**Lampiran 1. Bagan Alir Pembuatan Tepung Talas Termodifikasi**

Umbi Talas

Dicuci Umbi Talas hingga bersih, lakukan berulang.

Rendam dengan air selama ± 30 menit, cuci hingga bersih.

Fermentasi dengan bakteri *Lactobacillus casei* 3g dalam 1 kg sampel dengan air suling hingga umbi talas terendam merata.

Fermentasi dilakukan optimasi waktu 48 jam dan 72 jam

Hasil Fermentasi

Pengeringan

Dikeringkan di oven selama 24 jam pada suhu 55ºC

Penggilingan dan pengayakan

Diblender umbi talas yang telah di keringkan hingga

menjadi tepung kasar

Diayak menggunakan mesh

Tepung Talas Termodifikasi

**Lampiran 2. Bagan Alir Penetapan Kadar Protein**

Sampel

Ditimbang 1 gr sampel

Dimasukkan kedalam Beaker

Glass, ditambahkan 10 ml

*aquadest*, aduk hingga homogen

Setelah homogen dimasukkan kedalam erleyenmeyer, ditambahkan 20 ml *aquadest*, ditambahkan 0, 4 ml kalium oksalat dan 2-3 tetes fenolftalein

Dititrasi dengan NaOH 0,1 N hingga menjadi warna merah muda

Ditambahkan Formaldehid 40 % 0,2 ml dan ditambahkan 2-3 tetes fenolftalein .

Dititrasi kembali dengan NaOH 0,1N hingga merah muda tidak hilang, catat volume

Hasil

**Lampiran 3. Bagan Alir Penetapan Kadar Air**

Botol Timbang

Ditimbang Bobot botol timbang sebelum dioven

Dimasukkan ke oven suhu 105ºC selam 30 menit , kemudian desikator 15 menit

Lakukan hingga bobot tetap

Sampel

Ditimbang 2 gr kemudian masukkan kedalam botol timbang

Dioven selama 3 jam dengan suhu 105ºC

Dimasukkan desikator 15 menit , kemudian timbang

Dioven kembali 30 menit suhu 105ºC masukkan ke dalam desikator15 menit lakukan hingga bobot tetap , timbang.

Hasil

**Lampiran 4 . Bagan Alir Penetapan Kadar Abu**

Cawan Krus

Ditimbang cawan krus timbang sebelum dioven

Dimasukkan ke oven suhu 105ºC selam 30 menit , kemudian desikator 15 menit

Lakukan hingga bobot tetap

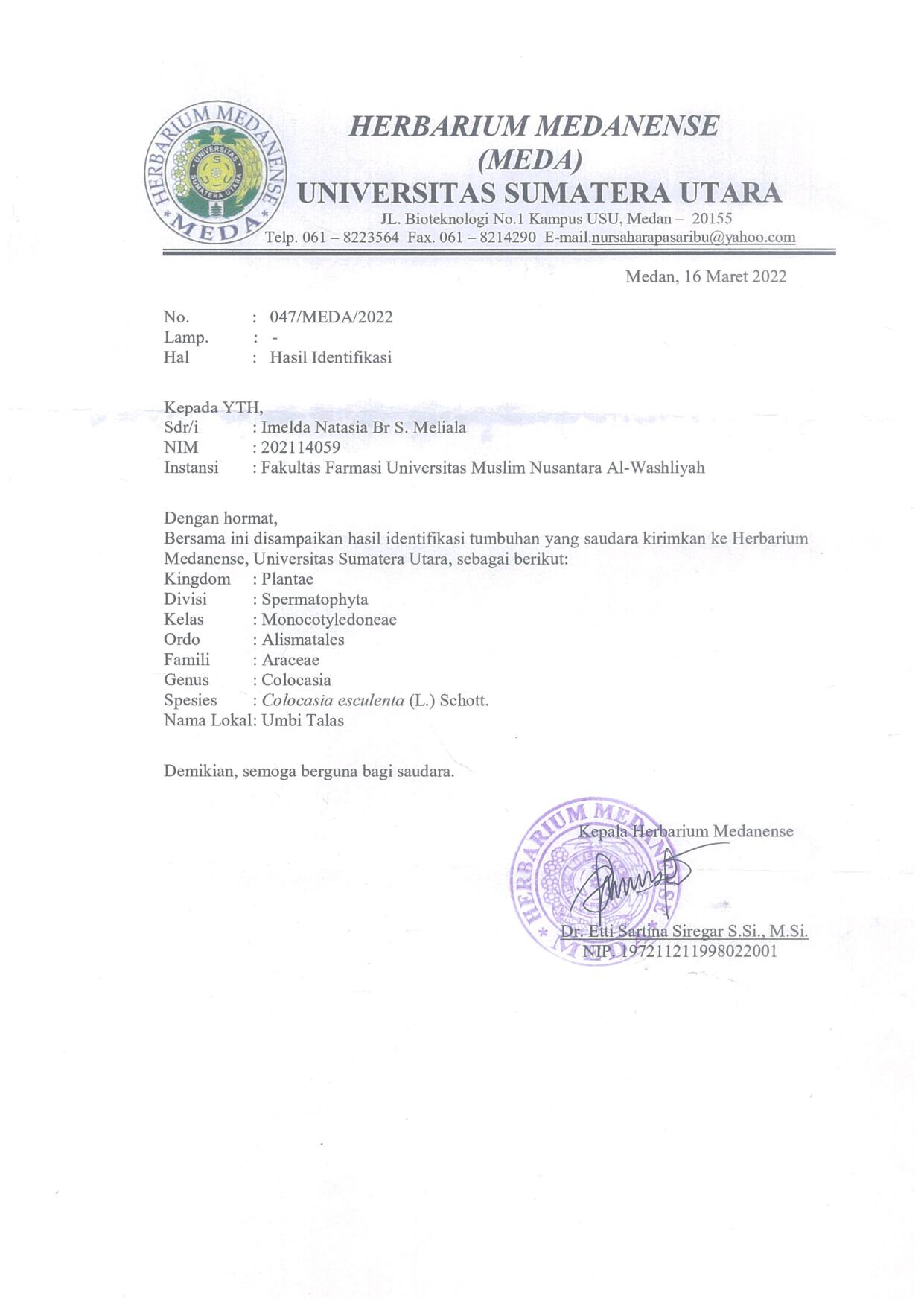
Sampel

Ditimbang 2 gr sampel masukkan ke cawan krus

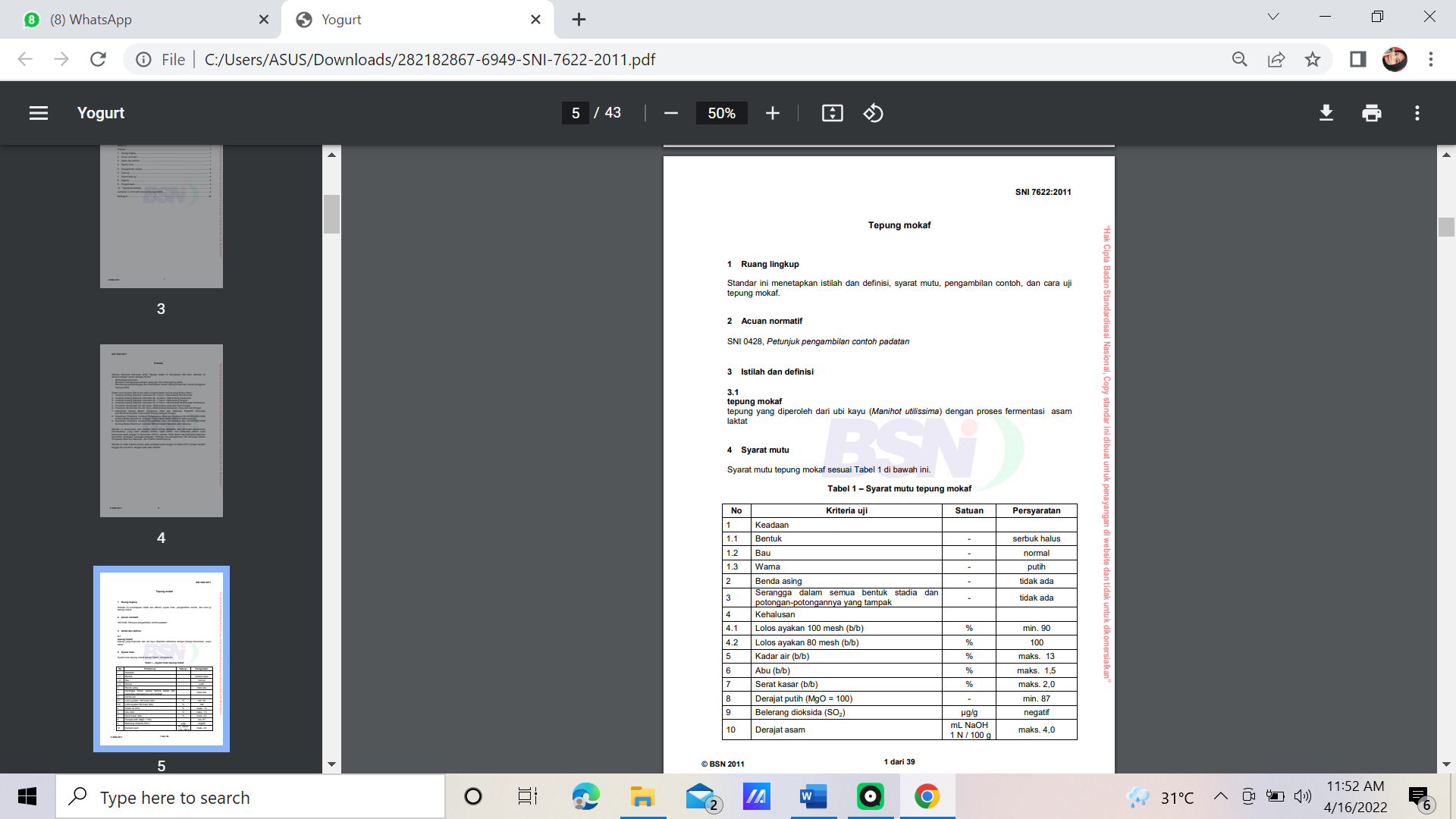
Dimasukkan ke tanur suhu 550ºC hingga menjadi abu

Dimasukkan kedalam desikator 15 menit kemudian timbang

Hasil

**Lampiran 5. Hasil Identifikasi Herbarium Medanese**

**Lampiran 6. Syarat Mutu Tepung Mocaf SNI Tepung Mocaf ( SNI 7622:2011).**

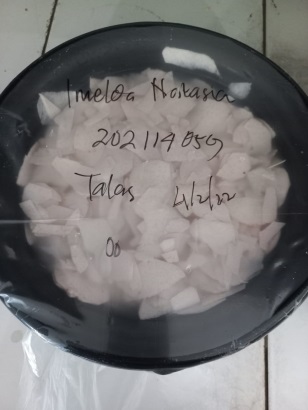


**Lampiran 7. Dokumentasi Penelitian**

1. Proses Pembuatan Tepung Talas Termodifikasi



Pemilihan Umbi Talas Pencucian Umbi Talas



Fermentasi dengan *Lactobacillus casei*



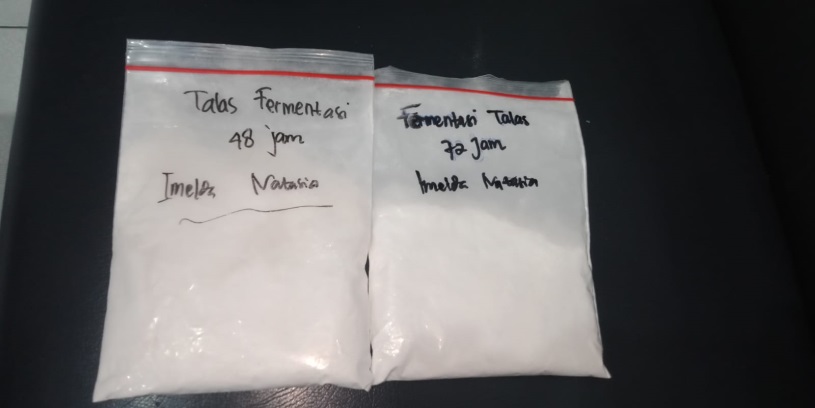
Hasil Fermentasi Umbi Talas



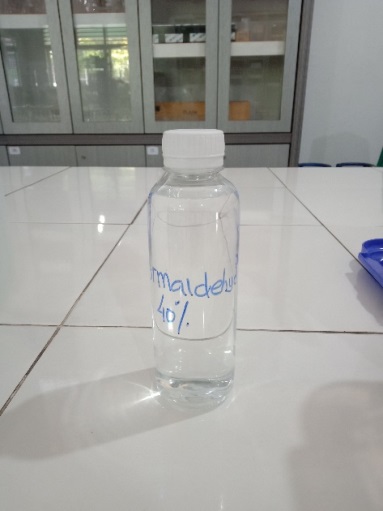
Pengeringan sampel dengan Oven



Hasil Pengeringan Sampel



Hasil Pengeringan Hasil Penepungan

1. Uji Karakteristik
2. Uji Kadar Protein

Bahan Uji Kadar Protein



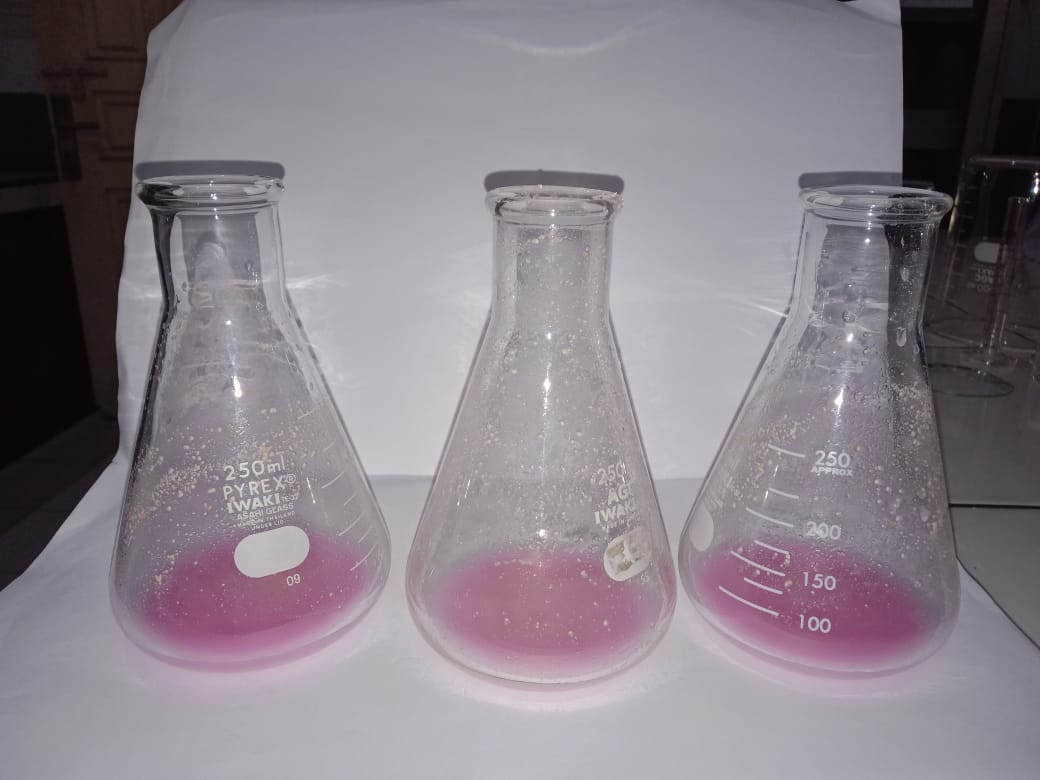
Blanko



Tepung Mocaf



Tepung Talas Alami



Tepung Talas Termodifikasi 48 jam



Tepung Talas Termodifikasi 72 jam

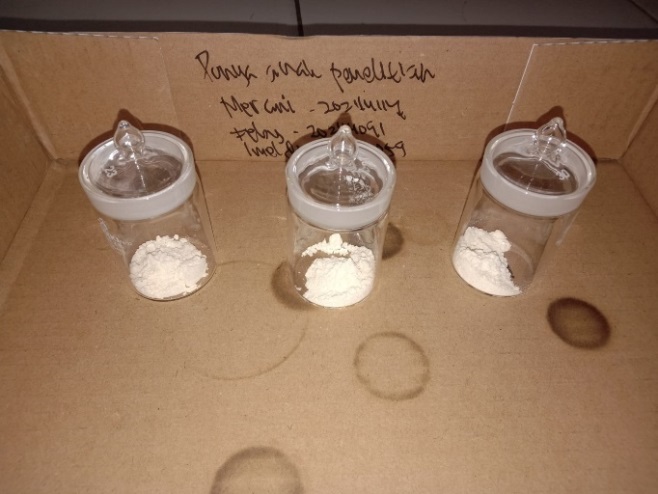
\

1. Uji Kadar Air



Pengujian Kadar Air secara Gravimetri





Setalah dipanaskan, dimasukkan Hasil Kadar Air Tepung Mocaf

kedalam desikator



Hasil Kadar Air Tepung Talas Hasil Kadar Air Tepung Talas Termodifikasi 72 jam

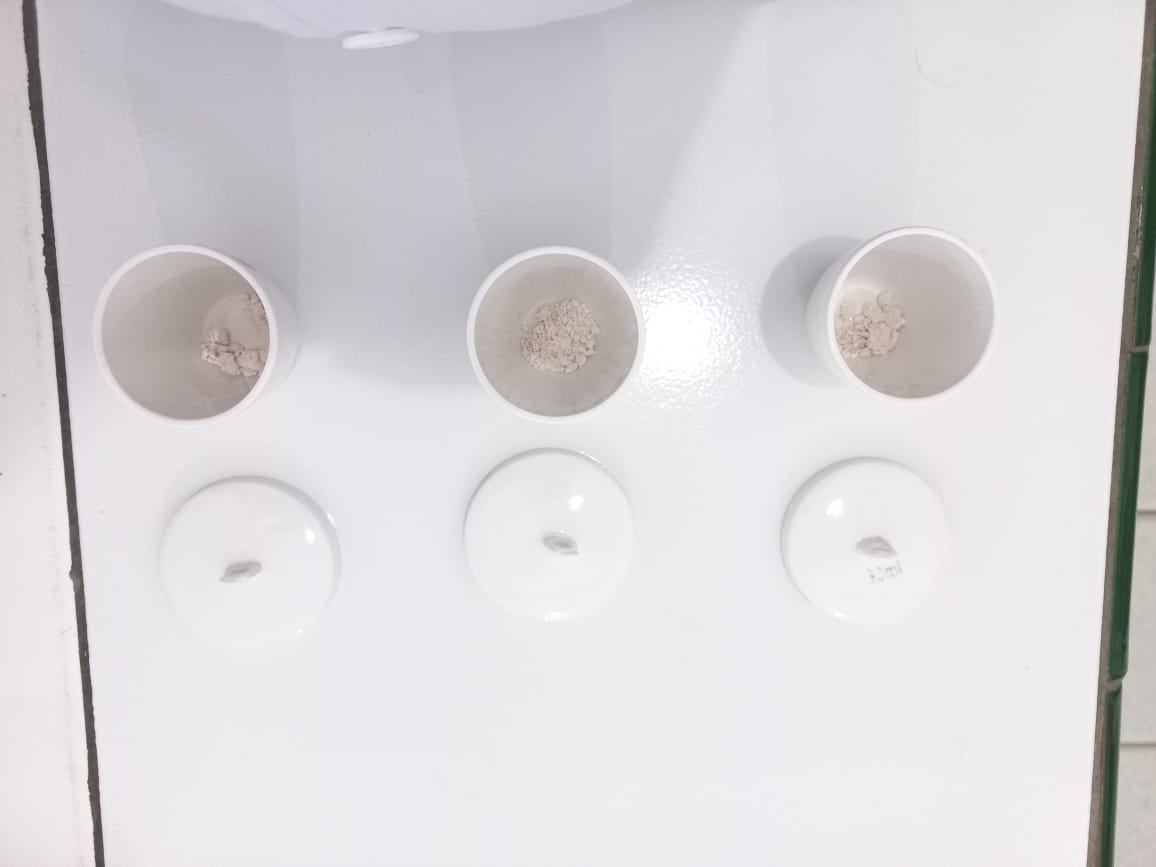
1. Uji Kadar Abu



Proses mengkonstankan cawan krus Proses Uji Kadar Abu



Hasil Kadar Abu Tepung Mocaf



Hasil Kadar Abu Tepung Talas Alami Hasil Kadar Abu Tepung Talas Termodifikasi 72 jam

**Lampiran 8. Perhitungan Uji Kadar Protein**

× 100 %

1. Tepung Mocaf

* × 100 %

= 2,17 %

* × 100 %

= 2,15 %

* × 100 %

= 2,20 %

Rata-rata = × 100 %

= 2,17 %

1. Tepung Talas Alami

* × 100 %

= 2,37 %

* × 100 %

= 2,36 %

* × 100 %

= 2,27%

Rata-rata = × 100 %

= 2,33 %

1. Tepung Talas Termodifikasi Fermentasi 72 Jam

* × 100 %

= 3,55 %

* × 100 %

= 3,57%

* × 100 %

= 3,48 %

Rata-rata = × 100 %

= 3,53 %

1. Tepung Talas Termodifikasi Fermentasi 48 Jam

* × 100 %

= 3,19 %

* × 100 %

= 3,18 %

* × 100 %

= 3,11 %

Rata-rata = × 100 %

= 3,16 %

**Lampiran 9. Perhitungan Uji Kadar Air**

1. Tepung Mocaf

* Botol Timbang I

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Botol Timbang | Botol Timbang | Botol Timbang + Sampel | Botol Timbang + Sampel | Hasil Kadar Air (%) |
| Sebelum Dioven | Sesudah Dioven | Sebelum Dioven | Sesudah Dioven |
| I | 39,3641 g | 39,3621 g | 41,3727 g | 41,1447 g | 11,36% |
| II | 39,3641 g | 39,3616 g | 41,3727 g | 41,1442 g |
| III | 39,3641 g | 39,3611 g | 41,3727 g | 41, 1437 g |
| Rata-rata | 39,3641 g | 39,3616 g | 41,3727 g | 41,1442 g |

Kadar Air : × 100 %

: 11,36 %

* Botol Timbang II

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Botol Timbang | Botol Timbang | Botol Timbang + Sampel | Botol Timbang + Sampel | Hasil Kadar Air (%) |
| Sebelum Dioven | Sesudah Dioven | Sebelum Dioven | Sesudah Dioven |
| I | 36,4716 g | 36,4697 g | 38,4851 g | 38,2580 g | 11,29% |
| II | 36,4716 g | 36,4692 g | 38,4851 g | 38,2575 g |
| III | 36,4716 g | 36,4687 g | 38,4851 g | 38,2570 g |
| Rata-rata | 36,4716 g | 36,4692 g | 38,4851 g | 38,2575 g |

Kadar Air : × 100 %

: 11,29 %

* Botol Timbang III

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Botol Timbang | Botol Timbang | Botol Timbang + Sampel | Botol Timbang + Sampel | Hasil Kadar Air (%) |
| Sebelum Dioven | Sesudah Dioven | Sebelum Dioven | Sesudah Dioven |
| I | 37,3634 g | 36,4697 g | 39,3794 g | 39,1519 g | 11,29% |
| II | 37,3634 g | 37,3612 g | 39,3794 g | 39,1514 g |
| III | 37,3634 g | 37,3607 g | 39,3794 g | 39,1509 g |
| Rata-rata | 37,3634 g | 37,3612 g | 39,3794 g | 39,1514 g |

Kadar Air : × 100 %

: 11,29 %

Rata-rata : = 11,31 %

1. Tepung Talas Alami

* Botol Timbang I

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Botol Timbang | Botol Timbang | Botol Timbang + Sampel | Botol Timbang + Sampel | Hasil Kadar Air (%) |
| Sebelum Dioven | Sesudah Dioven | Sebelum Dioven | Sesudah Dioven |
| I | 41,5804 | 41,4105 g | 39,5785 g | 39,5770 g | 8,49% |
| II | 41,5804 | 41,4102 g | 39,5785 g | 39,5768 g |
| III | 41,5804 | 41,4101 g | 39,5785 g | 39,5766 g |
| Rata-rata | 41,5804 | 41,4102 g | 39,5785 g | 39,5758 g |

Kadar Air : × 100 %

: 8,49%

* Botol Timbang II

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Botol Timbang | Botol Timbang | Botol Timbang + Sampel | Botol Timbang + Sampel | Hasil Kadar Air (%) |
| Sebelum Dioven | Sesudah Dioven | Sebelum Dioven | Sesudah Dioven |
| I | 38,8076 g | 38,8064 g | 40,8093 g | 40,6311 g | 8,90% |
| II | 38,8076 g | 38,8062 g | 40,8093 g | 40,6309 g |
| III | 38,8076 g | 38,8061 g | 40,8093 g | 40,6308 g |
| Rata-rata | 38,8076 g | 38,8062 g | 40,8093 g | 40,6309 g |

Kadar Air : × 100 %

:8,90%

* Botol Timbang III

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Botol Timbang | Botol Timbang | Botol Timbang + Sampel | Botol Timbang + Sampel | Hasil Kadar Air (%) |
| Sebelum Dioven | Sesudah Dioven | Sebelum Dioven | Sesudah Dioven |
| I | 37,7876 g | 37,7726 g | 39,7755 g | 39,6025 g | 8,64% |
| II | 37,7876 g | 37,7724 g | 39,7755 g | 39,6023 g |
| III | 37,7876 g | 37,7724 g | 39,7755 g | 39,6021 g |
| Rata-rata | 37,7876 g | 37,7724 g | 39,7755 g | 39,6023 g |

Kadar Air : × 100 %

: 8,64%

Rata-rata : = 8,67 %

1. Tepung Talas Termodifikasi

* Botol Timbang I

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Botol Timbang | Botol Timbang | Botol Timbang + Sampel | Botol Timbang + Sampel | Hasil Kadar Air (%) |
| Sebelum Dioven | Sesudah Dioven | Sebelum Dioven | Sesudah Dioven |
| I | 39,3650 g | 39,3624 g | 41,3757 | 41,1567 g | 10,89% |
| II | 39,3650 g | 39,3621 g | 41,3757 | 41,1564 g |
| III | 39,3650 g | 39,3620 g | 41,3757 | 41,1563 g |
| Rata-rata | 39,3650 g | 39,3621 g | 41,3757 | 41,1564 g |

Kadar Air : × 100 %

: 10,89%

* Botol Timbang II

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Botol Timbang | Botol Timbang | Botol Timbang + Sampel | Botol Timbang + Sampel | Hasil Kadar Air (%) |
| Sebelum Dioven | Sesudah Dioven | Sebelum Dioven | Sesudah Dioven |
| I | 36,5740 g | 36,4721 g | 38,4840 g | 38,2728 g | 10,68% |
| II | 36,5740 g | 36,4719 g | 38,4840 g | 38,2725 g |
| III | 36,5740 g | 36,4719 g | 38,4840 g | 38,2725 g |
| Rata-rata | 36,5740 g | 36,4719 g | 38,4840 g | 38,2725 g |

Kadar Air : × 100 %

: 10,68%

* Botol Timbang III

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Botol Timbang | Botol Timbang | Botol Timbang + Sampel | Botol Timbang + Sampel | Hasil Kadar Air (%) |
| Sebelum Dioven | Sesudah Dioven | Sebelum Dioven | Sesudah Dioven |
| I | 37,3733 g | 37,3613 g | 39,3822 g | 39,1626 g | 18,81% |
| II | 37,3733 g | 37,3612 g | 39,3822 g | 39,1623 g |
| III | 37,3733 g | 37,3609 g | 39,3822 g | 39,1620 g |
| Rata - rata | 37,3733 g | 37,3612 g | 39,3822 g | 39,1620 g |

Kadar Air : × 100 %

: 10,81%

Rata-rata : = 10,81 %

**Lampiran 10. Perhitungan Uji Kadar Abu**

1. Tepung Mocaf

* Cawan Krus I

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Berat Sampel | Cawan Krus | Cawan Krus | Cawan Krus + Sampel | Hasil Kadar Abu (%) |
| Sebelum Ditanur | Sesudah Ditanur | Sesudah Jadi Abu |
| I | 2,0160 g | 63,3729 g | 63,3706 g | 63,3941 g | 1,23% |
| II | 2,0160 g | 63,3729 g | 63,3689 g |
| III | 2,0160 g | 63,3729 g | 63, 3684 g |
| Rata - rata | 2,0160 g | 63,3729 g | 63,3693 g |

Kadar Abu : × 100 %

: 1,23 %

* Cawan Krus II

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Berat Sampel | Cawan Krus | Cawan Krus | Cawan Krus + Sampel | Hasil Kadar Abu (%) |
| Sebelum Ditanur | Sesudah Ditanur | Sesudah Jadi Abu |
| I | 2,0155 g | 67,8472 g | 67,8454 g | 67,8638 g | 0,99% |
| II | 2,0155 g | 67,8472 g | 67,8433 g |
| III | 2,0155 g | 67,8472 g | 67,8428 g |
| Rata - Rata | 2,0155 g | 67,8472 g | 67,8438 g |

Kadar Abu : × 100 %

: 0,99 %

* Cawan Krus III

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Berat Sampel | Cawan Krus | Cawan Krus | Cawan Krus + Sampel | Hasil Kadar Abu (%) |
| Sebelum Ditanur | Sesudah Ditanur | Sesudah Jadi Abu |
| I | 2,0121 g | 68,2614 g | 68,2599 g | 68,2818 g | 1,18% |
| II | 2,0121 g | 68,2614 g | 68,2573 g |
| III | 2,0121 g | 68,2614 g | 68,2568 g |
| Rata - rata | 2,0121 g | 68,2614 g | 68,2580 g |

Kadar Abu : × 100 %

: 1,18 %

1. Tepung Talas Alami

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Berat Sampel | Cawan Krus | Cawan Krus | Cawan Krus + Sampel | Hasil Kadar Abu (%) |
| Sebelum Ditanur | Sesudah Ditanur | Sesudah Jadi Abu |
| I | 2,0833 g | 62,8624 g | 62,8631 g | 62,9245 g | 2,98% |
| II | 2,0833 g | 62,8624 g | 62,8623 g |
| III | 2,0833 g | 62,8624 g | 58,8071 g |
| Rata - rata | 2,0833 g | 62,8624 g | 62,8624 g |

Kadar Abu : × 100 %

: 2,98 %

* Cawan Krus II

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Berat Sampel | Cawan Krus | Cawan Krus | Cawan Krus + Sampel | Hasil Kadar Abu (%) |
| Sebelum Ditanur | Sesudah Ditanur | Sesudah Jadi Abu |
| I | 2,0480 g | 61,1611 g | 61,1604 g | 61,2133 g | 2,62% |
| II | 2,0480 g | 61,1611 g | 61,1598 g |
| III | 2,0480 g | 61,1611 g | 58,8058 g |
| Rata - rata | 2,0480 g | 61,1611 g | 61,1596 g |

Kadar Abu : × 100 % : 2,62 %

* Cawan Krus III

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Berat Sampel | Cawan Krus | Cawan Krus | Cawan Krus + Sampel | Hasil Kadar Abu (%) |
| Sebelum Ditanur | Sesudah Ditanur | Sesudah Jadi Abu |
| I | 2,0456 g | 58,8075 g | 58,8071 g | 58,8591 g | 2,73% |
| II | 2,0456 g | 58,8075 g | 58,8058 g |
| III | 2,0456 g | 58,8075 g | 58,8055 g |
| Rata - rata | 2,0456 g | 58,8075 g | 58,8061 g |

Kadar Abu : × 100 %

: 2,59 %

Rata-rata : = 2,73%

1. Tepung Talas Termodifikasi

* Cawan Krus I

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Berat Sampel | Cawan Krus | Cawan Krus | Cawan Krus + Sampel | Hasil Kadar Abu (%) |
| Sebelum Ditanur | Sesudah Ditanur | Sesudah Jadi Abu |
| I | 2,0043 g | 62,8659 g | 62,8647 g | 62,9012 g | 1,83% |
| II | 2,0043 g | 62,8659 g | 62,8645 g |
| III | 2,0043 g | 62,8659 g | 62,8643 g |
| Rata -rata | 2,0043 g | 62,8659 g | 62,8645 g |

Kadar Abu : × 100 %

: 1,83 %

* Cawan Krus II

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Berat Sampel | Cawan Krus | Cawan Krus | Cawan Krus + Sampel | Hasil Kadar Abu (%) |
| Sebelum Ditanur | Sesudah Ditanur | Sesudah Jadi Abu |
| I | 2,0044 g | 61,1488 g | 61,1473 g | 61,1838 g | 1,82% |
| II | 2,0044 g | 61,1488 g | 61,1473 g |
| III | 2,0044 g | 61,1488 g | 61,1473 g |
| Rata - rata | 2,0044 g | 61,1488 g | 61,1473 g |

Kadar Abu : × 100 %

: 1,82 %

* Cawan Krus III

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Perlakuan | Berat Sampel | Cawan Krus | Cawan Krus | Cawan Krus + Sampel | Hasil Kadar Abu (%) |
| Sebelum Ditanur | Sesudah Ditanur | Sesudah Jadi Abu |
| I | 2,0044 g | 58,7886 g | 58,7871 g | 58,8235 g | 1,82% |
| II | 2,0044 g | 58,7886 g | 58,7869 g |
| III | 2,0044 g | 58,7886 g | 58,7867 g |
| Rata - Rata | 2,0044 g | 58,7886 g | 58,7869 g |

Kadar Abu : × 100 %

: 1,82 %

Rata-rata : = 1,82%