

LAMPIRAN

Lampiran 1. Pewarnaan jamur/identifikasi jamur *aspergillus oryzae*

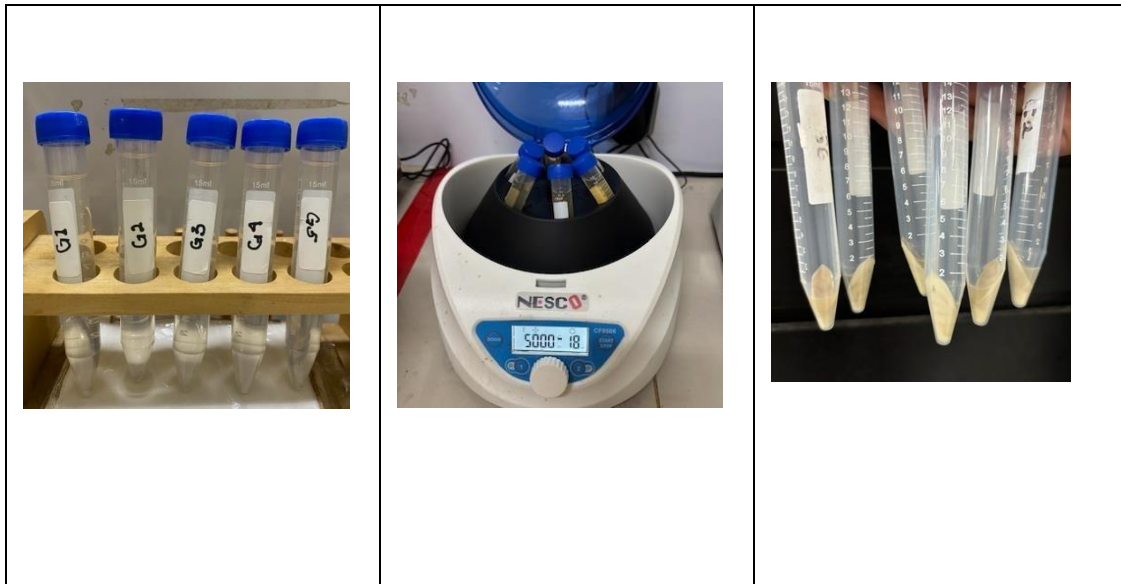


Lampiran 2. Fermentasi asam kojat



Lampiran 3. Hasil ekstraksi asam kojat

Lampiran 4. Biomassa



Substrat	Hari ke-3 (g/L)	Hari ke-6 (g/L)	Hari ke-9 (g/L)
Kontrol	24	39	12,73
Glukosa	6	18	7,27

- Biomassa hari ke 3

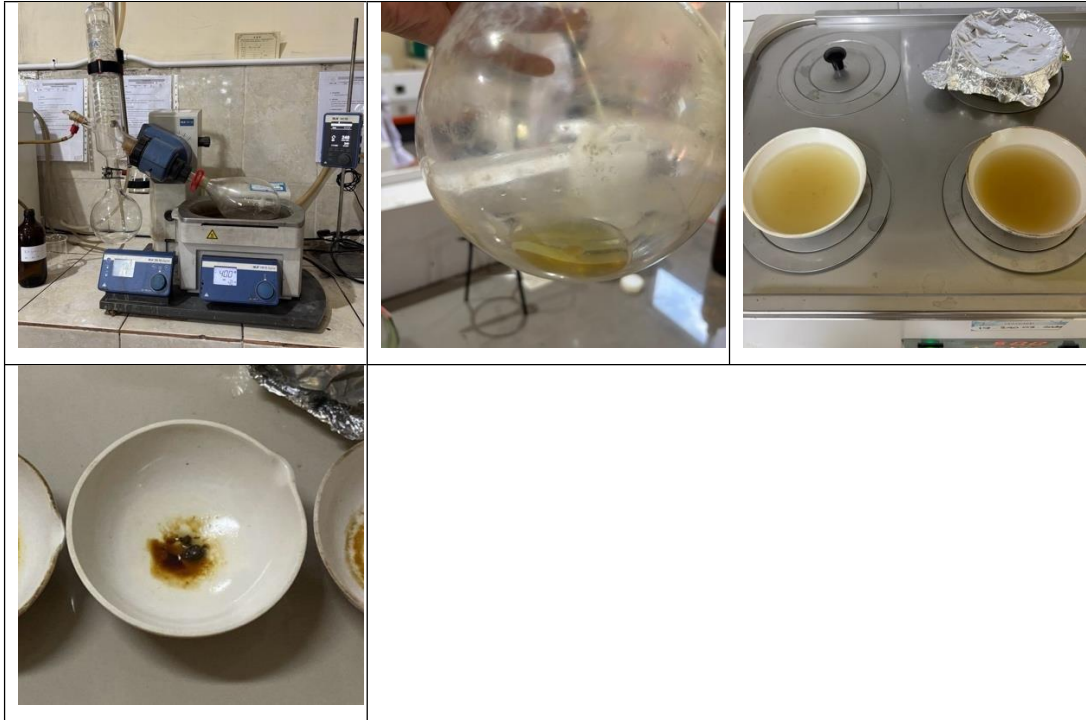
$$\frac{0,006}{1} = 6 \text{ g/l}$$
- Biomassa hari ke 3

$$\frac{0,018}{1} = 18 \text{ g/l}$$
- Biomasa hari ke 9

$$= 0,244 + 0,219 + 0,307 + 0.133 + 0,173$$

$$\frac{1,076}{146} = 7,720 \text{ g/l}$$

Lampiran 5. Identifikasi FeCl**Lampiran 6. Ekstraksi cair - cair**

Lampiran 7. Rotary evaporator dan water bath**Lampiran 8. Optimasi basis**

Lampiran 9. Perhitungan zat aktif asam kojat F1= 1% dalam 10 ml

$$\rightarrow \frac{1}{100} \times 10 = 0,1 \text{ g} \approx 100 \text{ ml}$$

F2= 1,5% dalam 10 ml

$$\rightarrow \frac{1,5}{100} \times 10 = 0,15 \text{ g} \approx 150 \text{ ml}$$

F2= 1,5% dalam 10 ml

$$\rightarrow \frac{2}{100} \times 10 = 0,2 \text{ g} \approx 200 \text{ ml}$$

Lampiran 10. Formulasi krim

Bahan	F0	Formula (%)		F3	Fungsi
		F1	F2		
Asam kojat	0	1	1,5	2	Zat aktif
Isopropil Miristat	9	9	9	9	Peningkat penetrasi
TEA	3	3	3	3	Pengemulsi
Asam stearat	6	6	6	6	Pengemulsi
Fenoksietanol	0,5	0,5	0,5	0,5	Pengawet
Aquadest ad	100	100	100	100	Pelarut



Ekstrak Kering
Asam kojat



Pengenceran



Peleburan fase
minyak



Peleburan fase air



Formula F0,F1,F2 dan
F3

Lampiran 11. Total yang di buat = 130 gr

- IPM $= \frac{9}{100} \times 130 \text{ g} = 11,7 \text{ ml} \approx 12 \text{ ml}$
- TEA $= \frac{3}{100} \times 130 \text{ g} = 3,9 \text{ ml} \approx 4 \text{ ml}$
- A.stearat $= \frac{8}{100} \times 130 \text{ g} = 10,4 \text{ ml}$
- Phenoxy $= \frac{0,5}{100} \times 130 \text{ g} = 0,65 \text{ ml} \approx 13 \text{ tetes}$
- Aquadest = add hingga 92,95 ml $\approx 93 \text{ ml}$

Lampiran 12. Hasil uji pH

Formula		Hari 0	Hari 1	Hari 4	Hari 8	Hari 12	Hari 16
F0		7,87	7,84	7,77	7,67	7,55	6,14
F1		7	7,88	7,63	7,3	7,22	7,14
F2		7	7,73	7,68	7,66	7,33	6,86
F3		7	7,7	7,54	7,36	7,1	6,81

Lampiran 13. Hasil uji viskositas

Viskositas	Hari 0	Hari 1	Hari 4	Hari 8	Hari 12	Hari 16
F0	16.583 Cp	16.050 Cp	15.933 Cp	16.050 Cp	15.550 Cp	15.833 Cp
F1	15.967 Cp	15.983 Cp	16.500 Cp	16.583 Cp	16.300 Cp	15.467 Cp
F2	16.783 Cp	16.183 Cp	16.017 Cp	16.350 Cp	16.500 Cp	16.183 Cp
F3	14.917 Cp	13.017 Cp	12.650 Cp	13.800 Cp	11.067 Cp	9.500 Cp

Lampiran 14. Hasil uji daya sebar

Daya Sebar	Hari 0	Hari 1	Hari 4	Hari 8	Hari 12	Hari 16
F0	5,07	5,09	5,21	5,3	5,48	5,68
F1	5,09	5,11	5,19	5,2	5,38	5,7
F2	5,07	5,09	5,11	5,38	5,38	5,9
F3	5,61	6,09	6,18	6,24	6,3	6,44

Lampiran 15. Hasil iritasi

Responden	Formula	Waktu	Kondisi kulit	Keterangan
M. Paisal	F0	24	normal	Tidak ada iritasi
	F1	24	normal	Tidak ada iritasi
	F2	24	normal	Tidak ada iritasi
	F3	24	normal	Tidak ada iritasi
Wisnu N	F0	24	normal	Tidak ada iritasi
	F1	24	normal	Tidak ada iritasi
	F2	24	normal	Tidak ada iritasi
	F3	24	normal	Tidak ada iritasi
Fahri	F0	24	normal	Tidak ada iritasi
	F1	24	normal	Tidak ada iritasi
	F2	24	normal	Tidak ada iritasi
	F3	24	normal	Tidak ada iritasi
Gandi	F0	24	normal	Tidak ada iritasi
	F1	24	normal	Tidak ada iritasi
	F2	24	normal	Tidak ada iritasi
	F3	24	normal	Tidak ada iritasi
Abidin	F0	24	normal	Tidak ada iritasi
	F1	24	normal	Tidak ada iritasi
	F2	24	normal	Tidak ada iritasi
	F3	24	normal	Tidak ada iritasi
Iis M	F0	24	normal	Tidak ada iritasi
	F1	24	normal	Tidak ada iritasi
	F2	24	normal	Tidak ada iritasi
	F3	24	normal	Tidak ada iritasi
Else S	F0	24	normal	Tidak ada iritasi
	F1	24	normal	Tidak ada iritasi
	F2	24	normal	Tidak ada iritasi
	F3	24	normal	Tidak ada iritasi
Firyal	F0	24	normal	Tidak ada iritasi
	F1	24	normal	Tidak ada iritasi
	F2	24	normal	Tidak ada iritasi
	F3	24	normal	Tidak ada iritasi
Marsya	F0	24	normal	Tidak ada iritasi
	F1	24	normal	Tidak ada iritasi
	F2	24	normal	Tidak ada iritasi
	F3	24	normal	Tidak ada iritasi
Alya	F0	24	normal	Tidak ada iritasi
	F1	24	normal	Tidak ada iritasi
	F2	24	normal	Tidak ada iritasi
	F3	24	normal	Tidak ada iritasi

Lampiran 16. CoA Aspergillus oryzae



Thermo Fisher Scientific
Microbiology
12076 Santa Fe Trail Drive
12230 Santa Fe Trail Drive
Lenexa, KS 66215
800.255.6730
800.447.5761 fax
www.thermofisher.com

Certificate of Analysis

Product Name: A. oryzae ATCC 10124 PK/5
Lot Number: 143026

Product Number: R4601017
Expiration Date: 2026-01-14
(YYYY-MM-DD)

This product has been manufactured, processed and packaged in accordance with Quality Systems Regulation, 21 CFR Part 820. Representative samples were tested per Remel Inc., a part of Thermo Fisher Scientific Quality Control specifications and were found to meet performance criteria for this product.

Purity:

Standardized aliquots of the rehydrated product are inoculated onto nonselective media and examined for pure growth following the appropriate incubation. Selective and Differential media are also tested where applicable.

Viability And Quantification:

Each organism is recovered from the preserved state within the required time frame and at an acceptable level. Passage number is stated as the current preserved state.

Macroscopic And Microscopic Morphology:

Colony morphology is consistent with documented referenced description. Traditional staining is performed.

Characterization:

Organism exhibits characteristic biochemical, enzymatic, genotypical and/or biochemical reactions. Automated and/or conventional testing was performed and results were within established limits. Antimicrobial testing performed where applicable. Results within expected ranges.

CFU/loop: >10(3)

Passage: 3
Identification Profile: MicroSEQ®

Macroscopic Morphology: Mature within 3-5 days, 25-30°C. Powdery or velvety texture. Surface - Yellow-green or brown. Reverse - Pale, yellow-gold to red-brown.

Microscopic Morphology: Rough, pitted, spiny conidiophores of variable length; uniseriate and biseriate phialides cover entire vesicle pointing in all directions; round rough-walled conidia in chains.

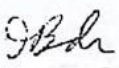
Appearance: Preserved Gel Matrix suspended in inoculating loop
pH: N/A

thermo scientific

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Lenexa, KS 66215
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Certificate of Analysis

Signed



Quality Assurance Manager

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Lampiran 17. CoA asam kojat

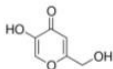


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Website: www.sigmaaldrich.com
Email USA: techserv@sial.com
Outside USA: eurtechserv@sial.com

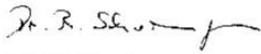
Certificate of Analysis

Product Name:
Kojic acid - analytical standard

Product Number: 95197
Batch Number: BCCM7501
Brand: SIAL
CAS Number: 501-30-4
Formula: C₆H₆O₄
Formula Weight: 142.11 g/mol
Quality Release Date: 04 FEB 2025
Expiration Date: DEC 2028



Test	Specification	Result
Appearance (Color)	White to Light Yellow to Light Brown	Faint Beige
Appearance (Form)	Powder or Crystals	Powder
Purity (HPLC)	≥ 99.0 %	100.0 %
Carbon Content		50.78 %
50.71 % (Theory)		
¹ H NMR Spectrum	Conforms to Structure	Conforms


Dr. Reinhold Schwenninger
Quality Assurance
Buchs, Switzerland CH

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Lampiran 18. Perizinan etik penelitian



KOMISI ETIK PENELITIAN KESEHATAN UNIVERSITAS BHAKTI KENCANA

Jl. Soekarno - Hatta 754. Bandung
Telp : 022-7830 760 / 022-7830-768
Email : komisi.etik@bku.ac.id



KOMISI ETIK PENELITIAN KESEHATAN
HEALTH RESEARCH ETHICS COMMITTEE
UNIVERSITAS BHAKTI KENCANA
BHAKTI KENCANA UNIVERSITY

KETERANGAN LAYAK ETIK
DESCRIPTION OF ETHICAL APPROVAL
"ETHICAL APPROVAL"
240/09.KEPK/UBK/VII/2025

Protokol penelitian yang diusulkan oleh :
The research protocol proposed by :

Peneliti Utama : Nadiyah Wulandari
Principal In Investigator

Nama institusi : Universitas Bhakti Kencana
Name of institution

Dengan judul :
Title

Formulasi Sediaan Krim Antihiperpigmentasi Berbahan Aktif Asam Kojat dari Jamur *Aspergillus oryzae* dengan Variasi Sumber Karbon Sukrosa, Glukosa, dan Laktosa

*Antihyperpigmentation Cream Formulation with Kojic Acid Active Ingredient from *Aspergillus oryzae* Fungus with Variations of Sucrose, Glucose, and Lactose Carbon Sources*

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

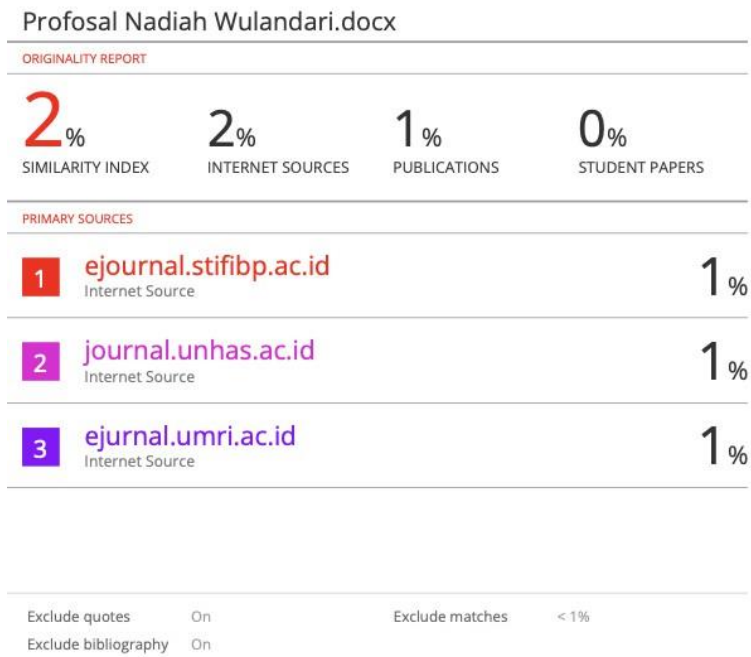
Declared to be ethically appropriate in accordance to 7 (seven) WHO 2011standards, 1) Social Value, 2) Scientific Value, 3) Equitable Assessment and Benefits, 4) Risks, 5) Persuasion/Eksploitation, 6) Confidentiality and Privacy, and Informed Consent, referring to the 2016 CIOMS guidelines. This is as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

Pernyataan Laik Etik ini berlaku selama kurun waktu 29 Juli 2025 sampai dengan tanggal 29 Juli 2026.

This declaration of ethics applies during the period 29th July 2025 until 29th July 2026.

29 Juli 2025
Professor and Chairperson

R. Nety Rustikayanti, S.Kp., M.Kep
NIK. 02019010336

Lampiran 19. Hasil turnitin

Lampiran 20. Kartu bimbingan

No	Tanggal	Dosen Pembimbing	Topik	Disetujui	Aksi
1	16 Februari 2025	Dr Fenti Fatmawati, M.Si	Optimasi Fermentasi	✓	 
1	16 Februari 2025	apt. Deny Puriyani Azhary, M.Si	Optimasi Fermentasi	✓	 
2	24 Februari 2025	Dr Fenti Fatmawati, M.Si	Evaluasi Produksi Asam Kojat dari Fermentasi	✓	 
2	24 Februari 2025	apt. Deny Puriyani Azhary, M.Si	Evaluasi Produksi Asam Kojat dari Fermentasi	✓	 
3	28 Februari 2025	apt. Deny Puriyani Azhary, M.Si	Interpretasi Hasil Identifikasi Asam Kojat (FeCl_3 dan LCMS)	✓	 
3	28 Februari 2025	Dr Fenti Fatmawati, M.Si	Interpretasi Hasil Identifikasi Asam Kojat (FeCl_3 dan LCMS)	✓	 
4	3 Maret 2025	apt. Deny Puriyani Azhary, M.Si	Optimasi dan Analisis Basis Krim Terpilih	✓	 
4	3 Maret 2025	Dr Fenti Fatmawati, M.Si	Optimasi dan Analisis Basis Krim Terpilih	✓	 
5	10 Maret 2025	Dr Fenti Fatmawati, M.Si	Optimasi dan Analisis Basis Krim Terpilih	✓	 
5	10 Maret 2025	apt. Deny Puriyani Azhary, M.Si	Optimasi dan Analisis Basis Krim Terpilih	✓	 
6	17 Maret 2025	apt. Deny Puriyani Azhary, M.Si	Evaluasi Perbandingan Formula Krim Berdasarkan Konsentrasi Asam Kojat	✓	 
6	17 Maret 2025	Dr Fenti Fatmawati, M.Si	Evaluasi Perbandingan Formula Krim Berdasarkan Konsentrasi Asam Kojat	✓	 
7	14 Mei 2024	apt. Deny Puriyani Azhary, M.Si	Analisis Stabilitas Fisik Krim Selama Penyimpanan	✓	 
7	14 April 2025	Dr Fenti Fatmawati, M.Si	Analisis Stabilitas Fisik Krim Selama Penyimpanan	✓	 
8	28 April 2025	apt. Deny Puriyani Azhary, M.Si	Evaluasi Sediaan Krim	✓	 
8	28 April 2025	Dr Fenti Fatmawati, M.Si	Evaluasi Sediaan Krim	✓	 

Lampiran 21. Daftar riwayat hidup

Nama lengkap : Nadiah Wulandari

Nama panggilan : Nadia, Princess

Tempat/tanggal lahir : Cianjur, 12 Februari 2003

Jenis kelamin : Perempuan

Agama : Islam

Status perkawinan : Belum kawin

Alamat : Jl. Ciherang Kp. Panyaweuyan RT001/RW004 Kec.
Pacer Kab. Cianjur

Email : 211FF03096@bku.ac.id

No Telpn : 081809605620

Anak ke- : 1