9	9	7	7	7	7	9
	9	9	9	9	9	9	9	7	7
	3	1	9	9	9	3	3	5	7
	5	7	9	5	9	9	3	3	3
	7	7	9	7	9	9	3	7	9
	5	7	9	3	1	7	3	5	9
	5	3	9	7	3	9	3	5	9
	1	5	9	9	3	5	5	7	3
	5	7	9	5	9	5	5	5	7
Rata-rata skor	5,1	5,4	8,9	6,0	6,2	7,2	3,20	5,8	7,30
Hasil	Kurang bersih, sedikit kotor, normal	Kurang bersih, sedikit kotor, normal	Bersih, normal, cerah	Netral, sedikit bau tambah	Netral, sedikit bau tambah	Kurang harum spesifik tepung maggot	Sedkit menggumpal, kurang kering, kasar	Tidak menggumpal, agak kering dan sedikit kasar	Tidak menggumpal, cukup kering dan halus

Semakin tinggi skor maka nilai semakin baik

Keterangan : A1= Tepung maggot komersil

A2=Tepung maggot sebelum fermentasi

A3= Tepung maggot setelah fermentasi

Lampiran 17. Data uji organoleptik pada pakan uji yang mengandung berbagai konsentrasi tepung maggot terfermentasi

Pakan (%Tepung Maggot Terfermen-tasi)	Parameter										
	Kenampakan			Bau			Warna		Tekstur		
	MS	BS	BL	M	KM	TM	CM	CT	K	KK	TK
A (0%)	17	3	0	4	9	7	20	0	20	0	0
B (25%)	4	14	2	13	4	3	1	19	12	8	0
C (50%)	11	8	1	6	12	2	18	2	18	2	0
D (75%)	11	9	0	7	11	2	15	5	18	1	1
E (100%)	5	13	2	7	11	2	11	9	14	5	1

Keterangan :
MS = Mulus; BS = Berserat; BL = Berlubang
M = Menyengat; KM = Kurang Menyengat; TM = Tidak Menyengat
CM = Coklat Muda; CT = Coklat Tua
K= Kompak; K = Kurang Kompak; TK = Tidak Kompak

Lampiran 18. Rata-rata sintasan vannamei pada akhir penelitian

Perlakuan	Sintasan(%) Rata-rata ± SD
A	50 70 55
Rata-rata	58,333±2,89
B	60 55 60
Rata-rata	58,333±1,53
C	55 60 65
Rata-rata	60,000±1,00
D	65 60 75
Rata-rata	66,667±2,08
E	70 65 75
Rata-rata	70,000±1,00

Lampiran 19. Hasil analisis ragam pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap sintasan udang vannamei pada akhir penelitian

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	343.333	4	85.833	25.245	.000[s]
Within Groups	34.000	10	3.400		
Total	377.333	14			

s : significant

Lampiran 20. Uji lanjut W-Tuckey pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap sintasan udang vannamei pada akhir penelitian

(I) Dosis tepung maggot terfermentasi (%	(J) Dosis tepung maggot terfermentasi (%)	Mean Difference (I-J)	Std. Error	Sig.
A (0)	25	.00000	1.50555	1.000
	50	-1.66667	1.50555	.800
	75	-8.33333*	1.50555	.002
	100	-11.66667*	1.50555	.000
B (25)	0	.00000	1.50555	1.000
	50	-1.66667	1.50555	.800
	75	-8.33333*	1.50555	.002
	100	-11.66667*	1.50555	.000
C (50)	0	1.66667	1.50555	.800
	25	1.66667	1.50555	.800
	75	-6.66667*	1.50555	.009
	100	-10.00000*	1.50555	.000
D (75)	0	8.33333*	1.50555	.002
	25	8.33333*	1.50555	.002
	50	6.66667*	1.50555	.009
	100	-3.33333	1.50555	.250
E (100)	0	11.66667*	1.50555	.000
	25	11.66667*	1.50555	.000
	50	10.00000*	1.50555	.000
	75	3.33333	1.50555	.250

Perlakuan	N	Subset for alpha = 0.05	
		1	2
A	3	58.3333	
B	3	58.3333	
C	3	60.0000	
D	3		66.6667
E	3		70.0000
Sig.		.800	.250

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 21 . Rata-rata laju pertumbuhan spesifik udang vannamei pada akhir penelitian

Perlakuan	Laju Pertumbuhan Spesifik (%) Rata-rata + SD
A	5,014 4,315 4,695
Rata-rata	4,674±0,08
B	4,757 5,365 5,290
Rata-rata	5,137±0,20
C	6,169 4,682 5,234
Rata-rata	5,361±0,23
D	4,807 5,108 6,210
Rata-rata	5,375±0,15
E	4,972 5,810 4,495
Rata-rata	5,092±0,17

Lampiran 22. Hasil analisis ragam pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap laju pertumbuhan spesifik udang vannamei pada akhir penelitian

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.972	4	.243	8.146	.003[s]
Within Groups	.298	10	.030		
Total	1.270	14			

s : significant

Lampiran 23. Uji lanjut W-Tuckey pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap laju pertumbuhan spesifik udang vannamei pada akhir penelitian

(I) Dosis tepung maggot terfermentasi (%)	(J) Dosis tepung maggot terfermentasi (%)	Mean Difference (I-J)	Std. Error	Sig.
A (0)	25	-.46333	.14100	.050
	50	-.68667*	.14100	.005
	75	-.70333*	.14100	.004
	100	-.41667	.14100	.084
B (25)	0	.46333	.14100	.050
	50	-.22333	.14100	.538
	75	-.24000	.14100	.474
	100	.04667	.14100	.997
C (50)	0	.68667*	.14100	.005
	25	.22333	.14100	.538
	75	-.01667	.14100	1.000
	100	.27000	.14100	.369
D (75)	0	.70333*	.14100	.004
	25	.24000	.14100	.474
	50	.01667	.14100	1.000
	100	.28667	.14100	.318
E (100)	0	.41667	.14100	.084
	25	-.04667	.14100	.997
	50	-.27000	.14100	.369
	75	-.28667	.14100	.318

		Subset for alpha = 0.05	
Perlakuan	N	1	2
A	3	4.6733	
E	3	5.0900	5.0900
B	3	5.1367	5.1367
C	3		5.3600
D	3		5.3767
Sig.		.050	.318

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 24 . Rata-rata biomassa udang vannamei pada akhir penelitian

Perlakuan	Biomassa (gram) Rata-rata + SD
A	18 23 18
Rata-rata	19,67±1,53
B	25 22 22
Rata-rata	23,00±2,00
C	21 22 25
Rata-rata	22,67±1,53
D	22 25 29
Rata-rata	25,33±2,52
E	28 24 26
Rata-rata	26,00±2,00

Lampiran 25. Hasil analisis ragam pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap biomassa udang vannamei pada akhir penelitian

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	75.333	4	18.833	4.956	.018
Within Groups	38.000	10	3.800		
Total	113.333	14			

Lampiran 26. Uji lanjut W-Tuckey pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap biomassa udang vannamei pada akhir penelitian

(I) Dosis tepung maggot terfermentasi (%)	(J) Dosis tepung maggot terfermentasi (%)	Mean Difference (I-J)	Std. Error	Sig.
A (0)	25	-3.33333	1.59164	.293
	50	-3.00000	1.59164	.383
	75	-5.66667*	1.59164	.033
	100	-6.33333*	1.59164	.017
B (25)	0	3.33333	1.59164	.293
	50	.33333	1.59164	.999
	75	-2.33333	1.59164	.604
	100	-3.00000	1.59164	.383
C (50)	0	3.00000	1.59164	.383
	25	-.33333	1.59164	.999
	75	-2.66667	1.59164	.488
	100	-3.33333	1.59164	.293
D (75)	0	5.66667*	1.59164	.033
	25	2.33333	1.59164	.604
	50	2.66667	1.59164	.488
	100	-.66667	1.59164	.993
E (100)	0	6.33333*	1.59164	.017
	25	3.00000	1.59164	.383
	50	3.33333	1.59164	.293
	75	.66667	1.59164	.993

		Subset for alpha = 0.05	
Perlakuan	N	1	2
A	3	19.6667	
C	3	22.6667	22.6667
B	3	23.0000	23.0000
D	3		25.3333
E	3		26.0000
Sig.		.293	.293

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 27. Rata-rata pertumbuhan berat mutlak udang vannamei pada akhir penelitian

Perlakuan	Pertumbuhan Berat Mutlak (g) Rata-rata ± SD
A	1,400 1,192 1,236
Rata-rata	1,276±0,06
B	1,583 1,600 1,750
Rata-rata	1,644±0,05
C	1,609 1,383 1,523
Rata-rata	1,505±0,02
D	1,292 1,633 1,633
Rata-rata	1,519±0,04
E	1,550 1,650 1,283
Rata-rata	1,494±0,17[ab]

Lampiran 28. Hasil analisis ragam pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap pertumbuhan berat mutlak udang vannamei pada akhir penelitian

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.212	4	.053	7.169	.005[s]
Within Groups	.074	10	.007		
Total	.286	14			

s : significant

Lampiran 29. Uji lanjut W-Tuckey pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap pertumbuhan berat mutlak udang vannamei pada akhir penelitian

(I) Dosis tepung maggot terfermentasi (%)	(J) Dosis tepung maggot terfermentasi (%)	Mean Difference (I-J)	Std. Error	Sig.
A (0)	25	-.36833*	.07022	.003
	50	-.22900	.07022	.052
	75	-.24333*	.07022	.038
	100	-.21833	.07022	.066
B (25)	0	.36833*	.07022	.003
	50	.13933	.07022	.338
	75	.12500	.07022	.434
	100	.15000	.07022	.277
C (50)	0	.22900	.07022	.052
	25	-.13933	.07022	.338
	75	-.01433	.07022	1.000
	100	.01067	.07022	1.000
D (75)	0	.24333*	.07022	.038
	25	-.12500	.07022	.434
	50	.01433	.07022	1.000
	100	.02500	.07022	.996
E (100)	0	.21833	.07022	.066
	25	-.15000	.07022	.277
	50	-.01067	.07022	1.000
	75	-.02500	.07022	.996

		Subset for alpha = 0.05	
Perlakuan	N	1	2
A	3	1.2760	
E	3	1.4943	1.4943
C	3	1.5050	1.5050
D	3		1.5193
B	3		1.6443
Sig.		.052	.277

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 30 . Rata-rata tingkat konsumsi pakan vannamei pada akhir penelitian

Perlakuan	Tingkat Konsumsi Pakan (gram) Rata-rata + SD
A	64,484 86,828 73,528
Rata-rata	74,946
B	84 82,6 78,372
Rata-rata	81,657
C	81,2 83,972 93,044
Rata-rata	86,072
D	88,928 90,328 103,628
Rata-rata	94,294
E	99,82 81,9 107,744
Rata-rata	96,488

Lampiran 31. Hasil analisis ragam pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap tingkat konsumsi pakan udang vannamei pada akhir penelitian

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	952.342	4	238.085	30.404	.000[s]
Within Groups	78.308	10	7.831		
Total	1030.649	14			

s : significant

Lampiran 32. Uji lanjut W-Tuckey pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap tingkat konsumsi pakan udang vannamei pada akhir penelitian

(I) Dosis tepung maggot terfermentasi (%)	(J) Dosis tepung maggot terfermentasi (%)	Mean Difference (I-J)	Std. Error	Sig.
A (0)	25	-6.71067	2.28484	.086
	50	-11.12533*	2.28484	.005
	75	-19.34800*	2.28484	.000
	100	-21.54133*	2.28484	.000
B (25)	0	6.71067	2.28484	.086
	50	-4.41467	2.28484	.361
	75	-12.63733*	2.28484	.002
	100	-14.83067*	2.28484	.001
C (50)	0	11.12533*	2.28484	.005
	25	4.41467	2.28484	.361
	75	-8.22267*	2.28484	.031
	100	-10.41600*	2.28484	.007
D (75)	0	19.34800*	2.28484	.000
	25	12.63733*	2.28484	.002
	50	8.22267*	2.28484	.031
	100	-2.19333	2.28484	.867
E (100)	0	21.54133*	2.28484	.000
	25	14.83067*	2.28484	.001
	50	10.41600*	2.28484	.007
	75	2.19333	2.28484	.867

		Subset for alpha = 0.05	
Perlakuan	N	1	2
A	3	55.8333	
B	3	60.5000	60.5000
C	3	62.5000	62.5000
E	3		67.5333
D	3		67.6667
Sig.		.149	.112

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 33. Rata-rata rasio konversi pakan udang vannamei pada akhir penelitian

Perlakuan	Rasio Konversi Pakan Rata-rata + SD
A	2,958 3,108 3,478
Rata-rata	3,181±0,14
B	3,015 3,024 3,223
Rata-rata	3,087±0,19
C	2,787 3,403 2,705
Rata-rata	2,965±0,06
D	3,200 3,057 2,427
Rata-rata	2,895±0,15
E	2,801 2,715 2,918
Rata-rata	2,811±0,10

Lampiran 34 Hasil analisis ragam pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap rasio konversi pakan udang vannamei pada akhir penelitian

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.261	4	.065	3.682	.043
Within Groups	.177	10	.018		
Total	.439	14			

Lampiran 35. Uji lanjut W-Tuckey pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap rasio konversi pakan udang vannamei pada akhir penelitian

(I) Dosis tepung maggot terfermentasi (%)	(J) Dosis tepung maggot terfermentasi (%)	Mean Difference (I-J)	Std. Error	Sig.
A (0)	25	.10000	.10873	.883
	50	.22667	.10873	.297
	75	.28667	.10873	.136
	100	.37000*	.10873	.042
B (25)	0	-.10000	.10873	.883
	50	.12667	.10873	.770
	75	.18667	.10873	.466
	100	.27000	.10873	.171
C (50)	0	-.22667	.10873	.297
	25	-.12667	.10873	.770
	75	.06000	.10873	.979
	100	.14333	.10873	.687
D (75)	0	-.28667	.10873	.136
	25	-.18667	.10873	.466
	50	-.06000	.10873	.979
	100	.08333	.10873	.935
E (100)	0	-.37000*	.10873	.042
	25	-.27000	.10873	.171
	50	-.14333	.10873	.687
	75	-.08333	.10873	.935

		Subset for alpha = 0.05	
Perlakuan	N	1	2
E	3	2.8133	
D	3	2.8967	2.8967
C	3	2.9567	2.9567
B	3	3.0833	3.0833
A	3		3.1833
Sig.		.171	.136

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 36. Rata-rata indeks hepatosomatik udang vannamei pada akhir penelitian

Perlakuan	Indeks Hepatosomatik (%) Rata-rata + SD
A	6,030 7,073 5,285
Rata-rata	6,129±0,14
B	6,216 6,737 5,719
Rata-rata	6,224±0,11
C	7,058 5,346 5,761
Rata-rata	6,055±0,11
D	5,635 5,828 6,023
Rata-rata	5,829±0,11
E	6,824 6,004 5,198
Rata-rata	6,009±0,19

L**ampiran 37** Hasil analisis ragam pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap indeks hepatosomatik udang vannamei pada akhir penelitian

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.268	4	.067	3.728	.042
Within Groups	.180	10	.018		
Total	.448	14			

Lampiran 38. Uji lanjut W-Tuckey pengaruh tepung maggot terfermentasi mikroorganisme mix dalam pakan terhadap indeks hepatosomatik udang vannamei pada akhir penelitian

(I) Dosis tepung maggot terfermentasi (%)	(J) Dosis tepung maggot terfermentasi (%)	Mean Difference (I-J)	Std. Error	Sig.
A (0)	25	-.09667	.10950	.897
	50	.07333	.10950	.959
	75	.30333	.10950	.111
	100	.12333	.10950	.790
B (25)	0	.09667	.10950	.897
	50	.17000	.10950	.555
	75	.40000*	.10950	.029
	100	.22000	.10950	.328
C (50)	0	-.07333	.10950	.959
	25	-.17000	.10950	.555
	75	.23000	.10950	.291
	100	.05000	.10950	.990
D (75)	0	-.30333	.10950	.111
	25	-.40000*	.10950	.029
	50	-.23000	.10950	.291
	100	-.18000	.10950	.505
E (100)	0	-.12333	.10950	.790
	25	-.22000	.10950	.328
	50	-.05000	.10950	.990
	75	.18000	.10950	.505

		Subset for alpha = 0.05	
Perlakuan	N	1	2
D	3	5.8267	
E	3	6.0067	6.0067
C	3	6.0567	6.0567
A	3	6.1300	6.1300
B	3		6.2267
Sig.		.111	.328

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

Lampiran 39. Data Pengukuran Ammonia selama Penelitian

PERLAKUAN	AWAL	TENGAH	AKHIR
		(mg/L)	
A1	0,183	0,346	0,485
A2	0,191	0,430	0,522
A3	0,209	0,438	0,451
B1	0,167	0,382	0,421
B2	0,233	0,369	0,460
B3	0,215	0,458	0,478
C1	0,201	0,361	0,495
C2	0,169	0,338	0,496
C3	0,179	0,358	0,428
D1	0,193	0,373	0,524
D2	0,185	0,376	0,580
D3	0,171	0,393	0,586
E1	0,197	0,435	0,582
E2	0,177	0,411	0,492
E3	0,187	0,412	0,468

LAMPIRAN
Dokumentasi Penelitian

1. Pencucian larva maggot dengan air mengalir hingga terpisah dari media hidupnya

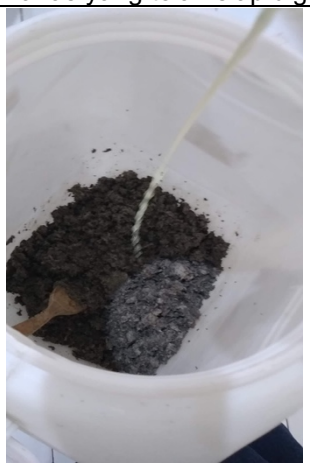
2. Blansing larva maggot yang bertujuan membunuh secara perlahan

3. Mengeringanginkan larva maggot

4. Menimbang larva maggot

5. Melakukan pengepresan larva magggot

6. Menimbang maggot yang telah dihilangkan lemaknya

 7. Menyiapkan nanas	 8. Melakukan penghalusan nanas dengan blender
 9. Melakukan penyaringan hasil penghalusan	 10. Air nanas yang telah siap digunakan
 11. Menambahkan NaCl sebanyak 10%	 12. Menambahkan air nanas dan dilakukan pengadukan selama 5 hari

13. MIkroorganisme mix

14. Inokulasi mikroorganisme mix

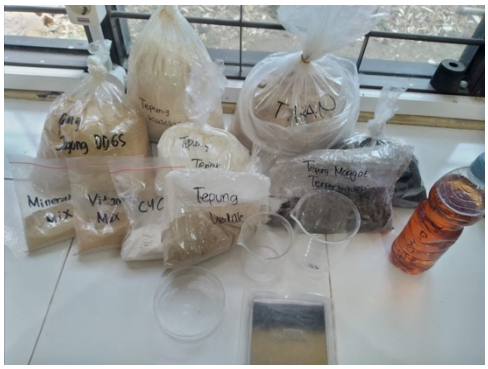
15. Menyimpan di dalam plastik tertutup rapat

16. Fermentasi maggot selama 7 hari

17. Penjemuran hasil fermentasi

18. Persiapan penghalusan hasil fermentasi maggot menggunakan blender

19. Tepung maggot terfermentasi

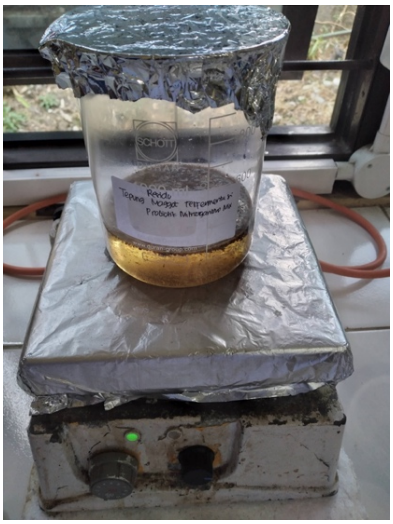
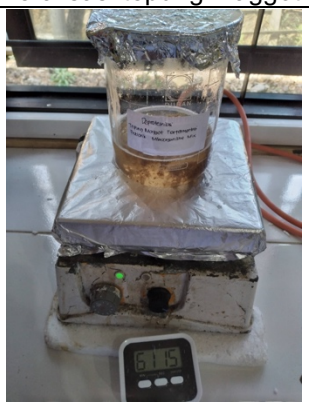
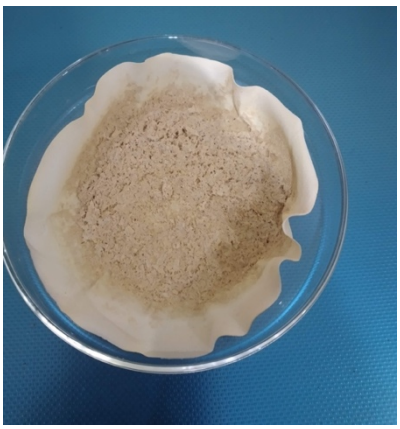


20. Penyiapan alat dan bahan pembuatan pakan

21. Pencampuran dan pengadukan bahan baku pakan uji

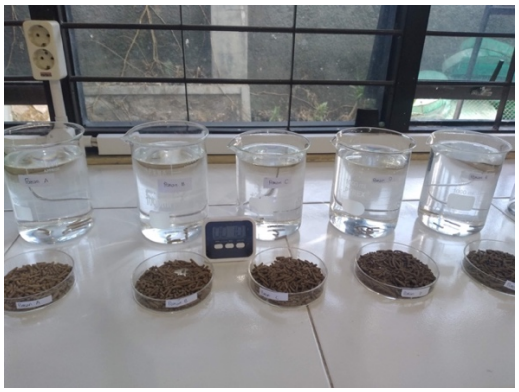
22. Pencetakan pellet

23. Penjemuran pakan uji

 24. Defatting tepung maggot terfermentasi	 25. Demineralisasi tepung maggot terfermentasi
 26. Penyaringan hasil demineralisasi	 27. Proses deproteinisasi
 28. Pengeringan hasil deproteinisasi	 29. Kitin dari tepung maggot terfermentasi

30. Uji kecepatan tenggelam

31. Uji tingkat kekerasan

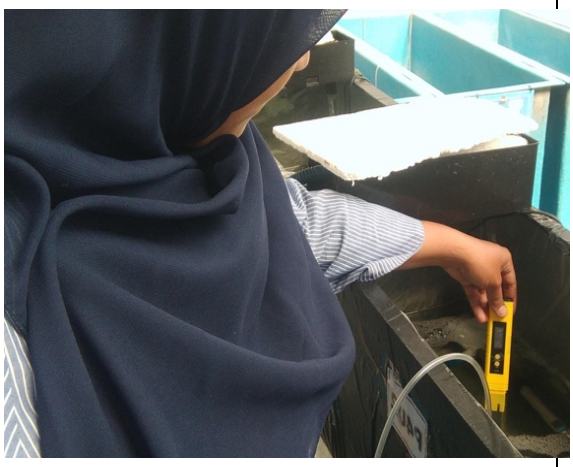


32. Uji kecepatan pecah pakan

33. Uji dispersi padatan

34. Uji Organoleptik pakan

35. Uji Organoleptik pakan



36. Pengukuran pH pada pagi dan sore hari di semua akuarium penelitian

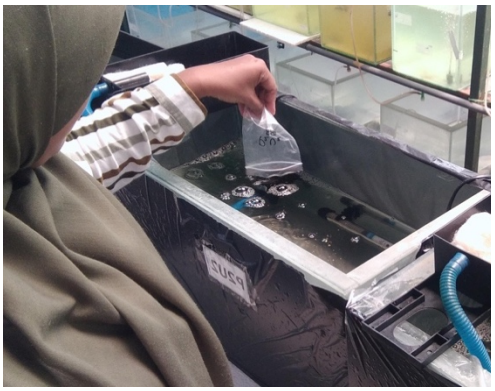
37. Pengukuran salinitas pada pagi dan sore hari di semua akuarium penelitian

38. Pengukuran suhu pada pagi dan sore hari di semua akuarium penelitian

39. Pengukuran DO paa pagi dan sore hari di semua akuarium penelitian

40. Penimbangan pakan perlakuan

41. Penimbangan pakan perlakuan



42.. Pemberian pakan uji

43. Penyiponan akuarium

44. Sampling pertumbuhan udang vannamei

45. Pengambilan udang mati pada akuarium penelitian kemudian menimbang dan mencatatnya

46. Persiapan pengukuran ammonia

47. Pengukuran ammonia menggunakan spektrofotometer