

## **LAMPIRAN**

## **Lampiran 1. Prosedur Analisis Proksimat (AOAC 1999)**

### **1. Prosedur Analisis Kadar Protein**

#### **A. Prosedur Oksidasi**

1. Sampel ditimbang hingga 0,5 gram dan dimasukkan ke dalam labu Kjeldahl.
2. Katalis ( $K_2SO_4 + CuSO_4 \cdot 5H_2O$ ) menggunakan rasio 9:1 ditimbang sebesar 3 gr dan dimasukkan ke labu Kjeldahl.
3. 10 mL  $H_2SO_4$  pekat ditambahkan ke dalam labu Kjeldahl dan labu dipanaskan dalam rak oksidasi/dekomposisi pada suhu  $400^\circ C$  selama 3-4 jam sampai warna cairan di dalam labu berubah menjadi hijau jernih.
4. Dinginkan larutan, tambahkan 100 ml aquades, tuangkan larutan ke dalam labu takar, encerkan dengan aquades hingga volume larutan menjadi 100 ml, dan larutan sampel siap didistilasi.

#### **B. Prosedur Distilasi**

1. Tambahkan beberapa tetes  $H_2SO_4$  ke dalam labu. Sebelumnya, labu diisi setengahnya dengan air suling untuk menghindari kontaminasi dengan amonia sekitar lalu dididihkan selama 10 menit.
2. Erlenmeyer diisi 10 mL  $H_2SO_4$  0,05 N dan ditambahkan dua tetes indikator metil merah yang diletakkan di bawah tabung pembuangan kondensor dengan memiringkannya sampai ujung tabung terendam cairan.
3. 5 mL larutan sampel dimasukkan ke pada tabung distilasi melalui corong yang lalu dibilas menggunakan akuades dan dibubuhi 10 mL NaOH 30% kemudian dimasukkan melalui corong tadi dan ditutup.
4. Setelah mendistilasi campuran basa dalam labu destilasi untuk menghasilkan uap selama 10 menit, terjadi pengembunan di dalam kondensor.
5. Turunkan labu Erlenmeyer sampai ujung tabung kondensor pada leher labu berada di atas permukaan larutan. Kondensor dibilas dengan akuades selama 1-2 menit.

#### **C. Prosedur Titrasi**

1. Destilat dititrasi dengan larutan NaOH 0,05N.
2. Volume hasil titrasi dicatat 33
3. Prosedur yang sama juga dilakukan pada blanko.

$$\text{Kadar protein (\%)} = \frac{0,0007 * \times (Vb - Vs) \times 6,25 ** \times 20}{s} + 100\%$$

Keterangan:

Vb = Volume hasil titrasi blanko (mL)

Vs = Volume hasil titrasi sampel (mL)

S = Bobot sampel (gram)

\* = Setiap mL 0.05 NaOH ekuivalen dengan 0.0007 gram Nitrogen

\*\* = Faktor Nitrogen

## 2. Prosedur Analisis Kadar Lemak

### A. Metode ekstraksi Soxhlet

1. Labu ekstraksi dipanaskan dalam oven pada suhu 110°C selama 1 jam. Kemudian didinginkan dalam desikator selama 30 menit dan ditimbang (X1).
2. Timbang sampel hingga 3-5 gram (A), masukkan ke dalam wadah tabung filter, masukkan ke dalam soxhlet, dan letakkan pemberat di atasnya.
3. 100-150 mL n-heksana ditambahkan ke dalam soxhlet sampai thimble terendam dan sisa n-heksana ditambahkan ke dalam labu.
4. Labu yang dihubungkan ke soxhlet dipanaskan di atas penangas air sampai cairan yang memandikan sampel dalam soxhlet menjadi jernih.
5. Keluarkan labu dan lanjutkan memanaskan sampai n-heksana menguap.
6. Labu dan lemak yang tersisa dipanaskan dalam oven selama 15-60 menit. kemudian didinginkan dalam desikator selama 15-30 menit dan ditimbang (X2)

### 3. Prosedur Analisis Kadar Air

1. Setelah gelas kimia dipanaskan dalam oven pada suhu 100 °C selama 1 jam, ditempatkan dalam desikator selama 30 menit dan ditimbang (X1).
2. Berat bahan 2-3 gram (A). 34
3. Gelas dan bahan dipanaskan dalam oven pada suhu 110°C selama 4 jam, kemudian dimasukkan ke dalam desikator selama 30 menit dan ditimbang (X2).

$$\text{Kadar air (\%)} = \frac{(x1+A)-x2}{A} \times 100\%$$

## Lampiran 2. Data dan Hasil Analisis Pertumbuhan Panjang Mutlak

Data pertumbuhan panjang larva ikan mas sinyonya

| Perlakuan | L0 (mm) | Lt (mm) | G (mm) | G (cm) |
|-----------|---------|---------|--------|--------|
| A1        | 5.94    | 11.56   | 5.62   | 0.56   |
| A2        | 5.94    | 11.87   | 5.93   | 0.59   |
| A3        | 5.94    | 11.36   | 5.42   | 0.54   |
| B1        | 5.94    | 11.78   | 5.84   | 0.58   |
| B2        | 5.94    | 11.97   | 6.03   | 0.6    |
| B3        | 5.94    | 11.67   | 5.73   | 0.57   |
| C1        | 5.94    | 14.36   | 8.42   | 0.84   |
| C2        | 5.94    | 12.49   | 6.55   | 0.65   |
| C3        | 5.94    | 14.24   | 8.3    | 0.83   |
| D1        | 5.94    | 15.36   | 9.42   | 0.94   |
| D2        | 5.94    | 13.43   | 7.49   | 0.74   |
| D3        | 5.94    | 14.43   | 8.49   | 0.85   |

Hasil ANOVA pertumbuhan panjang larva ikan mas sinyonya

| <i>Source of Variation</i> | <i>SS</i> | <i>Df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|-----------|-----------|-----------|----------|----------------|---------------|
| Between Groups             | 17.3898   | 3         | 5.7966    | 10.95593 | 0.003318       | 4.066181      |
| Within Groups              | 4.232667  | 8         | 0.529083  |          |                |               |
| Total                      | 21.62247  | 11        |           |          |                |               |

Hasil uji duncan pertumbuhan panjang larva ikan mas sinyonya

| Perlakuan | Rata-rata   | Notasi |
|-----------|-------------|--------|
| 1         | 5.656666667 | A      |
| 2         | 5.866666667 | A      |
| 3         | 7.756666667 | B      |
| 4         | 8.466666667 | B      |

### Lampiran 3. Data dan Hasil Analisis Pertumbuhan Bobot Mutlak

Data pertumbuhan bobot larva ikan mas sinyonya

| Perlakuan | W0    | Wt    | G (g) |
|-----------|-------|-------|-------|
| A1        | 0.002 | 0.034 | 0.032 |
| A2        | 0.002 | 0.014 | 0.012 |
| A3        | 0.002 | 0.011 | 0.009 |
| B1        | 0.002 | 0.022 | 0.02  |
| B2        | 0.002 | 0.019 | 0.017 |
| B3        | 0.002 | 0.018 | 0.016 |
| C1        | 0.002 | 0.029 | 0.027 |
| C2        | 0.002 | 0.023 | 0.021 |
| C3        | 0.002 | 0.029 | 0.027 |
| D1        | 0.002 | 0.034 | 0.032 |
| D2        | 0.002 | 0.025 | 0.023 |
| D3        | 0.002 | 0.034 | 0.032 |

Hasil ANOVA pertumbuhan bobot larva ikan mas sinyonya

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|-----------|-----------|-----------|----------|----------------|---------------|
| Between Groups             | 0.000285  | 3         | 9.51E-05  | 1.905398 | 0.207219       | 4.066181      |
| Within Groups              | 0.000399  | 8         | 4.99E-05  |          |                |               |
| Total                      | 0.000685  | 11        |           |          |                |               |

Hasil duncan pertumbuhan bobot larva ikan mas sinyonya

| Perlakuan | Rata-rata | Notasi |
|-----------|-----------|--------|
| 1         | 0.017667  | A      |
| 2         | 0.017667  | A      |
| 3         | 0.025     | B      |
| 4         | 0.029     | C      |

#### Lampiran 4. Data dan Hasil Analisis Laju Pertumbuhan Panjang Harian

Data laju pertumbuhan panjang harian larva ikan mas sinyonya

| Perlakuan | L0   | Lt    | Ln L0    | Ln Lt    | LPPH (%mm/hari) |
|-----------|------|-------|----------|----------|-----------------|
| A1        | 5.94 | 11.56 | 1.781709 | 2.447551 | 3.329209        |
| A2        | 5.94 | 11.87 | 1.781709 | 2.474014 | 3.461525        |
| A3        | 5.94 | 11.36 | 1.781709 | 2.430098 | 3.241946        |
| B1        | 5.94 | 11.78 | 1.781709 | 2.466403 | 3.42347         |
| B2        | 5.94 | 11.97 | 1.781709 | 2.482404 | 3.503472        |
| B3        | 5.94 | 11.67 | 1.781709 | 2.457021 | 3.376562        |
| C1        | 5.94 | 14.36 | 1.781709 | 2.664447 | 4.413687        |
| C2        | 5.94 | 12.49 | 1.781709 | 2.524928 | 3.716096        |
| C3        | 5.94 | 14.24 | 1.781709 | 2.656055 | 4.371729        |
| D1        | 5.94 | 15.36 | 1.781709 | 2.731767 | 4.750288        |
| D2        | 5.94 | 13.43 | 1.781709 | 2.597491 | 4.078909        |
| D3        | 5.94 | 14.43 | 1.781709 | 2.669309 | 4.438001        |

Hasil ANOVA laju pertumbuhan panjang harian larva ikan mas sinyonya

| <i>Source of Variation</i> | <i>SS</i> | <i>Df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|-----------|-----------|-----------|----------|----------------|---------------|
| Between Groups             | 2.569299  | 3         | 0.856433  | 12.13714 | 0.002397       | 4.066181      |
| Within Groups              | 0.564504  | 8         | 0.070563  |          |                |               |
| Total                      | 3.133803  | 11        |           |          |                |               |

Hasil duncan laju pertumbuhan panjang harian larva ikan mas sinyonya

| Perlakuan | Rata-rata | Notasi |
|-----------|-----------|--------|
| 1         | 3.344227  | A      |
| 2         | 3.434501  | AB     |
| 3         | 4.167171  | AB     |
| 4         | 4.4224    | B      |

### Lampiran 5. Data dan Hasil Analisis Laju Pertumbuhan Bobot Harian

Data laju pertumbuhan spesifik larva ikan mas sinyonya

| Perlakuan | W0    | Wt    | Ln W0    | Ln Wt    | LPBH (%g/hari) |
|-----------|-------|-------|----------|----------|----------------|
| A1        | 0.002 | 0.034 | -6.21461 | -3.38139 | 14.16607       |
| A2        | 0.002 | 0.014 | -6.21461 | -4.2687  | 9.729551       |
| A3        | 0.002 | 0.011 | -6.21461 | -4.50986 | 8.52374        |
| B1        | 0.002 | 0.022 | -6.21461 | -3.81671 | 11.98948       |
| B2        | 0.002 | 0.019 | -6.21461 | -3.96332 | 11.25646       |
| B3        | 0.002 | 0.018 | -6.21461 | -4.01738 | 10.98612       |
| C1        | 0.002 | 0.029 | -6.21461 | -3.54046 | 13.37074       |
| C2        | 0.002 | 0.023 | -6.21461 | -3.77226 | 12.21174       |
| C3        | 0.002 | 0.029 | -6.21461 | -3.54046 | 13.37074       |
| D1        | 0.002 | 0.034 | -6.21461 | -3.38139 | 14.16607       |
| D2        | 0.002 | 0.025 | -6.21461 | -3.68888 | 12.62864       |
| D3        | 0.002 | 0.034 | -6.21461 | -3.38139 | 14.16607       |

Hasil ANOVA laju pertumbuhan spesifik larva ikan mas sinyonya

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|-----------|-----------|-----------|----------|----------------|---------------|
| Between Groups             | 15.87737  | 3         | 5.292456  | 2.048575 | 0.185664       | 4.066181      |
| Within Groups              | 20.66785  | 8         | 2.583481  |          |                |               |
| Total                      | 36.54522  | 11        |           |          |                |               |

Hasil duncan laju pertumbuhan spesifik larva ikan mas sinyonya

| Perlakuan | Rata-rata | Notasi |
|-----------|-----------|--------|
| 1         | 10.80645  | a      |
| 2         | 11.41069  | a      |
| 3         | 12.98441  | a      |
| 4         | 13.65359  | a      |

**Lampiran 6. Data Hasil Tingkat Kelangsungan Hidup Larva Ikan Mas Sinyonya**

Data tingkat kelangsungan hidup

| Perlakuan | Ikan Mati | n0  | nt  | TKH (%) |
|-----------|-----------|-----|-----|---------|
| A1        | 1         | 200 | 199 | 99.5    |
| A2        | 0         | 200 | 200 | 100     |
| A3        | 0         | 200 | 200 | 100     |
| B1        | 1         | 200 | 199 | 99.5    |
| B2        | 0         | 200 | 200 | 100     |
| B3        | 0         | 200 | 200 | 100     |
| C1        | 0         | 200 | 200 | 100     |
| C2        | 0         | 200 | 200 | 100     |
| C3        | 2         | 200 | 198 | 99      |
| D1        | 2         | 200 | 198 | 99      |
| D2        | 1         | 200 | 199 | 99.5    |
| D3        | 0         | 200 | 200 | 100     |

### Lampiran 7. Data dan Hasil Analisis Kimia *Artemia* sp.

Data komposisi kandungan nutrisi *Artemia* sp.

| Perlakuan | Kadar air (%) | Protein (%) | Lemak (%) |
|-----------|---------------|-------------|-----------|
| A1        | 92.31         | 1.64        | 2.44      |
| A2        | 92.50         | 1.19        | 2.00      |
| B1        | 75.83         | 1.56        | 3.96      |
| B2        | 75.00         | 2.18        | 1.00      |
| C1        | 78.22         | 2.61        | 4.10      |
| C2        | 78.00         | 2.66        | 4.00      |
| D1        | 76.79         | 2.95        | 3.76      |
| D2        | 76.24         | 3.68        | 5.00      |

Hasil ANOVA kadar air *Artemia* sp.

| <i>Source of Variation</i> | <i>SS</i>  | <i>df</i> | <i>MS</i>  | <i>F</i>   | <i>P-value</i> | <i>F crit</i> |
|----------------------------|------------|-----------|------------|------------|----------------|---------------|
| Between Groups             | 378.234563 | 3         | 126.078188 | 934.538777 | 3.804E-06      | 6.59138212    |
| Within Groups              | 0.53963812 | 4         | 0.13490953 |            |                |               |
| Total                      | 378.774201 | 7         |            |            |                |               |

Hasil uji duncan kadar air *Artemia* sp.

| Perlakuan | Rata-rata  | Notasi |
|-----------|------------|--------|
| 1         | 92.4038462 | d      |
| 2         | 75.4166667 | a      |
| 3         | 78.1089109 | c      |
| 4         | 76.511669  | b      |

Hasil ANOVA protein *Artemia* sp.

| <i>Source of Variation</i> | <i>SS</i>  | <i>df</i> | <i>MS</i>  | <i>F</i>   | <i>P-value</i> | <i>F crit</i> |
|----------------------------|------------|-----------|------------|------------|----------------|---------------|
| Between Groups             | 4.23117312 | 3         | 1.41039104 | 9.96632063 | 0.02505579     | 6.59138212    |
| Within Groups              | 0.56606288 | 4         | 0.14151572 |            |                |               |
| Total                      | 4.79723601 | 7         |            |            |                |               |

**Lampiran 7. Data dan Hasil Analisis Kimia *Artemia* sp. (Lanjutan)**

Hasil uji duncan protein *Artemia* sp.

| Perlakuan | Rata-rata  | Notasi |
|-----------|------------|--------|
| 1         | 1.41293612 | a      |
| 2         | 1.86944853 | a      |
| 3         | 2.63894314 | ab     |
| 4         | 3.31428013 | b      |

Hasil ANOVA lemak *Artemia* sp.

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|-----------|-----------|-----------|----------|----------------|---------------|
| Between Groups             | 7.130552  | 3         | 2.376851  | 1.809994 | 0.285033       | 6.591382      |
| Within Groups              | 5.252727  | 4         | 1.313182  |          |                |               |
| Total                      | 12.38328  | 7         |           |          |                |               |

Hasil uji duncan lemak *Artemia* sp.

| Perlakuan | Rata-rata | Notasi |
|-----------|-----------|--------|
| 1         | 2.219512  | a      |
| 2         | 2.480198  | a      |
| 3         | 4.04918   | a      |
| 4         | 4.379699  | a      |

## Lampiran 8. Data dan Hasil Analisis Kimia Larva Ikan Mas Sinyonya

Data komposisi kandungan nutrisi larva ikan mas sinyonya

| Perlakuan    | Kadar air (%) | Protein (%) | Lemak (%) |
|--------------|---------------|-------------|-----------|
| Larva awal 1 | 71.11         | 1.11        | 1.18      |
| Larva awal 2 | 72.73         | 1.26        | 1.00      |
| A1           | 82.35         | 1.35        | 2.04      |
| A2           | 81.82         | 1.32        | 1.00      |
| B1           | 83.78         | 1.03        | 1.90      |
| B2           | 82.50         | 1.52        | 0.98      |
| C1           | 82.09         | 1.72        | 2.97      |
| C2           | 81.82         | 1.25        | 1.00      |
| D1           | 86.90         | 1.66        | 2.44      |
| D2           | 86.57         | 1.15        | 2.46      |

Hasil ANOVA kadar air larva ikan mas sinyonya

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|-----------|-----------|-----------|----------|----------------|---------------|
| Between Groups             | 243.7968  | 4         | 60.94921  | 128.757  | 3.15E-05       | 5.192168      |
| Within Groups              | 2.36683   | 5         | 0.473366  |          |                |               |
| Total                      | 246.1637  | 9         |           |          |                |               |

Hasil uji duncan kadar air larva ikan mas sinyonya

| Perlakuan  | Rata-rata | notasi |
|------------|-----------|--------|
| Larva awal | 71.91919  | a      |
| 1          | 82.08556  | b      |
| 2          | 83.14189  | b      |
| 3          | 81.95387  | b      |
| 4          | 86.73596  | b      |

**Lampiran 8. Data dan Hasil Analisis Kimia Larva Ikan Mas Sinyonya**  
(Lanjutan)

Hasil ANOVA protein larva ikan mas sinyonya

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|-----------|-----------|-----------|----------|----------------|---------------|
| Between Groups             | 0.104726  | 4         | 0.026181  | 0.347199 | 0.836315       | 5.192168      |
| Within Groups              | 0.377038  | 5         | 0.075408  |          |                |               |
| Total                      | 0.481763  | 9         |           |          |                |               |

Hasil uji duncan protein larva ikan mas sinyonya

| Perlakuan  | Rata-rata | Notasi |
|------------|-----------|--------|
| Larva awal | 1.186261  | a      |
| 1          | 1.333543  | a      |
| 2          | 1.273808  | a      |
| 3          | 1.481381  | a      |
| 4          | 1.406228  | a      |

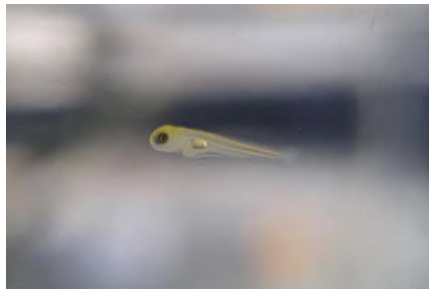
Hasil ANOVA lemak larva ikan mas sinyonya

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|-----------|-----------|-----------|----------|----------------|---------------|
| Between Groups             | 2.230149  | 4         | 0.557537  | 0.952832 | 0.50486        | 5.192168      |
| Within Groups              | 2.925685  | 5         | 0.585137  |          |                |               |
| Total                      | 5.155834  | 9         |           |          |                |               |

Hasil uji duncan lemak larva ikan mas sinyonya

| Perlakuan  | Rata-rata | Notasi |
|------------|-----------|--------|
| Larva Awal | 1.088235  | a      |
| 1          | 1.520408  | a      |
| 2          | 1.442577  | a      |
| 3          | 1.985149  | a      |
| 4          | 2.44902   | a      |

## Lampiran 9. Dokumentasi Penelitian



Gambar 2. Larva hari ke-1 pemeliharaan



Gambar 3. Larva hari ke-20 pemeliharaan



Gambar 4. Sampling awal



Gambar 5. Pengukuran pH



Gambar 6. Pengukuran suhu



Gambar 7. Pengukuran DO



Gambar 8. Pemberian *Artemia* sp.



Gambar 9. Proses syphon

## Lampiran 9. Dokumentasi Penelitian (Lanjutan)



Gambar 10. Proses pemanenan larva



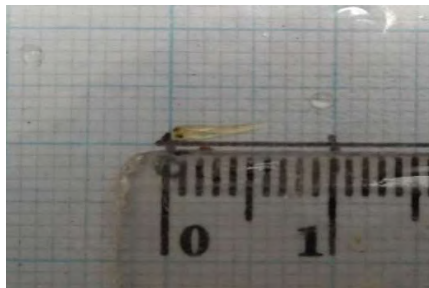
Gambar 11. Sampling akhir (panjang)



Gambar 12. Sampling akhir (bobot)



Gambar 13. Media kultur *Artemia* sp.



Gambar 14. Panjang larva awal



Gambar 15. Panjang larva akhir



Gambar 16. Penimbangan bahan pengkaya



Gambar 17. Persiapan wadah pengkayaan

## Lampiran 9. Dokumentasi Penelitian (Lanjutan)



Gambar 18. Proses pemisahan cangkang *Artemia* sp.



Gambar 19. Persiapan pemberian pakan untuk larva



Gambar 20. Persiapan pengkayaan *Artemia* sp.



Gambar 21. Kondisi Larva selama pemeliharaan