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## LAMPIRAN

### Lampiran 1 Ethical Clearance



**Kementerian Kesehatan  
Poltekkes Medan**  
Komisi Etik Penelitian Kesehatan  
Jalan Jamin Ginting KM. 13,5  
Medan, Sumatera Utara 20137  
(061) 8368633  
<https://poltekkes-medan.ac.id>

**KETERANGAN LAYAK ETIK**  
*DESCRIPTION OF ETHICAL EXEMPTION*  
"ETHICAL EXEMPTION"

No.01.26.2897/KEPK/POLTEKKES KEMENKES MEDAN 2026

Protokol penelitian versi 1 yang diusulkan oleh :  
*The research protocol proposed by*

Peneliti utama : Indah Rahma Farica  
*Principal In Investigator*

Nama Institusi : Poltekkes Kemenkes Medan  
*Name of the Institution*

Dengan judul:  
*Title*

**"Daya Terima dan Uji Kimia Tempe (*Rhizopus oryzae*) Dengan Fortifikasi Tepung Tulang Ikan Nila (*Oreochromis niloticus*)"**

*"Receiving Power and Chemical Test Tempe (*Rhizopus oryzae*) With Fortification Of Tilapia Bone Flour (*Oreochromis niloticus*)"*

Dinyatakan layak etik sesuai 7 (tujuh) Standar WHO 2011, yaitu 1) Nilai Sosial, 2) Nilai Ilmiah, 3) Pemerataan Beban dan Manfaat, 4) Risiko, 5) Bujukan/Eksploitasi, 6) Kerahasiaan dan Privacy, dan 7) Persetujuan Setelah Penjelasan, yang merujuk pada Pedoman CIOMS 2016. Hal ini seperti yang ditunjukkan oleh terpenuhinya indikator setiap standar.

*Declared to be ethically appropriate in accordance to 7 (seven) WHO 2011 Standards, 1) Social Values, 2) Scientific Values, 3) Equitable Assessment and Benefits, 4) Risks, 5) Persuasion/Exploitation, 6) Confidentiality and Privacy, and 7) Informed Consent, referring to the 2016 CIOMS Guidelines. This is as indicated by the fulfillment of the indicators of each standard.*

Pernyataan Laik Etik ini berlaku selama kurun waktu tanggal 18 Juni 2026 sampai dengan tanggal 18 Juni 2027.

*This declaration of ethics applies during the period June 18, 2026 until June 18, 2027.*

June 18, 2026  
Chairperson,



Dr. Lestari Rahmah, MKT

## Lampiran 2 Hasil Laboratorium Uji Kimia Tempe Sampel T0

### IV. Result / Hasil Uji

| No | Parameter                    | Unit       | Simplo  | Duplo   | Limit Of Detection | Method                          |
|----|------------------------------|------------|---------|---------|--------------------|---------------------------------|
| 1  | Ash Content                  | %          | 1.13    | 1.11    | -                  | SNI 01-2891-1992 butir 6.1      |
| 2  | Calorie From Fat             | Kcal/100 g | 99.72   | 101.16  | -                  | 18-8-9/MU/SMM-SIG (perhitungan) |
| 3  | Total Fat                    | %          | 11.08   | 11.24   | -                  | 18-8-5/MU (Gravimetri)          |
| 4  | Moisture Content             | %          | 62.79   | 62.86   | -                  | SNI 3144:2015 lampiran A.3      |
| 5  | Total Calories               | Kcal/100 g | 199.72  | 200.32  | -                  | 18-8-9/MU/SMM-SIG (perhitungan) |
| 6  | Carbohydrate (By Difference) | %          | 6.97    | 6.67    | -                  | 18-8-9/MU (perhitungan)         |
| 7  | Protein Content              | %          | 18.03   | 18.12   | -                  | 18-8-31/MU (Titrimetri)         |
| 8  | Calcium (Ca)                 | mg / 100 g | 60.91   | 61.08   | -                  | 18-13-1/MU (ICP-OES)            |
| 9  | Phosphorus (P)               | mg / kg    | 1552.21 | 1556.58 | -                  | 18-13-1/MU (ICP-OES)            |
| 10 | Iron (Fe)                    | mg / 100 g | 4.64    | 4.60    | -                  | 18-13-1/MU (ICP-OES)            |
| 11 | Magnesium (Mg)               | mg / 100 g | 19.54   | 19.74   | -                  | 18-13-1/MU (ICP-OES)            |

Bogor, September 02, 2025  
PT. Saraswanti Indo Genetech



Dwi Yulianto Laksono, S.Si  
General Laboratory Manager



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Result Of Analysis | Page

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## Lampiran 3 Hasil Laboratorium Uji Kimia Tempe Sampel T1



28.1/F-PP Revisi 5

### IV. Result / Hasil Uji

| No | Parameter                    | Unit       | Simplo  | Duplo   | Limit Of Detection | Method                          |
|----|------------------------------|------------|---------|---------|--------------------|---------------------------------|
| 1  | Ash Content                  | %          | 1.85    | 1.88    | -                  | SNI 01-2891-1992 butir 6.1      |
| 2  | Calorie From Fat             | Kcal/100 g | 95.04   | 93.33   | -                  | 18-8-9/MU/SMM-SIG (perhitungan) |
| 3  | Total Fat                    | %          | 10.56   | 10.37   | -                  | 18-8-5/MU (Gravimetri)          |
| 4  | Moisture Content             | %          | 62.63   | 62.45   | -                  | SNI 3144:2015 lampiran A.3      |
| 5  | Total Calories               | Kcal/100 g | 194.88  | 194.53  | -                  | 18-8-9/MU/SMM-SIG (perhitungan) |
| 6  | Carbohydrate (By Difference) | %          | 6.6     | 6.77    | -                  | 18-8-9/MU (perhitungan)         |
| 7  | Protein Content              | %          | 18.36   | 18.53   | -                  | 18-8-31/MU (Titrimetri)         |
| 8  | Calcium (Ca)                 | mg / 100 g | 440.47  | 445.08  | -                  | 18-13-1/MU (ICP-OES)            |
| 9  | Phosphorus (P)               | mg / kg    | 3166.73 | 3186.83 | -                  | 18-13-1/MU (ICP-OES)            |
| 10 | Iron (Fe)                    | mg / 100 g | 3.39    | 3.39    | -                  | 18-13-1/MU (ICP-OES)            |
| 11 | Magnesium (Mg)               | mg / 100 g | 24.50   | 24.85   | -                  | 18-13-1/MU (ICP-OES)            |

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## Lampiran 4 Hasil Laboratorium Uji Kimia Tempe Sampel T2



28.1/F-PP Revisi 5

### IV. Result / Hasil Uji

| No | Parameter                    | Unit       | Simplo  | Duplo   | Limit Of Detection | Method                          |
|----|------------------------------|------------|---------|---------|--------------------|---------------------------------|
| 1  | Ash Content                  | %          | 3.23    | 3.20    | -                  | SNI 01-2891-1992 butir 6.1      |
| 2  | Calorie From Fat             | Kcal/100 g | 98.19   | 97.74   | -                  | 18-8-9/MU/SMM-SIG (perhitungan) |
| 3  | Total Fat                    | %          | 10.91   | 10.86   | -                  | 18-8-5/MU (Gravimetri)          |
| 4  | Moisture Content             | %          | 61.89   | 61.95   | -                  | SNI 3144:2015 lampiran A.3      |
| 5  | Total Calories               | Kcal/100 g | 194.07  | 193.70  | -                  | 18-8-9/MU/SMM-SIG (perhitungan) |
| 6  | Carbohydrate (By Difference) | %          | 5.82    | 5.57    | -                  | 18-8-9/MU (perhitungan)         |
| 7  | Protein Content              | %          | 18.15   | 18.42   | -                  | 18-8-31/MU (Titrimetri)         |
| 8  | Calcium (Ca)                 | mg / 100 g | 888.26  | 884.81  | -                  | 18-13-1/MU (ICP-OES)            |
| 9  | Phosphorus (P)               | mg / kg    | 5273.91 | 5243.78 | -                  | 18-13-1/MU (ICP-OES)            |
| 10 | Iron (Fe)                    | mg / 100 g | 2.33    | 2.33    | -                  | 18-13-1/MU (ICP-OES)            |
| 11 | Magnesium (Mg)               | mg / 100 g | 32.15   | 31.98   | -                  | 18-13-1/MU (ICP-OES)            |

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## Lampiran 5 Surat Pernyataan

### SURAT PERNYATAAN MENJADI PANELIS (INFORMED CONSENT)

Saya yang bertanda tangan dibawah ini:

Nama :

Umur :

Kelas :

Alamat :

Telp/hp : Dengan sukarela dari tanpa paksaan menyatakan bahwa bersedia ikut berpartisipasi menjadi panelis penelitian “Daya terima dan uji kimia tempe (*Rhizopus oryzae*) dengan Fortifikasi tepung tulang ikan nila (*Oreochromis niloticus*)” yang akan dilakukan oleh Indah Rahma Farica dari Program Studi Sarjana Terapan Gizi dan Dietetika Jurusan Gizi Politeknik Kemenkes Medan.

Lubuk Pakam, 2025

Mengetahui

Peneliti

Panelis

(Indah Rahma Farica )

( )

## Lampiran 6 Formulir Uji Daya Terima

### FORMULIR UJI ORGANOLEPTIK

Nama Panelis :

Tanggal Pengujian :

Instruksi : Berilah penilaian anda terhadap warna, tekstur, rasa dan aroma lalu *aftertaste* tempe dengan fortifikasi tepung tulang ikan nila pada setiap kode berdasarkan tingkat kesukaan yang paling anda sukai. Pada setiap panelis yang akan mencicipi, minum air putih terlebih dahulu. Nyatakan penilaian anda dengan skala sebagai berikut:

- a. Amat suka : 5
- b. Sangat suka : 4
- c. Suka : 3
- d. Kurang suka : 2
- e. Tidak suka : 1

| No. | Kode bahan | Komponen Yang Dinilai |         |      |       |
|-----|------------|-----------------------|---------|------|-------|
|     |            | Warna                 | Tekstur | Rasa | Aroma |
| 1.  | 0.132      |                       |         |      |       |
| 2.  | 0.203      |                       |         |      |       |
| 3.  | 0.401      |                       |         |      |       |
| 4.  | 0.442      |                       |         |      |       |
| 5.  | 0.669      |                       |         |      |       |
| 6.  | 0.832      |                       |         |      |       |

## Lampiran 7 Master Table

### Rekapitulasi rata-rata nilai kesukaan terhadap warna, tekstur, rasa, aroma

| N<br>O | Warna       |             |                               |             |             |                           |             |             |                           | Tekstur     |             |                               |             |             |                           |             |             |                           | Rasa        |             |                               |             |             |                           |             |             |                           | Aroma       |             |                               |             |             |                           |             |             |                           |   |         |
|--------|-------------|-------------|-------------------------------|-------------|-------------|---------------------------|-------------|-------------|---------------------------|-------------|-------------|-------------------------------|-------------|-------------|---------------------------|-------------|-------------|---------------------------|-------------|-------------|-------------------------------|-------------|-------------|---------------------------|-------------|-------------|---------------------------|-------------|-------------|-------------------------------|-------------|-------------|---------------------------|-------------|-------------|---------------------------|---|---------|
|        | T<br>0<br>A | T<br>0<br>B | R<br>AT<br>A-<br>R<br>AT<br>A | T<br>1<br>A | T<br>1<br>B | R<br>at<br>a-<br>ra<br>ta | T<br>2<br>A | T<br>2<br>B | R<br>at<br>a-<br>ra<br>ta | T<br>0<br>A | T<br>0<br>B | R<br>AT<br>A-<br>R<br>AT<br>A | T<br>1<br>A | T<br>1<br>B | R<br>at<br>a-<br>ra<br>ta | T<br>2<br>A | T<br>2<br>B | R<br>at<br>a-<br>ra<br>ta | T<br>0<br>A | T<br>0<br>B | R<br>AT<br>A-<br>R<br>AT<br>A | T<br>1<br>A | T<br>1<br>B | R<br>at<br>a-<br>ra<br>ta | T<br>2<br>A | T<br>2<br>B | R<br>at<br>a-<br>ra<br>ta | T<br>0<br>A | T<br>0<br>B | R<br>AT<br>A-<br>R<br>AT<br>A | T<br>1<br>A | T<br>1<br>B | R<br>at<br>a-<br>ra<br>ta | T<br>2<br>A | T<br>2<br>B | R<br>at<br>a-<br>ra<br>ta |   |         |
| 1      | 4           | 4           | 4                             | 4           | 4           | 4                         | 4           | 4           | 4                         | 1           | 4           | 4                             | 4           | 4           | 4                         | 4           | 4           | 4                         | 4           | 1           | 5                             | 4           | 4,<br>5     | 5                         | 4           | 4,<br>5     | 4                         | 4           | 4           | 4                             | 4           | 1           | 4                         | 4           | 4           | 4                         | 5 | 4,<br>5 |
| 2      | 4           | 4           | 4                             | 4           | 4           | 4                         | 4           | 4           | 4                         | 2           | 4           | 5                             | 4,<br>5     | 3           | 5                         | 4           | 4           | 4                         | 4           | 2           | 3                             | 4           | 3,<br>5     | 5                         | 5           | 5           | 5                         | 4           | 3           | 3,<br>5                       | 2           | 5           | 4                         | 4,<br>5     | 3           | 5                         | 4 |         |
| 3      | 3           | 4           | 3,5                           | 4           | 4           | 4                         | 4           | 4           | 4                         | 3           | 3           | 3                             | 3           | 3           | 3                         | 3           | 4           | 4                         | 4           | 3           | 3                             | 4           | 3,<br>5     | 3                         | 3           | 3           | 3                         | 4           | 3,<br>5     | 3                             | 4           | 3           | 3                         | 4           | 4           | 4                         | 4 |         |
| 4      | 4           | 3           | 3,5                           | 4           | 3           | 3,<br>5                   | 3           | 5           | 4                         | 4           | 4           | 3                             | 3,<br>5     | 3           | 3                         | 3           | 3           | 5                         | 4           | 4           | 5                             | 3           | 4           | 3                         | 3           | 3           | 3                         | 3           | 3           | 4                             | 4           | 3           | 3,<br>5                   | 3           | 3           | 3                         | 3 |         |
| 5      | 4           | 4           | 4                             | 3           | 3           | 3                         | 4           | 4           | 4                         | 5           | 4           | 4                             | 4           | 4           | 3                         | 3,<br>5     | 4           | 4                         | 4           | 5           | 4                             | 4           | 4           | 4                         | 4           | 4           | 4                         | 5           | 4,<br>5     | 5                             | 3           | 4           | 3,<br>5                   | 3           | 4           | 3,<br>5                   |   |         |
| 6      | 5           | 4           | 4,5                           | 3           | 5           | 4                         | 5           | 5           | 5                         | 6           | 5           | 4                             | 4,<br>5     | 4           | 5                         | 4,<br>5     | 5           | 5                         | 5           | 6           | 5                             | 4           | 4,<br>5     | 4                         | 5           | 4,<br>5     | 5                         | 5           | 5           | 6                             | 5           | 5           | 5                         | 5           | 5           | 5                         | 5 |         |
| 7      | 3           | 3           | 3                             | 4           | 3           | 3,<br>5                   | 3           | 4           | 3,<br>5                   | 7           | 3           | 3                             | 3           | 4           | 4                         | 4           | 4           | 3                         | 3,<br>5     | 7           | 4                             | 4           | 4           | 3                         | 3           | 3           | 3                         | 3           | 3           | 7                             | 3           | 3           | 3                         | 3           | 3           | 3                         | 3 |         |
| 8      | 3           | 4           | 3,5                           | 4           | 4           | 4                         | 5           | 4           | 4,<br>5                   | 8           | 3           | 4                             | 3,<br>5     | 4           | 4                         | 4           | 5           | 5                         | 5           | 8           | 3                             | 4           | 3,<br>5     | 4                         | 5           | 4,<br>5     | 5                         | 5           | 5           | 8                             | 4           | 4           | 4                         | 4           | 5           | 4,<br>5                   |   |         |
| 9      | 3           | 4           | 3,5                           | 3           | 3           | 3                         | 4           | 3           | 3,<br>5                   | 9           | 3           | 4                             | 3,<br>5     | 3           | 3                         | 3           | 3           | 4                         | 3,<br>5     | 9           | 3                             | 3           | 3           | 3                         | 3           | 3           | 4                         | 4           | 4           | 9                             | 4           | 4           | 4                         | 3           | 4           | 3,<br>5                   |   |         |
| 10     | 3           | 3           | 3                             | 3           | 3           | 3                         | 3           | 3           | 3                         | 1<br>0      | 3           | 4                             | 3,<br>5     | 4           | 3                         | 3,<br>5     | 4           | 3                         | 3,<br>5     | 1<br>0      | 3                             | 3           | 3           | 4                         | 4           | 4           | 3                         | 3           | 3           | 10                            | 3           | 3           | 3                         | 4           | 3           | 3,<br>5                   |   |         |
| 11     | 5           | 4           | 4,5                           | 3           | 5           | 4                         | 5           | 3           | 4                         | 1<br>1      | 5           | 4                             | 4,<br>5     | 4           | 5                         | 4,<br>5     | 5           | 4                         | 4,<br>5     | 1<br>1      | 5                             | 4           | 4,<br>5     | 4                         | 4           | 4           | 5                         | 5           | 5           | 11                            | 5           | 5           | 5                         | 3           | 5           | 4                         |   |         |
| 12     | 4           | 4           | 4                             | 3           | 4           | 3,<br>5                   | 3           | 3           | 3                         | 1           | 4           | 4                             | 4           | 4           | 3                         | 3,<br>5     | 4           | 4                         | 4           | 1           | 3                             | 4           | 3,<br>5     | 3                         | 4           | 3,<br>5     | 4                         | 4           | 4           | 12                            | 4           | 3           | 3,<br>5                   | 4           | 3           | 3,<br>5                   |   |         |

|    |   |   |     |   |   |         |   |   |         |        |   |   |         |   |   |         |   |   |         |        |   |   |         |   |   |         |         |   |         |         |    |   |         |   |   |         |         |
|----|---|---|-----|---|---|---------|---|---|---------|--------|---|---|---------|---|---|---------|---|---|---------|--------|---|---|---------|---|---|---------|---------|---|---------|---------|----|---|---------|---|---|---------|---------|
|    |   |   |     |   |   | 5       |   |   |         | 2      |   |   |         |   |   | 5       |   |   |         | 2      |   |   | 5       |   |   |         |         | 5 |         |         |    | 5 |         |   | 5 |         |         |
| 13 | 3 | 3 | 3   | 3 | 5 | 4       | 3 | 5 | 4       | 1<br>3 | 5 | 3 | 4       | 4 | 3 | 3,<br>5 | 4 | 5 | 4,<br>5 | 1<br>3 | 3 | 5 | 4       | 5 | 4 | 5       | 4,<br>5 | 5 | 4       | 4,<br>5 | 13 | 3 | 3       | 3 | 4 | 3       | 3,<br>5 |
| 14 | 5 | 5 | 5   | 4 | 3 | 3,<br>5 | 4 | 4 | 4       | 1<br>4 | 5 | 5 | 5       | 3 | 4 | 3,<br>5 | 5 | 4 | 4,<br>5 | 1<br>4 | 5 | 4 | 4,<br>5 | 4 | 5 | 4,<br>5 | 5       | 4 | 4,<br>5 | 14      | 3  | 4 | 3,<br>5 | 5 | 4 | 4,<br>5 |         |
| 15 | 4 | 3 | 3,5 | 3 | 4 | 3,<br>5 | 3 | 3 | 3       | 1<br>5 | 3 | 3 | 3       | 4 | 3 | 3,<br>5 | 4 | 3 | 3,<br>5 | 1<br>5 | 3 | 3 | 3       | 4 | 3 | 3,<br>5 | 3       | 4 | 3,<br>5 | 15      | 3  | 3 | 3       | 3 | 4 | 3,<br>5 |         |
| 16 | 3 | 5 | 4   | 3 | 4 | 3,<br>5 | 4 | 4 | 4       | 1<br>6 | 3 | 3 | 3       | 3 | 3 | 3       | 4 | 3 | 3,<br>5 | 1<br>6 | 3 | 3 | 3       | 3 | 4 | 3,<br>5 | 4       | 3 | 3,<br>5 | 16      | 3  | 4 | 3,<br>5 | 4 | 4 | 4       |         |
| 17 | 4 | 4 | 4   | 4 | 5 | 4,<br>5 | 4 | 4 | 4       | 1<br>7 | 3 | 4 | 3,<br>5 | 4 | 4 | 4       | 3 | 3 | 3       | 1<br>7 | 5 | 5 | 5       | 4 | 4 | 4       | 4       | 4 | 4       | 17      | 5  | 5 | 5       | 4 | 4 | 4       |         |
| 18 | 4 | 4 | 4   | 5 | 3 | 4       | 4 | 4 | 4       | 1<br>8 | 4 | 4 | 4       | 5 | 4 | 4,<br>5 | 4 | 5 | 4,<br>5 | 1<br>8 | 5 | 5 | 5       | 5 | 4 | 4,<br>5 | 4       | 5 | 4,<br>5 | 18      | 5  | 5 | 5       | 5 | 4 | 4,<br>5 |         |
| 19 | 3 | 3 | 3   | 4 | 3 | 3,<br>5 | 3 | 3 | 3       | 1<br>9 | 3 | 4 | 3,<br>5 | 3 | 3 | 3       | 3 | 3 | 3       | 1<br>9 | 4 | 4 | 4       | 4 | 4 | 4       | 4       | 4 | 4       | 19      | 3  | 3 | 3       | 4 | 3 | 3,<br>5 |         |
| 20 | 3 | 3 | 3   | 3 | 3 | 3       | 3 | 3 | 3       | 2<br>0 | 3 | 3 | 3       | 4 | 3 | 3,<br>5 | 4 | 3 | 3,<br>5 | 2<br>0 | 3 | 3 | 3       | 3 | 3 | 3       | 3       | 3 | 3       | 20      | 3  | 3 | 3       | 3 | 3 | 3       |         |
| 21 | 5 | 5 | 5   | 5 | 5 | 5       | 4 | 5 | 4,<br>5 | 2<br>1 | 5 | 5 | 5       | 5 | 3 | 4       | 3 | 4 | 3,<br>5 | 2<br>1 | 5 | 5 | 5       | 5 | 3 | 4       | 3       | 5 | 4       | 21      | 4  | 5 | 4,<br>5 | 5 | 4 | 4,<br>5 |         |
| 22 | 3 | 3 | 3   | 3 | 3 | 3       | 3 | 3 | 3       | 2<br>2 | 3 | 4 | 3,<br>5 | 3 | 4 | 3,<br>5 | 4 | 4 | 4       | 2<br>2 | 3 | 3 | 3       | 4 | 3 | 3,<br>5 | 3       | 3 | 3       | 22      | 4  | 4 | 4       | 3 | 4 | 3,<br>5 |         |
| 23 | 4 | 4 | 4   | 5 | 4 | 4,<br>5 | 3 | 3 | 3       | 2<br>3 | 5 | 3 | 4       | 4 | 4 | 4       | 4 | 4 | 4       | 2<br>3 | 5 | 3 | 4       | 5 | 3 | 4       | 4       | 3 | 3,<br>5 | 23      | 4  | 4 | 4       | 4 | 3 | 3,<br>5 |         |
| 24 | 4 | 3 | 3,5 | 5 | 5 | 5       | 4 | 3 | 3,<br>5 | 2<br>4 | 3 | 4 | 3,<br>5 | 3 | 3 | 3       | 3 | 4 | 3,<br>5 | 2<br>4 | 3 | 4 | 3,<br>5 | 3 | 3 | 3       | 3       | 4 | 3,<br>5 | 24      | 5  | 5 | 5       | 4 | 3 | 3,<br>5 |         |
| 25 | 5 | 4 | 4,5 | 4 | 3 | 3,<br>5 | 4 | 5 | 4,<br>5 | 2<br>5 | 3 | 4 | 3,<br>5 | 3 | 3 | 3       | 4 | 4 | 4       | 2<br>5 | 4 | 5 | 4,<br>5 | 3 | 4 | 3,<br>5 | 4       | 3 | 3,<br>5 | 25      | 3  | 3 | 3       | 4 | 4 | 4       |         |
| 26 | 5 | 5 | 5   | 5 | 5 | 5       | 5 | 5 | 5       | 2<br>6 | 5 | 5 | 5       | 5 | 5 | 5       | 5 | 4 | 4,<br>5 | 2<br>6 | 5 | 5 | 5       | 5 | 3 | 4       | 5       | 4 | 4,<br>5 | 26      | 4  | 4 | 4       | 4 | 4 | 4       |         |
| 27 | 5 | 4 | 4,5 | 5 | 4 | 4,<br>5 | 5 | 4 | 4,<br>5 | 2<br>7 | 5 | 4 | 4,<br>5 | 5 | 5 | 5       | 5 | 4 | 4,<br>5 | 2<br>7 | 5 | 4 | 4,<br>5 | 5 | 4 | 4,<br>5 | 5       | 4 | 4,<br>5 | 27      | 5  | 4 | 4,<br>5 | 5 | 4 | 4,<br>5 |         |
| 28 | 5 | 5 | 5   | 4 | 4 | 4       | 4 | 5 | 4,<br>5 | 2<br>8 | 5 | 5 | 5       | 4 | 4 | 4       | 4 | 5 | 4,<br>5 | 2<br>8 | 5 | 5 | 5       | 4 | 4 | 4       | 4       | 5 | 4,<br>5 | 28      | 5  | 5 | 5       | 4 | 4 | 4       |         |

|    |   |   |     |   |   |         |   |   |         |        |   |   |         |   |   |         |   |   |         |        |   |   |         |   |   |         |   |   |         |    |   |   |         |   |   |         |
|----|---|---|-----|---|---|---------|---|---|---------|--------|---|---|---------|---|---|---------|---|---|---------|--------|---|---|---------|---|---|---------|---|---|---------|----|---|---|---------|---|---|---------|
| 29 | 3 | 3 | 3   | 4 | 4 | 4       | 3 | 4 | 3,<br>5 | 2<br>9 | 3 | 3 | 3       | 4 | 4 | 4       | 3 | 4 | 3,<br>5 | 2<br>9 | 3 | 3 | 3       | 4 | 4 | 4       | 3 | 4 | 3,<br>5 | 29 | 3 | 3 | 3       | 4 | 4 | 4       |
| 30 | 4 | 4 | 4   | 4 | 4 | 4       | 4 | 4 | 4       | 3<br>0 | 5 | 4 | 4,<br>5 | 4 | 5 | 4,<br>5 | 5 | 5 | 5       | 3<br>0 | 5 | 5 | 5       | 5 | 5 | 5       | 5 | 5 | 5       | 30 | 5 | 5 | 5       | 5 | 5 | 5       |
| 31 | 4 | 4 | 4   | 4 | 4 | 4       | 4 | 4 | 4       | 3<br>1 | 5 | 4 | 4,<br>5 | 5 | 4 | 4,<br>5 | 5 | 4 | 4,<br>5 | 3<br>1 | 4 | 5 | 4,<br>5 | 5 | 4 | 4,<br>5 | 5 | 5 | 5       | 31 | 3 | 4 | 3,<br>5 | 3 | 5 | 4       |
| 32 | 4 | 3 | 3,5 | 5 | 3 | 4       | 4 | 3 | 3,<br>5 | 3<br>2 | 5 | 5 | 5       | 4 | 4 | 4       | 4 | 4 | 4       | 3<br>2 | 4 | 4 | 4       | 5 | 4 | 4,<br>5 | 4 | 5 | 4,<br>5 | 32 | 4 | 5 | 4,<br>5 | 4 | 4 | 4       |
| 33 | 3 | 3 | 3   | 3 | 4 | 3,<br>5 | 3 | 4 | 3,<br>5 | 3<br>3 | 4 | 3 | 3,<br>5 | 3 | 3 | 3       | 4 | 3 | 3,<br>5 | 3<br>3 | 3 | 4 | 3,<br>5 | 3 | 4 | 3,<br>5 | 4 | 3 | 3,<br>5 | 33 | 5 | 4 | 4,<br>5 | 3 | 4 | 3,<br>5 |
| 34 | 5 | 4 | 4,5 | 5 | 4 | 4,<br>5 | 5 | 4 | 4,<br>5 | 3<br>4 | 4 | 5 | 4,<br>5 | 5 | 5 | 5       | 4 | 5 | 4,<br>5 | 3<br>4 | 4 | 5 | 4,<br>5 | 5 | 4 | 4,<br>5 | 5 | 3 | 4       | 34 | 5 | 4 | 4,<br>5 | 4 | 4 | 4       |
| 35 | 4 | 4 | 4   | 3 | 3 | 3       | 4 | 4 | 4       |        | 3 | 3 | 3       | 4 | 4 | 4       | 3 | 3 | 3       | 3<br>5 | 3 | 3 | 3       | 3 | 3 | 3       | 3 | 3 | 3       | 35 | 4 | 3 | 3,<br>5 | 3 | 3 | 3       |
| 36 | 4 | 3 | 3,5 | 3 | 4 | 3,<br>5 | 3 | 3 | 3       | 3<br>6 | 3 | 3 | 3       | 4 | 3 | 3,<br>5 | 3 | 3 | 3       | 3<br>6 | 3 | 3 | 3       | 3 | 3 | 3       | 3 | 3 | 3       | 36 | 3 | 3 | 3       | 3 | 4 | 3,<br>5 |
| 37 | 5 | 4 | 4,5 | 3 | 4 | 3,<br>5 | 4 | 4 | 4       | 3<br>7 | 5 | 4 | 4,<br>5 | 5 | 4 | 4,<br>5 | 4 | 4 | 4       | 3<br>7 | 5 | 4 | 4,<br>5 | 5 | 4 | 4,<br>5 | 5 | 5 | 5       | 37 | 4 | 4 | 4       | 5 | 4 | 4,<br>5 |
| 38 | 3 | 4 | 3,5 | 4 | 3 | 3,<br>5 | 4 | 3 | 3,<br>5 | 3<br>8 | 3 | 4 | 3,<br>5 | 4 | 3 | 3,<br>5 | 4 | 3 | 3,<br>5 | 3<br>8 | 4 | 4 | 4       | 3 | 3 | 3       | 4 | 4 | 4       | 38 | 4 | 4 | 4       | 4 | 3 | 3,<br>5 |
| 39 | 3 | 4 | 3,5 | 4 | 5 | 4,<br>5 | 5 | 4 | 4,<br>5 | 3<br>9 | 3 | 3 | 3       | 4 | 4 | 4       | 4 | 4 | 4       | 3<br>9 | 3 | 4 | 3,<br>5 | 4 | 5 | 4,<br>5 | 3 | 4 | 3,<br>5 | 39 | 3 | 3 | 3       | 4 | 4 | 4       |
| 40 | 3 | 3 | 3   | 4 | 4 | 4       | 4 | 4 | 4       | 4<br>0 | 3 | 3 | 3       | 3 | 4 | 3,<br>5 | 4 | 4 | 4       | 4<br>0 | 3 | 3 | 3       | 4 | 4 | 4       | 3 | 4 | 3,<br>5 | 40 | 3 | 3 | 3       | 4 | 4 | 4       |
| 41 | 3 | 3 | 3   | 3 | 3 | 3       | 4 | 3 | 3,<br>5 | 4<br>1 | 3 | 5 | 4       | 3 | 4 | 3,<br>5 | 5 | 4 | 4,<br>5 | 4<br>1 | 3 | 5 | 4       | 4 | 4 | 4       | 5 | 3 | 4       | 41 | 4 | 4 | 4       | 3 | 3 | 3       |
| 42 | 5 | 4 | 4,5 | 4 | 5 | 4,<br>5 | 4 | 4 | 4       | 4<br>2 | 5 | 5 | 5       | 4 | 4 | 4       | 4 | 4 | 4       | 4<br>2 | 5 | 5 | 5       | 5 | 5 | 5       | 5 | 5 | 5       | 42 | 5 | 4 | 4,<br>5 | 5 | 4 | 4,<br>5 |
| 43 | 4 | 5 | 4,5 | 4 | 4 | 4       | 5 | 4 | 4,<br>5 | 4<br>3 | 5 | 5 | 5       | 4 | 4 | 4       | 5 | 4 | 4,<br>5 | 4<br>3 | 5 | 5 | 5       | 4 | 4 | 4       | 5 | 4 | 4,<br>5 | 43 | 5 | 5 | 5       | 4 | 4 | 4       |
| 44 | 4 | 5 | 4,5 | 4 | 3 | 3,<br>5 | 4 | 4 | 4       | 4<br>4 | 3 | 4 | 3,<br>5 | 4 | 3 | 3,<br>5 | 3 | 4 | 3,<br>5 | 4<br>4 | 4 | 3 | 3,<br>5 | 3 | 3 | 3       | 4 | 4 | 4       | 44 | 4 | 4 | 4       | 3 | 3 | 3       |
| 45 | 3 | 4 | 3,5 | 4 | 4 | 4       | 5 | 5 | 5       | 4<br>5 | 4 | 3 | 3,<br>5 | 5 | 4 | 4,<br>5 | 5 | 5 | 5       | 4<br>5 | 4 | 3 | 3,<br>5 | 5 | 5 | 5       | 5 | 5 | 5       | 45 | 3 | 4 | 3,<br>5 | 5 | 5 | 5       |

|    |   |   |     |   |   |         |   |   |         |        |   |   |         |   |   |         |   |   |         |        |   |   |         |   |   |         |   |   |         |    |   |   |         |   |   |         |
|----|---|---|-----|---|---|---------|---|---|---------|--------|---|---|---------|---|---|---------|---|---|---------|--------|---|---|---------|---|---|---------|---|---|---------|----|---|---|---------|---|---|---------|
| 46 | 3 | 4 | 3,5 | 4 | 5 | 4,<br>5 | 5 | 5 | 5       | 4<br>6 | 5 | 3 | 4       | 5 | 5 | 5       | 5 | 4 | 4,<br>5 | 4<br>6 | 4 | 4 | 4       | 5 | 4 | 4,<br>5 | 5 | 3 | 4       | 46 | 4 | 4 | 4       | 5 | 4 | 4,<br>5 |
| 47 | 4 | 4 | 4   | 4 | 5 | 4,<br>5 | 5 | 4 | 4,<br>5 | 4<br>7 | 4 | 5 | 4,<br>5 | 3 | 4 | 3,<br>5 | 5 | 4 | 4,<br>5 | 4<br>7 | 3 | 5 | 4       | 5 | 4 | 4,<br>5 | 5 | 4 | 4,<br>5 | 47 | 3 | 4 | 3,<br>5 | 5 | 4 | 4,<br>5 |
| 48 | 3 | 3 | 3   | 4 | 5 | 4,<br>5 | 5 | 5 | 5       | 4<br>8 | 3 | 3 | 3       | 4 | 5 | 4,<br>5 | 5 | 5 | 5       | 4<br>8 | 3 | 4 | 3,<br>5 | 5 | 5 | 5       | 5 | 5 | 5       | 48 | 3 | 4 | 3,<br>5 | 5 | 5 | 5       |
| 49 | 3 | 5 | 4   | 3 | 4 | 3,<br>5 | 5 | 5 | 5       | 4<br>9 | 3 | 3 | 3       | 5 | 5 | 5       | 5 | 3 | 4       | 4<br>9 | 4 | 3 | 3,<br>5 | 5 | 5 | 5       | 5 | 5 | 5       | 49 | 3 | 3 | 3       | 5 | 4 | 4,<br>5 |
| 50 | 3 | 4 | 3,5 | 5 | 4 | 4,<br>5 | 4 | 5 | 4,<br>5 | 5<br>0 | 3 | 5 | 4       | 5 | 4 | 4,<br>5 | 4 | 5 | 4,<br>5 | 5<br>0 | 3 | 5 | 4       | 5 | 5 | 5       | 4 | 5 | 4,<br>5 | 50 | 3 | 3 | 3       | 5 | 5 | 5       |
| 51 | 3 | 4 | 3,5 | 4 | 5 | 4,<br>5 | 4 | 5 | 4,<br>5 | 5<br>1 | 4 | 3 | 3,<br>5 | 5 | 4 | 4,<br>5 | 5 | 5 | 5       | 5<br>1 | 4 | 5 | 4,<br>5 | 5 | 5 | 5       | 5 | 5 | 5       | 51 | 3 | 3 | 3       | 5 | 5 | 5       |
| 52 | 3 | 3 | 3   | 4 | 3 | 3,<br>5 | 4 | 4 | 4       | 5<br>2 | 3 | 4 | 3,<br>5 | 4 | 4 | 4       | 4 | 4 | 4       | 5<br>2 | 3 | 4 | 3,<br>5 | 4 | 3 | 3,<br>5 | 4 | 4 | 4       | 52 | 3 | 4 | 3,<br>5 | 4 | 4 | 4       |

## Lampiran 8 Hasil Uji SPSS Warna

| Tests of Normality       |                                 |    |      |              |    |      |
|--------------------------|---------------------------------|----|------|--------------|----|------|
|                          | Kolmogorov-Smirnov <sup>a</sup> |    |      | Shapiro-Wilk |    |      |
|                          | Statistic                       | df | Sig. | Statistic    | df | Sig. |
| rerata kontrol warna     | ,185                            | 52 | ,000 | ,900         | 52 | ,000 |
| rerata perlakuan 1 warna | ,178                            | 52 | ,000 | ,915         | 52 | ,001 |
| rerata perlakuan 2 warna | ,199                            | 52 | ,000 | ,909         | 52 | ,001 |

a. Lilliefors Significance Correction

## Uji Kruskal-Wallis

| Ranks          |                 |     |           |
|----------------|-----------------|-----|-----------|
|                | perlakuan warna | N   | Mean Rank |
| gabungan warna | t0w             | 52  | 71,43     |
|                | t1w             | 52  | 78,12     |
|                | t2w             | 52  | 85,95     |
|                | Total           | 156 |           |

| Test Statistics <sup>a,b</sup> |                |
|--------------------------------|----------------|
|                                | gabungan warna |
| Chi-Square                     | 2,851          |
| df                             | 2              |
| Asymp. Sig.                    | ,240           |

a. Kruskal Wallis Test

b. Grouping Variable:  
perlakuan warna

## Lampiran 9 Hasil Uji SPSS Tekstur

| Tests of Normality         |                                 |    |      |              |    |      |
|----------------------------|---------------------------------|----|------|--------------|----|------|
|                            | Kolmogorov-Smirnov <sup>a</sup> |    |      | Shapiro-Wilk |    |      |
|                            | Statistic                       | df | Sig. | Statistic    | df | Sig. |
| rerata kontrol tekstur     | ,213                            | 52 | ,000 | ,884         | 52 | ,000 |
| rerata perlakuan 1 tekstur | ,172                            | 52 | ,001 | ,914         | 52 | ,001 |
| rerata perlakuan 2 tekstur | ,167                            | 52 | ,001 | ,918         | 52 | ,002 |

a. Lilliefors Significance Correction

## Uji Kruskal-Wallis

| Ranks               |                      |     |              |
|---------------------|----------------------|-----|--------------|
|                     | perlakuan<br>tekstur | N   | Mean<br>Rank |
| gabungan<br>tekstur | t0t                  | 52  | 71,63        |
|                     | t1t                  | 52  | 76,35        |
|                     | t2t                  | 52  | 87,52        |
|                     | Total                | 156 |              |

| Test Statistics <sup>a,b</sup> |                     |
|--------------------------------|---------------------|
|                                | gabungan<br>tekstur |
| Chi-Square                     | 3,569               |
| df                             | 2                   |
| Asymp.<br>Sig.                 | ,168                |

a. Kruskal Wallis Test

b. Grouping Variable:  
perlakuan tekstur

## Lampiran 10 Hasil Uji SPSS Rasa

### Tests of Normality

|                         | Kolmogorov-Smirnov <sup>a</sup> |    |      | Shapiro-Wilk |    |      |
|-------------------------|---------------------------------|----|------|--------------|----|------|
|                         | Statistic                       | df | Sig. | Statistic    | df | Sig. |
| rerata kontrol rasa     | ,167                            | 52 | ,001 | ,901         | 52 | ,000 |
| rerata perlakuan 1 rasa | ,181                            | 52 | ,000 | ,894         | 52 | ,000 |
| rerata perlakuan 2 rasa | ,158                            | 52 | ,002 | ,900         | 52 | ,000 |

a. Lilliefors Significance Correction

## Uji Kruskal-Wallis

### Ranks

|               | perlakuan rasa | N   | Mean Rank |
|---------------|----------------|-----|-----------|
| gabungan rasa | t0r            | 52  | 73,58     |
|               | t1r            | 52  | 79,57     |
|               | t2r            | 52  | 82,36     |
|               | Total          | 156 |           |

### Test Statistics<sup>a,b</sup>

|             | gabungan rasa |
|-------------|---------------|
| Chi-Square  | 1,070         |
| df          | 2             |
| Asymp. Sig. | ,586          |

a. Kruskal Wallis Test

b. Grouping Variable:  
perlakuan rasa

## Lampiran 11 Hasil Uji SPSS Aroma

**Tests of Normality**

|                          | Kolmogorov-Smirnov <sup>a</sup> |    |      | Shapiro-Wilk |    |      |
|--------------------------|---------------------------------|----|------|--------------|----|------|
|                          | Statistic                       | df | Sig. | Statistic    | df | Sig. |
| rerata kontrol aroma     | ,177                            | 52 | ,000 | ,872         | 52 | ,000 |
| rerata perlakuan 1 aroma | ,160                            | 52 | ,002 | ,918         | 52 | ,002 |
| rerata perlakuan 2 aroma | ,150                            | 52 | ,005 | ,899         | 52 | ,000 |

a. Lilliefors Significance Correction

## Uji Kruskal-Wallis

**Ranks**

|                | perlakuan<br>aroma | N   | Mean<br>Rank |
|----------------|--------------------|-----|--------------|
| gabungan aroma | t0a                | 52  | 67,96        |
|                | t1a                | 52  | 78,36        |
|                | t2a                | 52  | 89,18        |
|                | Total              | 156 |              |

**Test Statistics<sup>a,b</sup>**

|                | gabungan<br>aroma |
|----------------|-------------------|
| Chi-Square     | 6,004             |
| df             | 2                 |
| Asymp.<br>Sig. | ,050              |

a. Kruskal Wallis Test

b. Grouping Variable:  
perlakuan aroma

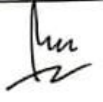
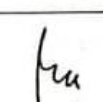
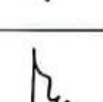
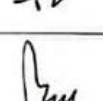
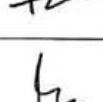
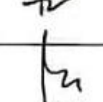
## Lampiran 12 Bukti Bimbingan

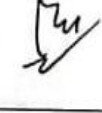
### Bukti Bimbingan Usulan Skripsi

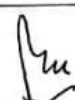
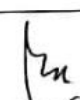
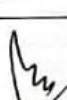
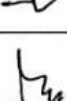
Nama : Indah Rahma Farica Simatupang  
 Nim : P01031222083  
 Judul : Daya Terima dan Uji Kimia Tempe (*Rhizopus oryzae*)  
 dengan Fortifikasi Tepung Tulang Ikan Nila (*Oreochromis niloticus*)

Nama pembimbing utama : Novriani Tarigan, DCN, M.Kes

| No | Tanggal          | Topik Bimbingan                                                                                              | T.Tangan Mahasiswa                                                                   | T.Tangan Pembimbing                                                                   |
|----|------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1  | 19 Februari 2025 | Mencari topik untuk di diskusikan, membaca artikel, dan belajar mendelay                                     |   |   |
| 2  | 3 Maret 2025     | Mencari jurnal tentang tulang ikan nila, dan tempe                                                           |  |  |
| 3  | 21 Maret 2025    | Mencari jurnal tentang ibu hamil yang mengalami preeklamsia dan kebutuhan kalsium untuk semua golongan umur. |  |  |
| 4  | 26 Maret 2025    | Menunjukkan hasil uji coba tempe dengan penambahan tepung tulang ikan nila.                                  |  |  |
| 5  | 8 April 2025     | Mendiskusikan Bab I dan Bab II                                                                               |  |  |

|    |                 |                                                                          |                                                                                       |                                                                                       |
|----|-----------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 6  | 16 April 2025   | Revisi Bab I                                                             |    |    |
| 7  | 21 April 2025   | Revisi Bab II                                                            |    |    |
| 8  | 23 April 2025   | Mendiskusikan Bab III                                                    |    |    |
| 9  | 07 Mei 2025     | Revisi Bab III                                                           |    |    |
| 10 | 14 Mei 2025     | Revisi Bab III                                                           |    |    |
| 11 | 27 Mei 2025     | Seminar Proposal                                                         |  |   |
| 12 | 04 Juli 2025    | Revisi hasil dari seminar proposal                                       |  |  |
| 13 | 15 Juli 2025    | Revisi hasil dari seminar proposal                                       |  |  |
| 14 | 18 Juli 2025    | ACC revisi proposal                                                      |  |  |
| 15 | 11 Agustus 2025 | Menunjukkan hasil produk tempe tepung tulang ikan nila dan mendiskusikan |  |  |

|    |                   |                                                      |                                                                                       |                                                                                       |
|----|-------------------|------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    |                   | pengiriman produk untuk diuji mutu kimia             |    |    |
| 16 | 14 Agustus 2025   | Melakukan pengiriman tempe ke laboratorium SIG Bogor |    |    |
| 17 | 21 Agustus 2025   | Melakukan uji daya terima panelis                    |    |    |
| 18 | 12 September 2025 | Mendiskusikan hasil uji kimia                        |    |    |
| 19 | 15 September 2025 | Mendiskusikan Bab IV dan V                           |   |   |
| 20 | 12 Januari 2026   | Mendiskusikan Bab IV dan V hasil data uji sensori    |  |  |
| 21 | 16 Januari 2026   | Mendiskusikan Bab IV dan V hasil data                |  |  |
| 22 | 21 Januari 2026   | Mendiskusikan penulisan Bab IV dan V                 |  |  |
| 23 | 27 Januari 2026   | Seminar Hasil                                        |  |  |

|    |                 |                                              |                                                                                      |                                                                                       |
|----|-----------------|----------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 24 | 03 Maret 2026   | Revisi perbaikan dari seminar hasil          |    |    |
| 25 | 24 April 2026   | Pengurusan EC                                |   |    |
| 26 | 11 Mei 2026     | Menerima/Acc revisi                          |   |    |
| 27 | 08 Juni 2026    | Diskusi mengenai penulisan abstrak           |   |    |
| 28 | 22 Juni 2026    | Hasil translate bahasa inggris abstrak       |   |    |
| 29 | 14 Juli 2026    | Pengecekan turnitin skripsi                  |  |   |
| 30 | 13 Agustus 2026 | Melakukan jilid lux dan tanda tangan skripsi |  |  |

### Lampiran 13 Dokumentasi Pembuatan Tepung Tulang Ikan Nila



Tulang ikan nila yang utuh



Tulang ikan dicuci dengan air bersih dan direndam dengan 50 ml cuka dan 2 liter selama 10 menit



Tulang ikan difresto selama 2 jam dengan air  $\frac{3}{4}$  air dengan api medium



Tulang ikan yang telah dikeringkan



Pengeringan dilakukan selama 5 jam dengan suhu 60°C



Setelah difresto, tulang ikan dikeringkan dalam cabinet dryer



Tulang ikan digiling dengan mesin penggiling merk Yamasuka



Setelah digiling, diayak dengan ayakan 100 mesh

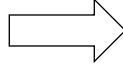


Tepung tulang ikan nila

#### Lampiran 14 Dokumentasi Pembuatan Tempe Fortifikasi Tepung Tulang Ikan Nila



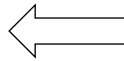
Kacang kedelai dicuci bersih dengan air mengalir.



Setelah itu, kacang kedelai direndam



Lalu membersihkan kacang kedelai dari kulit.



Kacang kedelai direbus



Kemudian, ragi ditambahkan sebanyak 2 g dan tepung tulang ikan sesuai dengan perlakuan.



Lalu tempe dibungkus kedalam plastik yang sudah dilubangi.



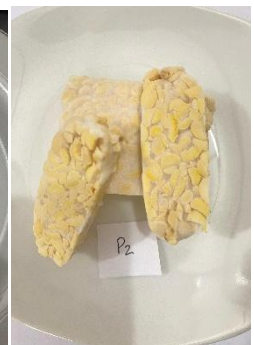
Kacang kedelai diinkubasi pada suhu selama 24 hingga 48 jam.

### Hasil tempe (kontrol)



### Hasil tempe dengan perlakuan penambahan tepung tulang ikan nila

1. P1 = 3 g Tepung tulang ikan nila    2. P2 = 5 g Tepung tulang ikan nila



### Lampiran 15 Dokumentasi Hasil Uji Organoleptik (Uji Panelis)

