



**BADAN POM**

# RASIONALISASI KOMPOSISI OBAT BAHAN ALAMI

**Dr. apt. Kintoko, M.Sc, ASJ**

Peneliti/Inovator & Dosen Farmasi UAD

Ketua Umum Apoteker Praktek Herbal Indonesia

Pengurus Dewan Jamu DIY & Komisi Daerah Saintifikasi Jamu DIY

Founder/Owner NATURONAL GROUP, Ketua SP3T Dinkes DIY

Pengurus HIMASTRA PP Ikatan Apoteker Indonesia



# TEBAK-TEBAKAN

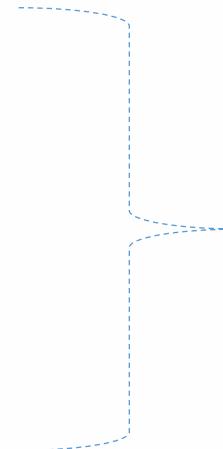
ADA BERAPA JENIS JAMU .....

# JAMU-JAMUAN

1.Jamu Tolak **Miskin**

2.Jamu Singkir **Kere**

3.Jamu Anti-**Mlarat**



KAYA ATAU  
KAYA SEKALI

Tahun	Omset (Trilyun)	Sumber
2003	2	Bank Indonesia (LIPPI dalam <a href="http://www.bexi.co.id">www.bexi.co.id</a> )
2004	3,5	Bank Indonesia (LIPPI dalam <a href="http://www.bexi.co.id">www.bexi.co.id</a> )
2006	4	KADIN ( <a href="http://www.kadin-indonesia.co.id/en/berita_isi.php?news_id">www.kadin-indonesia.co.id/en/berita_isi.php?news_id</a> )
2007	6	GP Jamu
2008	7,2	GP Jamu (Laporan Ketua Umum GP Jamu pada Gelar Kebangkitan Jamu Indonesia dan Pembukaan Symposium International Pertama Temulawak Istana Negara, 27 Mei 2008).
2010	10	Target GP Jamu

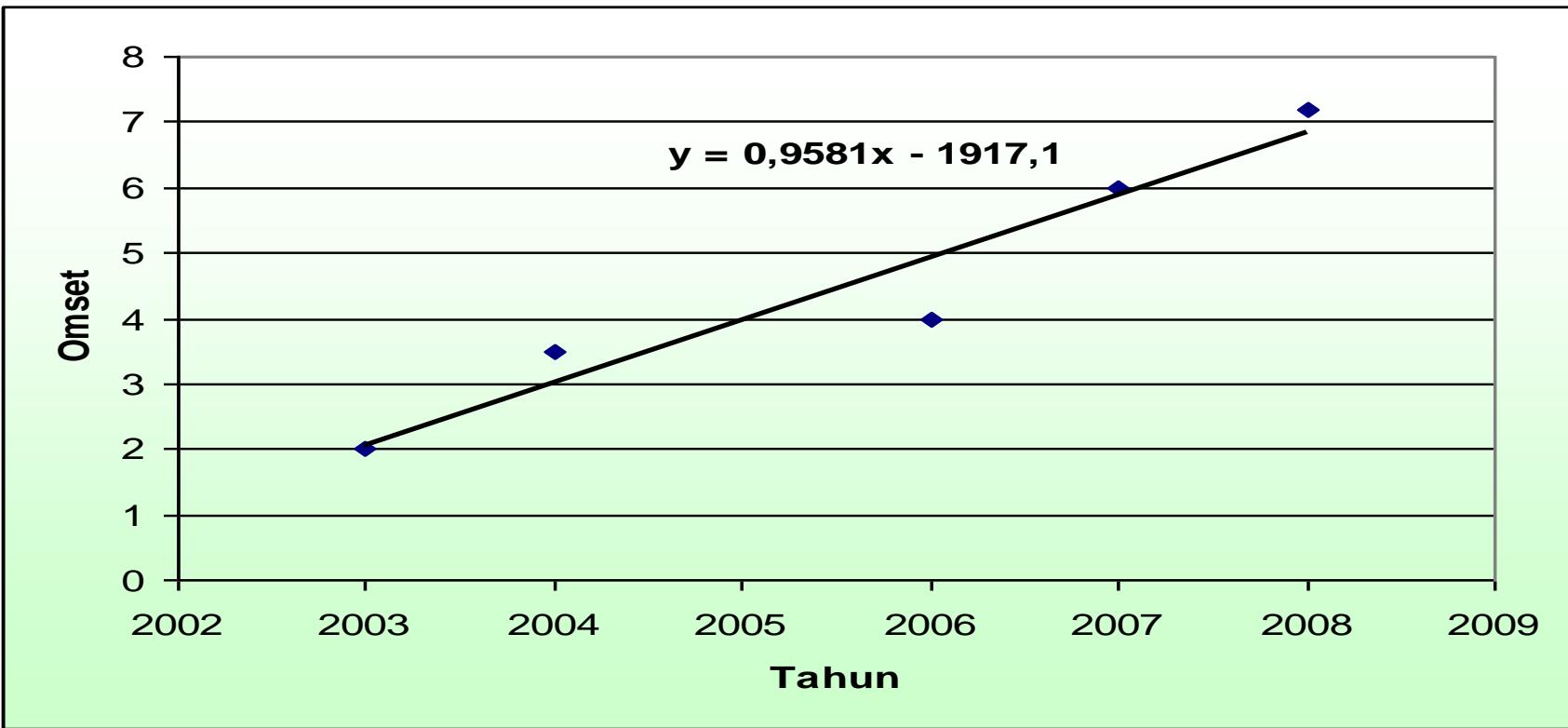
Dari data-data tersebut untuk dapat memprediksi omset jamu dengan **Metode Kuadrat Terkecil** (Least Square Method) mempergunakan persamaan :

$$Y = mX + C$$

Dimana :    Y = Data Time Series (Omset)

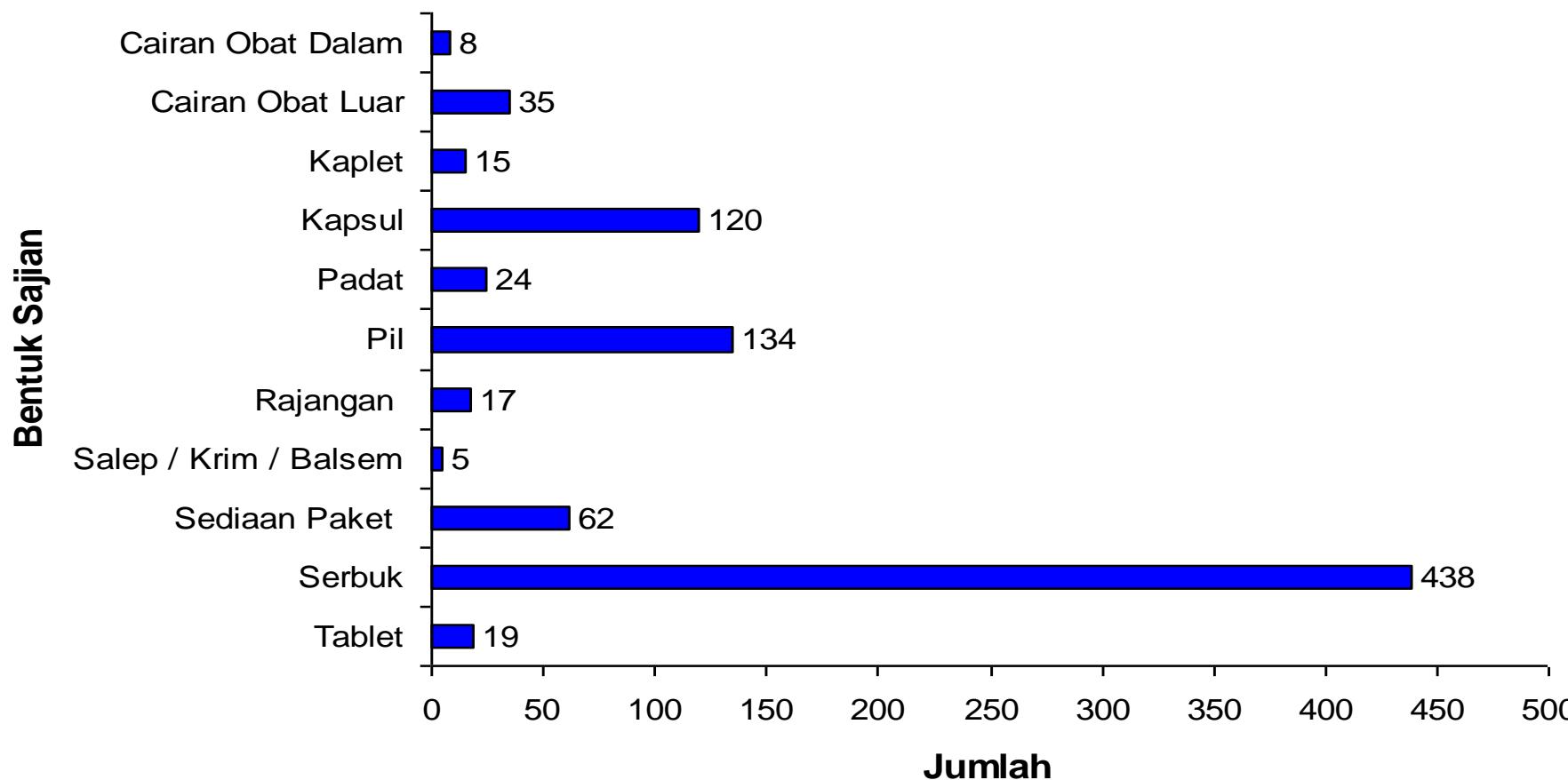
              m dan C = bilangan konstan

              X = Waktu (Tahun)

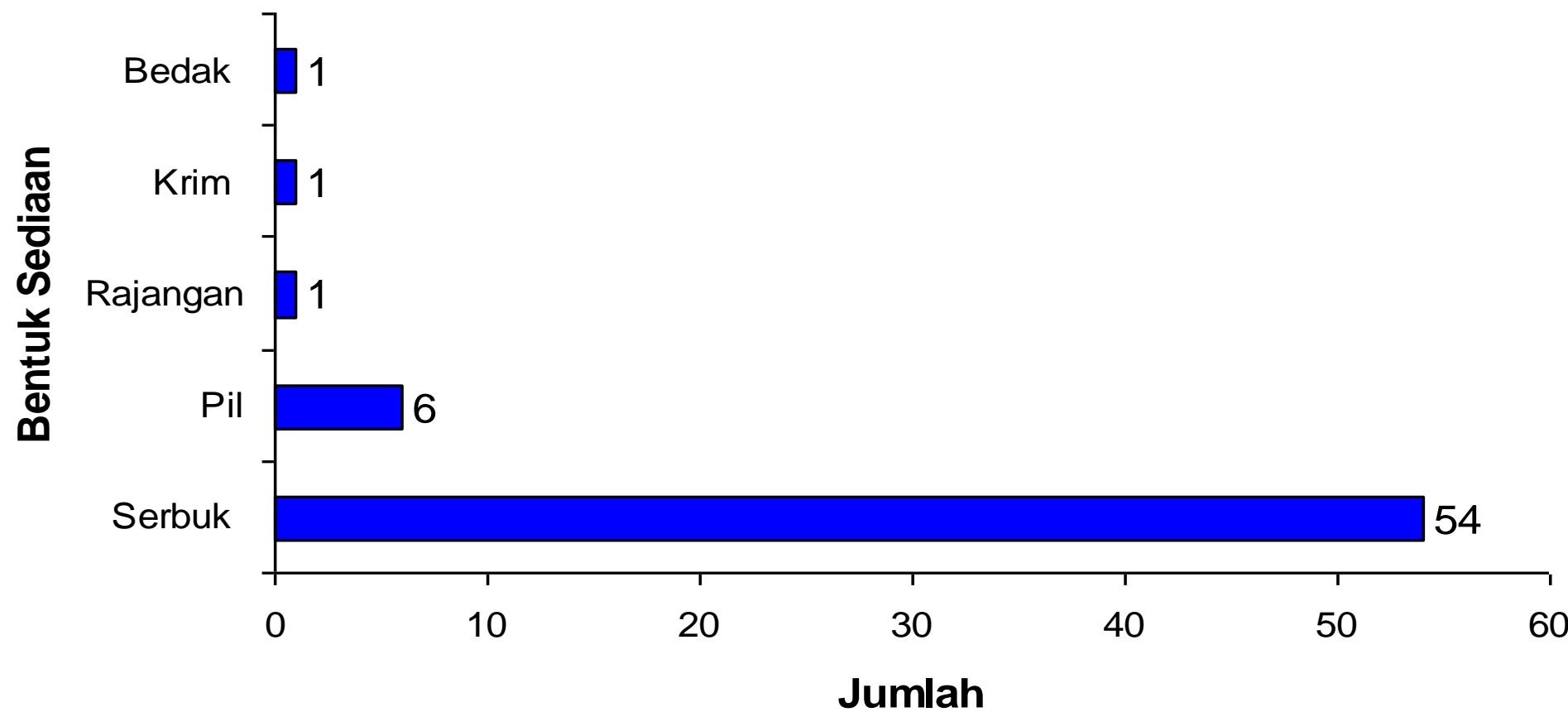


Pada tahun 2025, omset jamu diperkirakan mencapai 23 trilyun rupiah

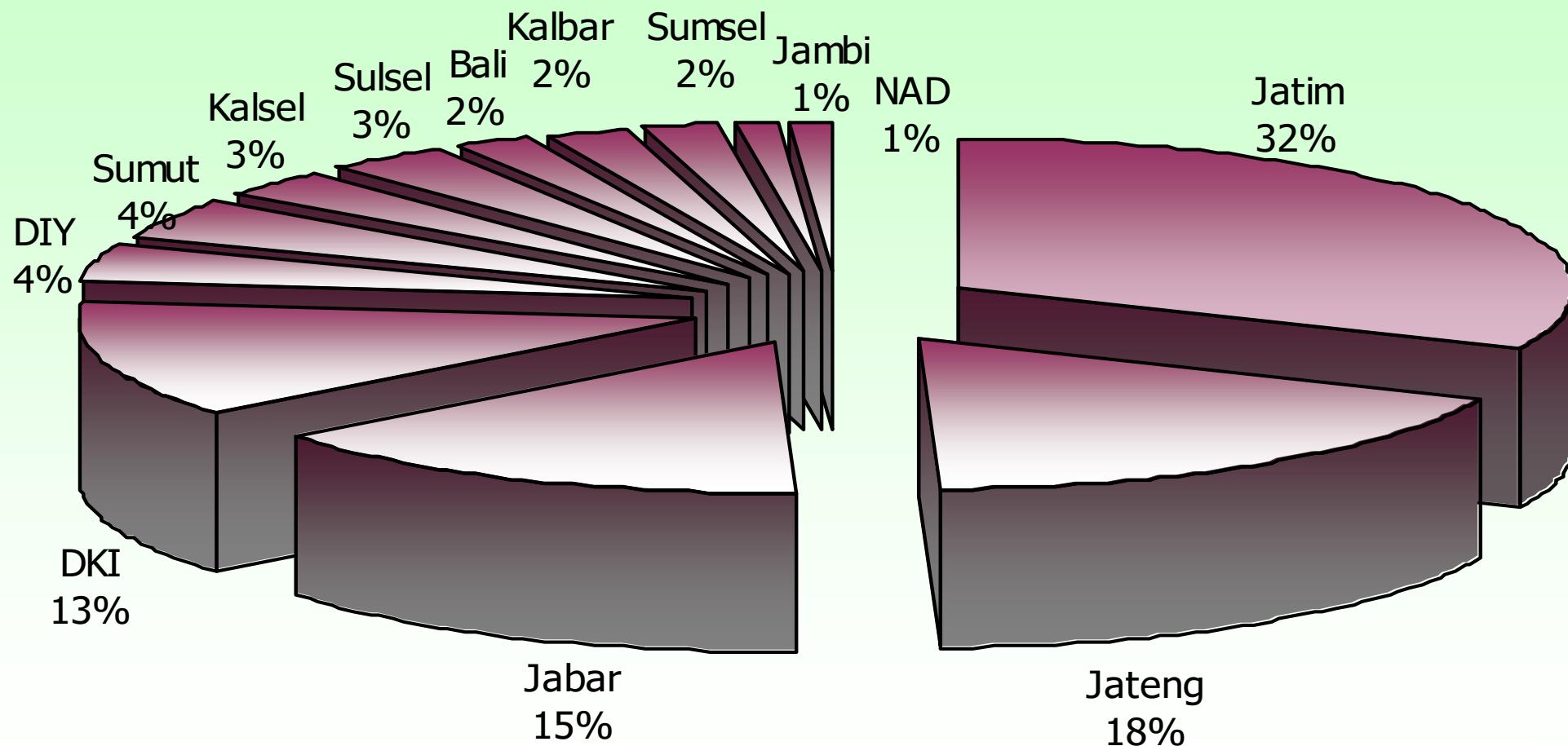
## Bentuk Sajian Jamu pada Industri Menengah-Besar (20 Perusahaan, 778 Produk)



## Bentuk Sajian Jamu pada Industri Menengah-Kecil (17 Perusahaan, 63 Produk)



## Persentase industri OT



*Menghasilkan formula OBA yang  
rasional/ilmiah adalah upaya meningkatkan  
pertumbuhan ekonomi bangsa sehingga  
tercapai kesejahteraan masyarakat*

ADA BERAPA JENIS EMAS YA....

# ADA BERAPA EMAS !!

1. Emas kuning
2. Emas putih
3. Emas hitam
4. Emas biru
5. Emas hijau





## Mega Biodiversity Negara Indonesia



**EMAS HIJAU**

**Darat**

> 30.000  
Tumbuhan

9.600  
Berkhasiat  
Obat

300 Dijadikan  
Bahan Baku Obat  
dan OT

**EMAS BIRU**

**Laut**

8.500 spesies  
ikan

950 spesies biota  
terumbu karang

555 spesies  
rumput laut

32 dari 87 jenis mamalia  
laut di dunia

6 dari 7 penyu di dunia

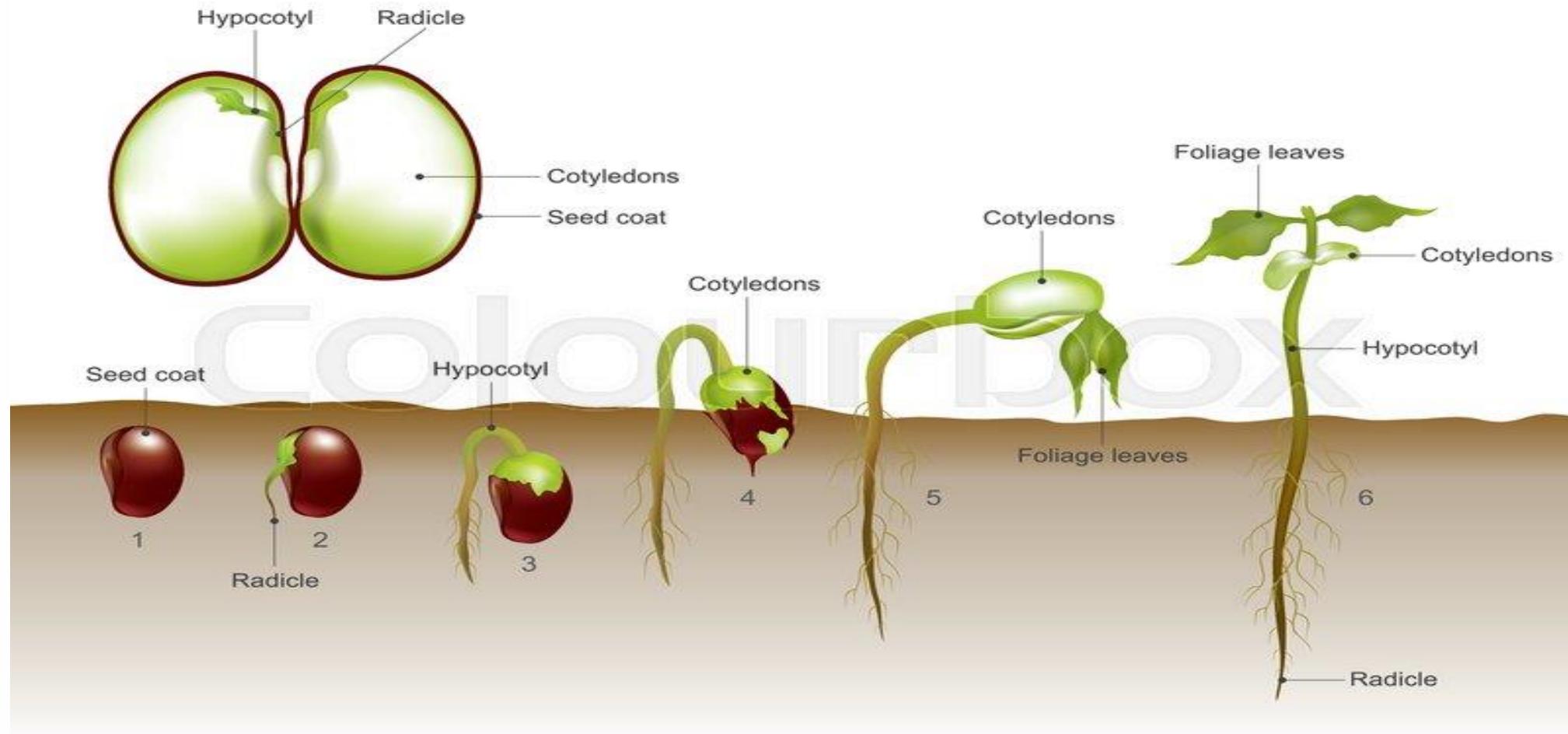
Sumber: Kotranas dan Kementerian Kelautan dan Perikanan

# KARAKTERISTIK EMAS HIJAU & BIRU

1. Renewable
2. Sustainable
3. Valueable
4. Marketable
5. Applicable

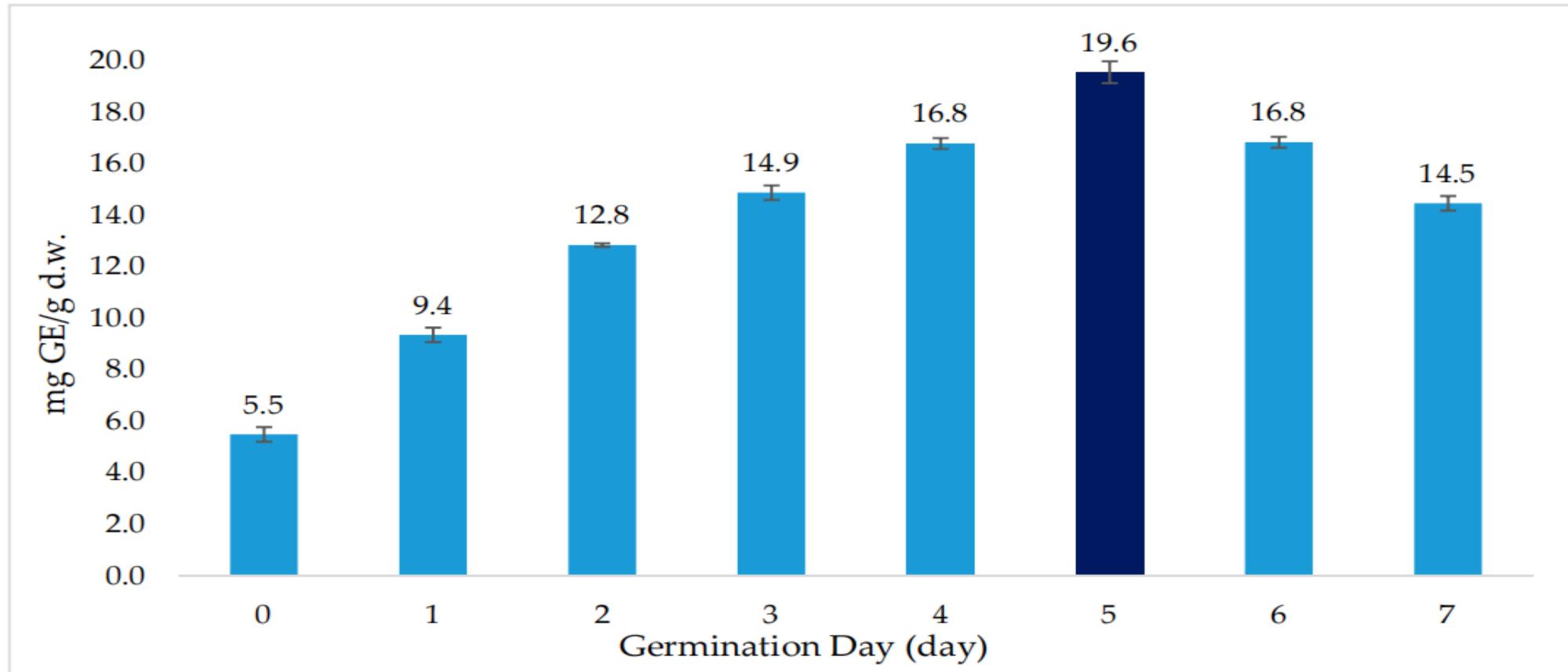
# **Renewable**

# Patterns of Change in Seed





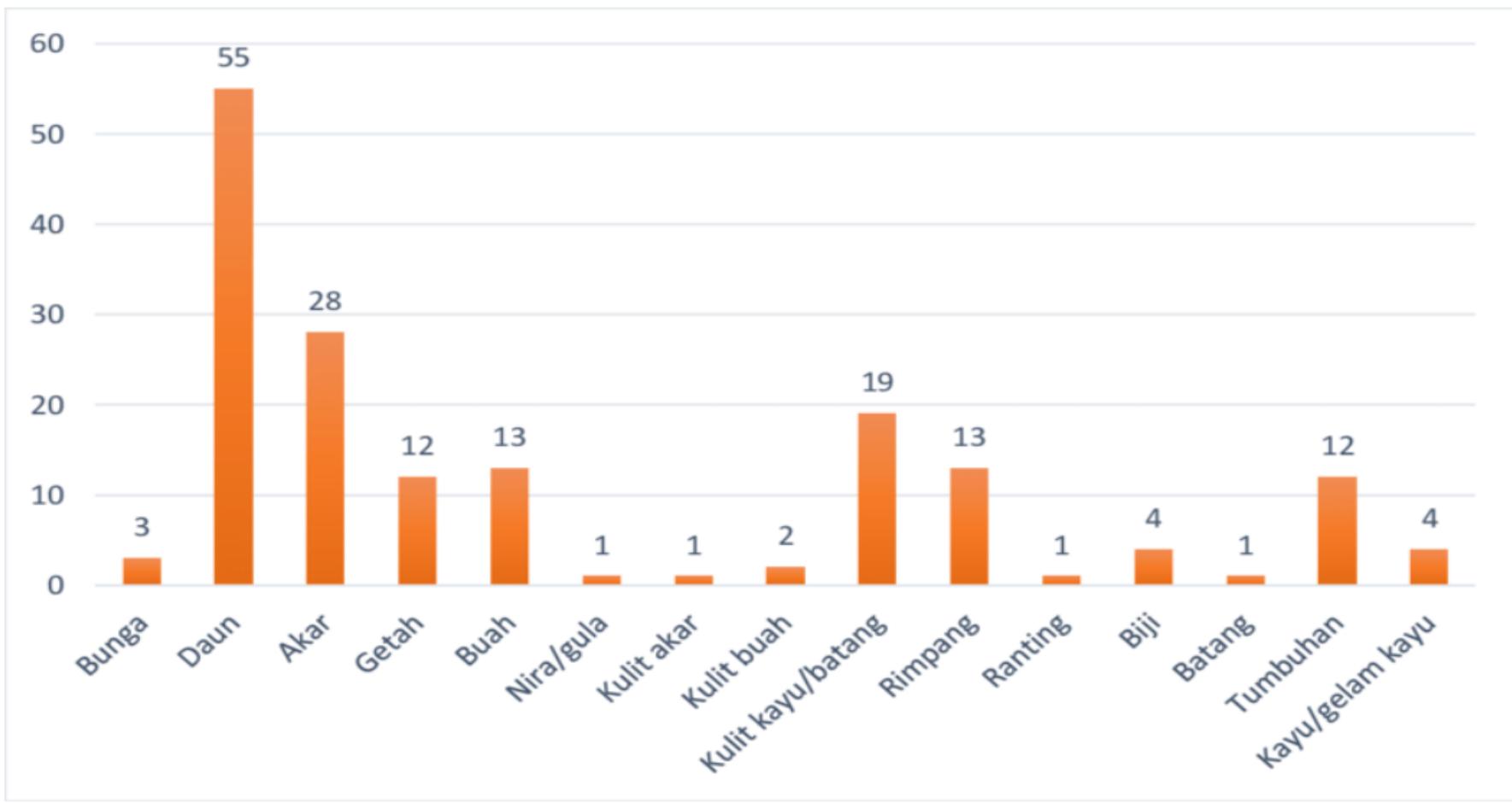
**Figure 1.** Germination progress of soybean seeds over 7 days.



**Figure 7.** Effect of germination day.

*Menghasilkan formula OBA yang  
rasional/ilmiah adalah memperhatikan  
sumber bahan baku terbarukan yang  
tidak akan pernah habis*

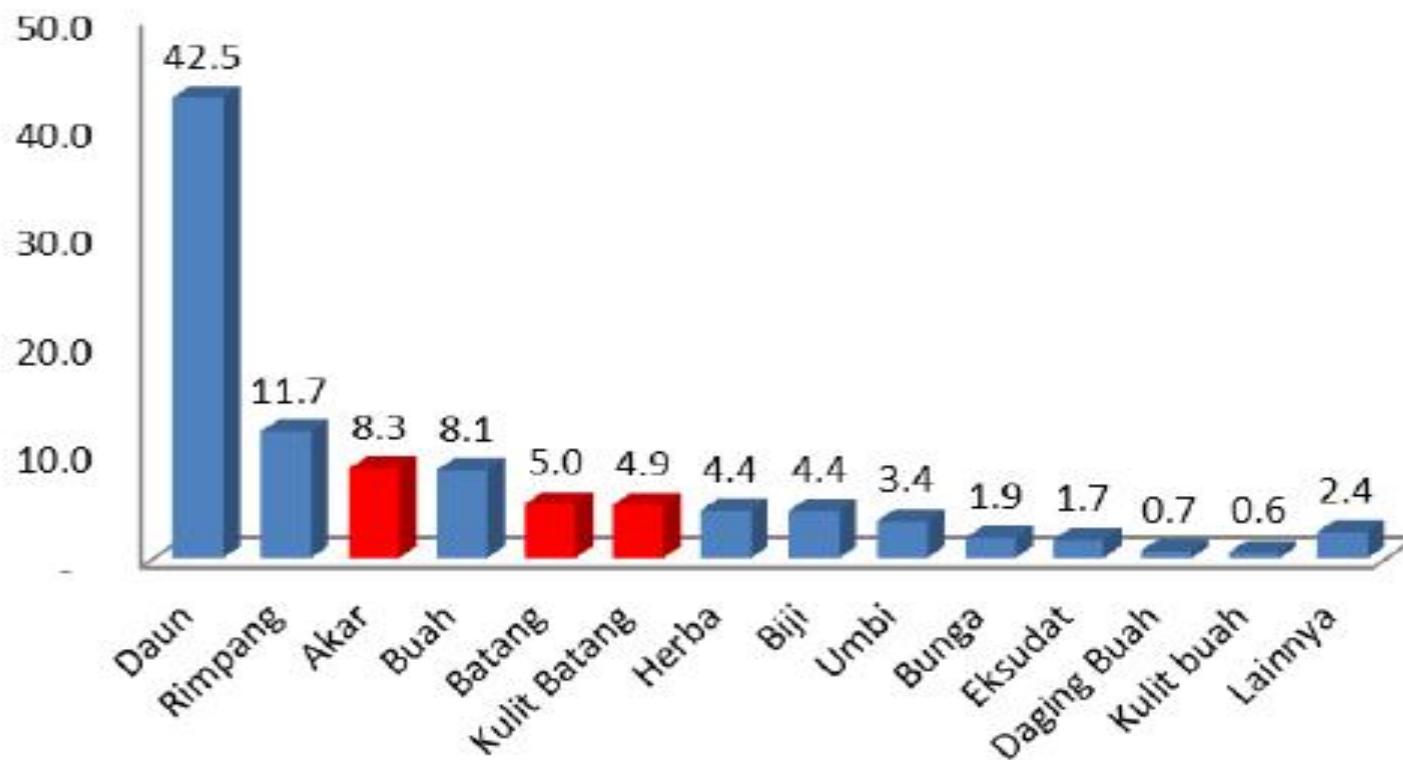
# **Sustainable**



STASIUN PENELITIAN WAY CANGUK: DUA DEKADE RISET EKOLOGI HUTAN HUJAN TROPIS DATARAN RENDAH SUMATERA

© Balai Besar Taman Nasional Bukit Barisan Selatan & Wildlife Conservation Society-Indonesia Program, Kotaagung 2020

# Bagian tumbuhan yang dipakai sbg bahan jamu



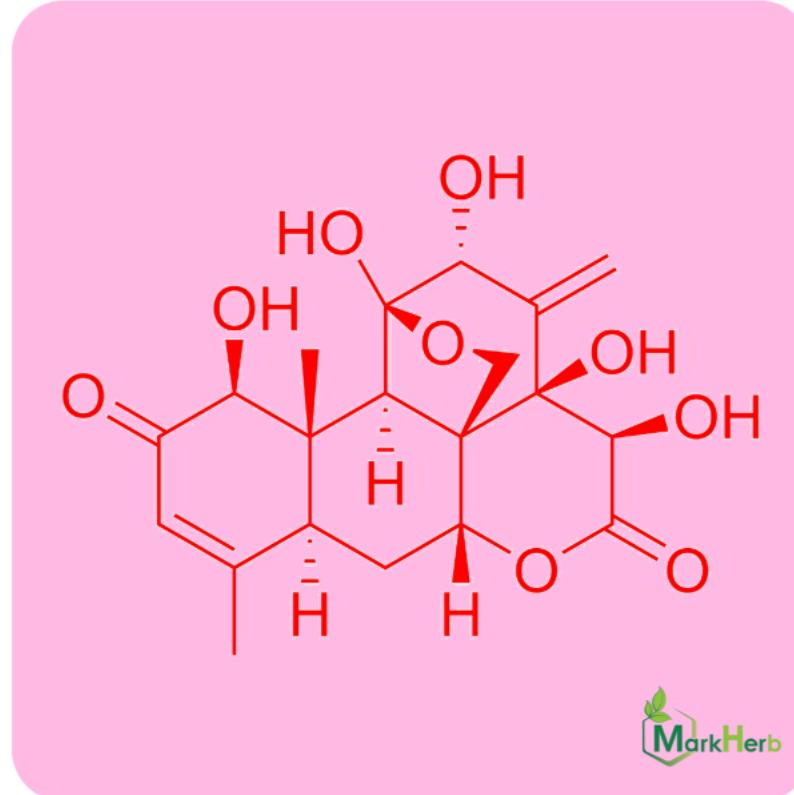
42,5% ramuan pengobatan tradisional menggunakan daun sebagai bahan baku, sedangkan batang, kulit batang, dan akar yang pemanfaatannya diperkirakan merusak ekosistem hanya berkisar 4 – 8 %



*Menghasilkan formula OBA yang  
rasional/ilmiah adalah dengan menggunakan  
bahan baku yang ketersediannya kontinue  
dengan kualitas dan kuantitas terjamin*

# **Valueable**

Harga untuk 3 gram perhiasan emas kuning 17 karat dibanderol **Rp2.187.000**, sedangkan untuk harga 3 gram perhiasan emas putih 17 karat ditaksir senilai **Rp2.238.000**



## Eurycomanone

Catalog No : TER-9-1

Compound Classification : Diterpenoids

CAS : 84633-29-4

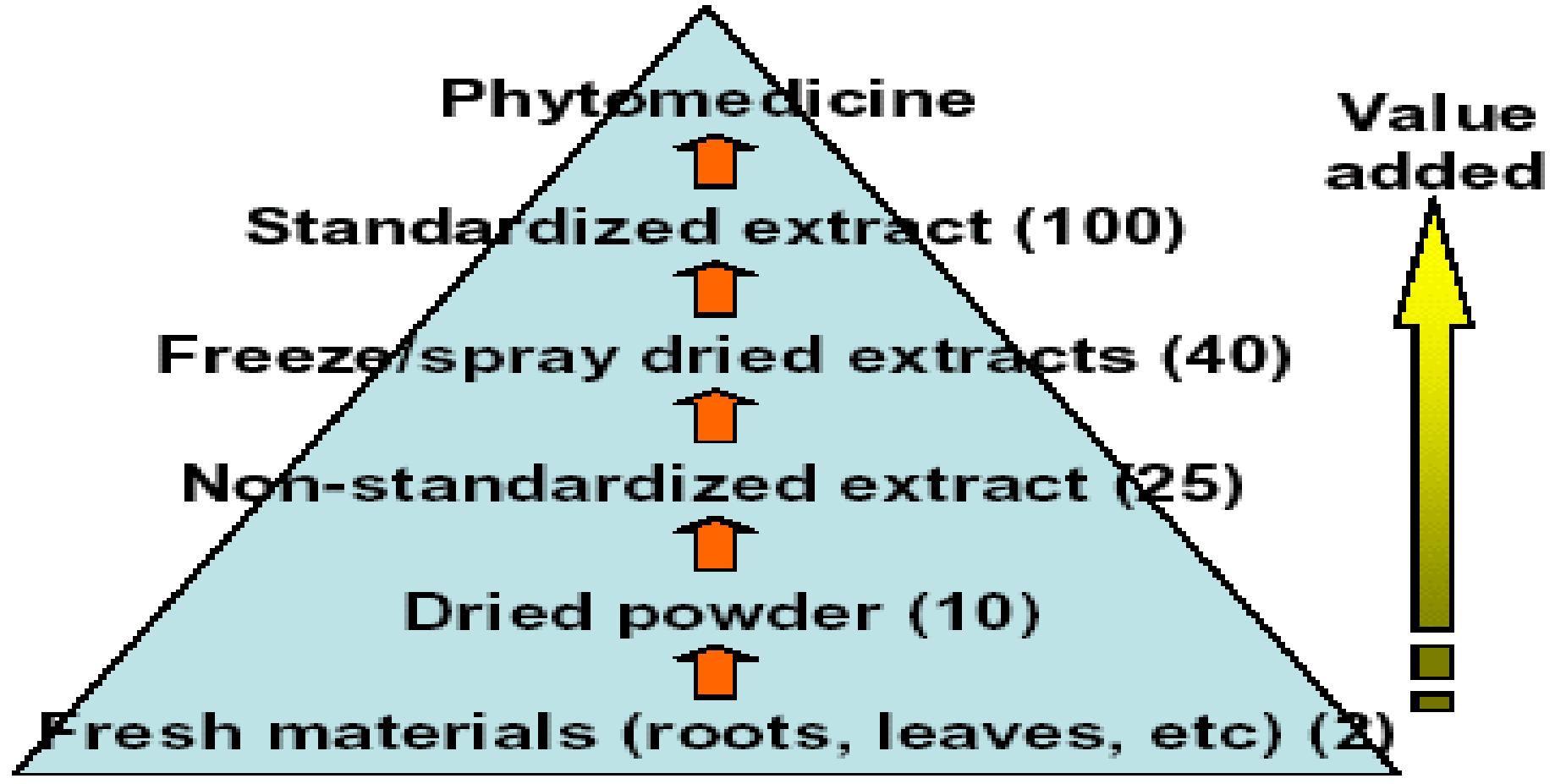
Other Names :

Pasakbumin-A; Eurycomanone;; Picrasa-3,13(21)-Diene-2,16-Dione, 11,20-Epoxy-1,11,12,14,15-Pentahydroxy-, (1-Beta,11-Beta,12-Alpha,15-Beta)-, Dihydrate

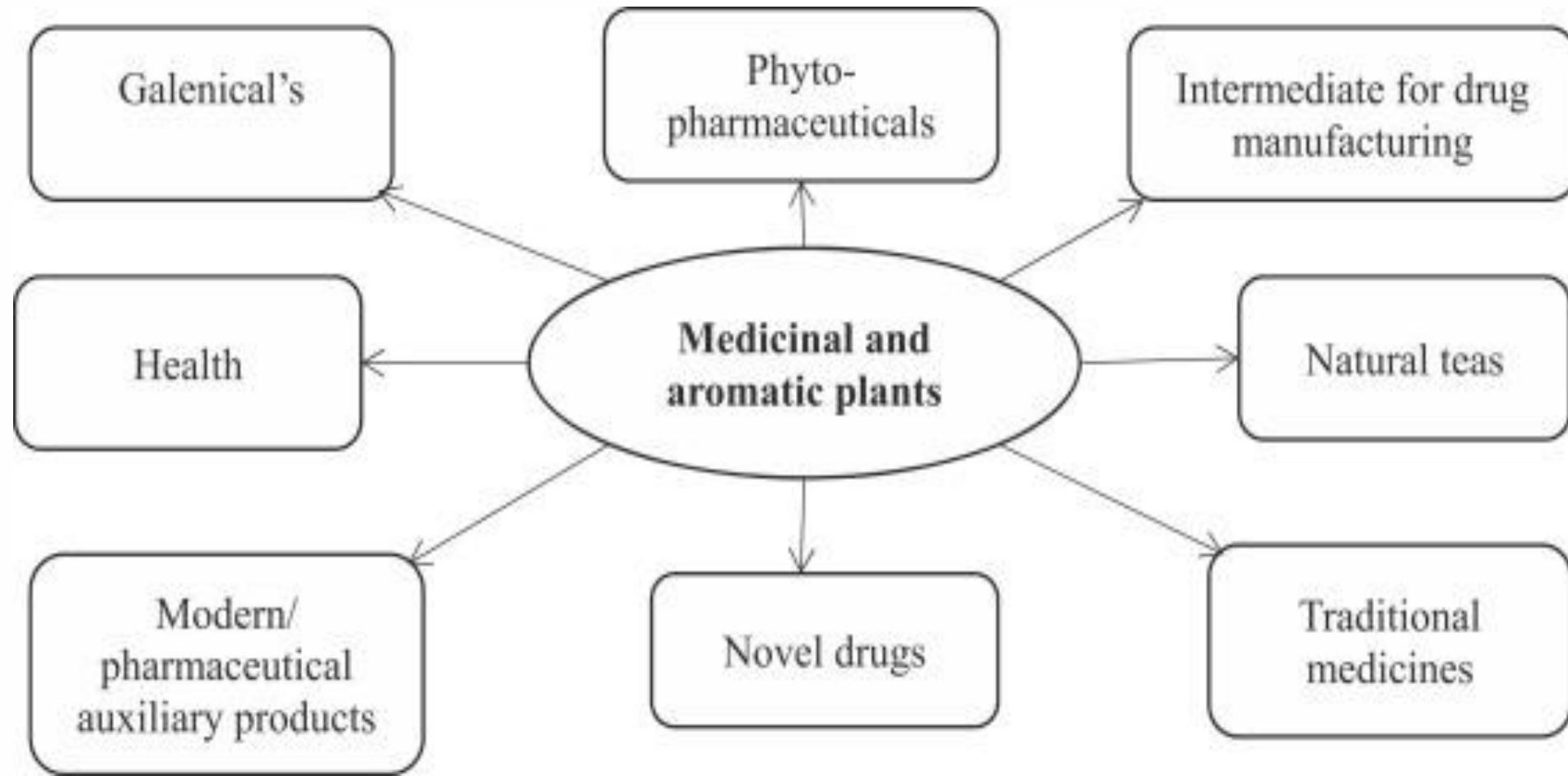
Rp 1,470,000.00

UNIT

1 mg



Increasing value of herbal products with processing and standardization (Ismail 2003)



*Value addition: A novel strategy for quality enhancement of medicinal and aromatic plants*

<https://doi.org/10.1016/j.jarmap.2022.100415>

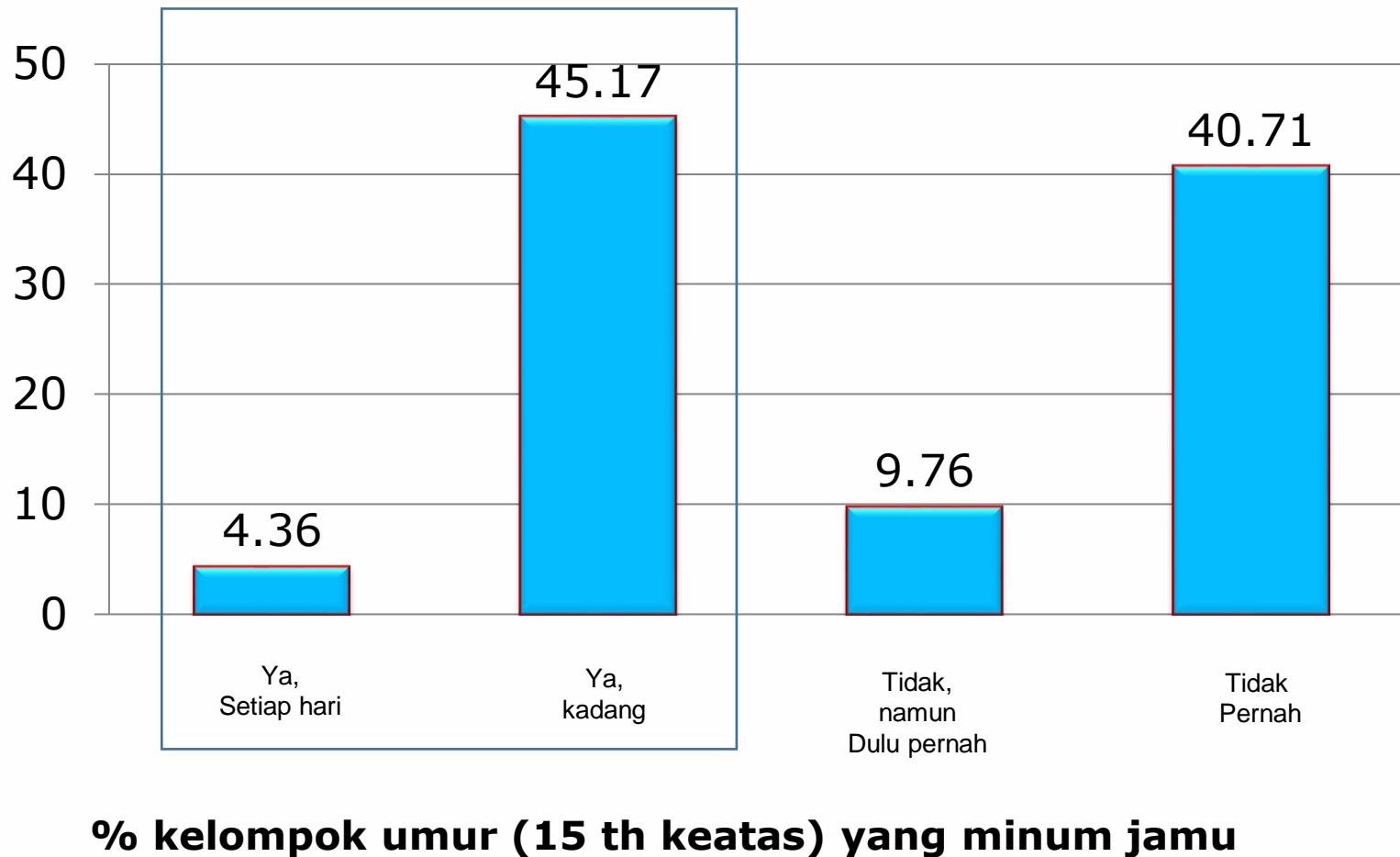
*Menghasilkan formula OBA yang  
rasional/ilmiah adalah upaya meningkatkan  
nilai tambah suatu produk melalui sentuhan  
inovasi yang inventif*

# **Marketable**

# MARKET POTENSIAL JAMU

1. Riset Pasar
2. Google Trend
3. Market Place
4. Data Sekunder
5. Expert Opinion

# RISET KESEHATAN DASAR, KEMENKES RI 2012



Riskesdas (2010) menyatakan bahwa  
50% penduduk Indonesia telah menggunakan  
jamu dan 96% diantaranya merasakan  
manfaatnya

Mereka yang menderita penyakit  
metabolik-degeneratif (kronis)

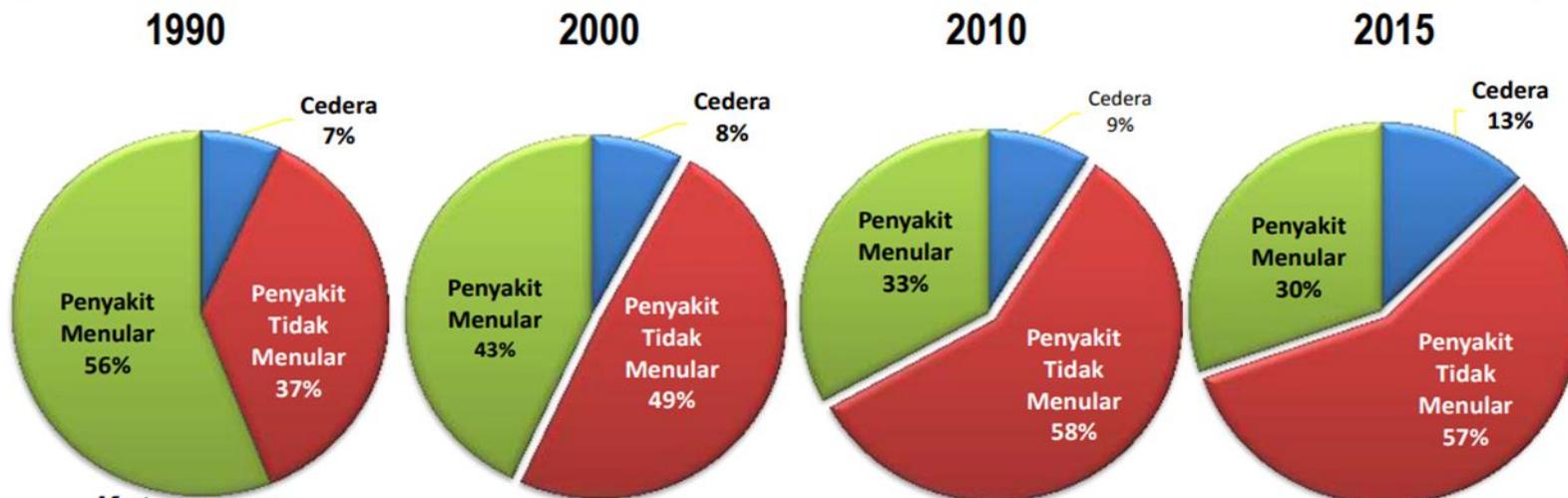


MENTERI KESEHATAN  
REPUBLIK INDONESIA

# TRANSISI EPIDEMIOLOGI

- Kematian akibat penyakit tidak menular semakin meningkat
- Tren ini kemungkinan akan berlanjut seiring dengan perubahan perilaku hidup (**pola makan dengan gizi tidak seimbang, kurang aktifitas fisik, merokok, dll**)

## Saat ini PTM menjadi Beban Penyakit Utama

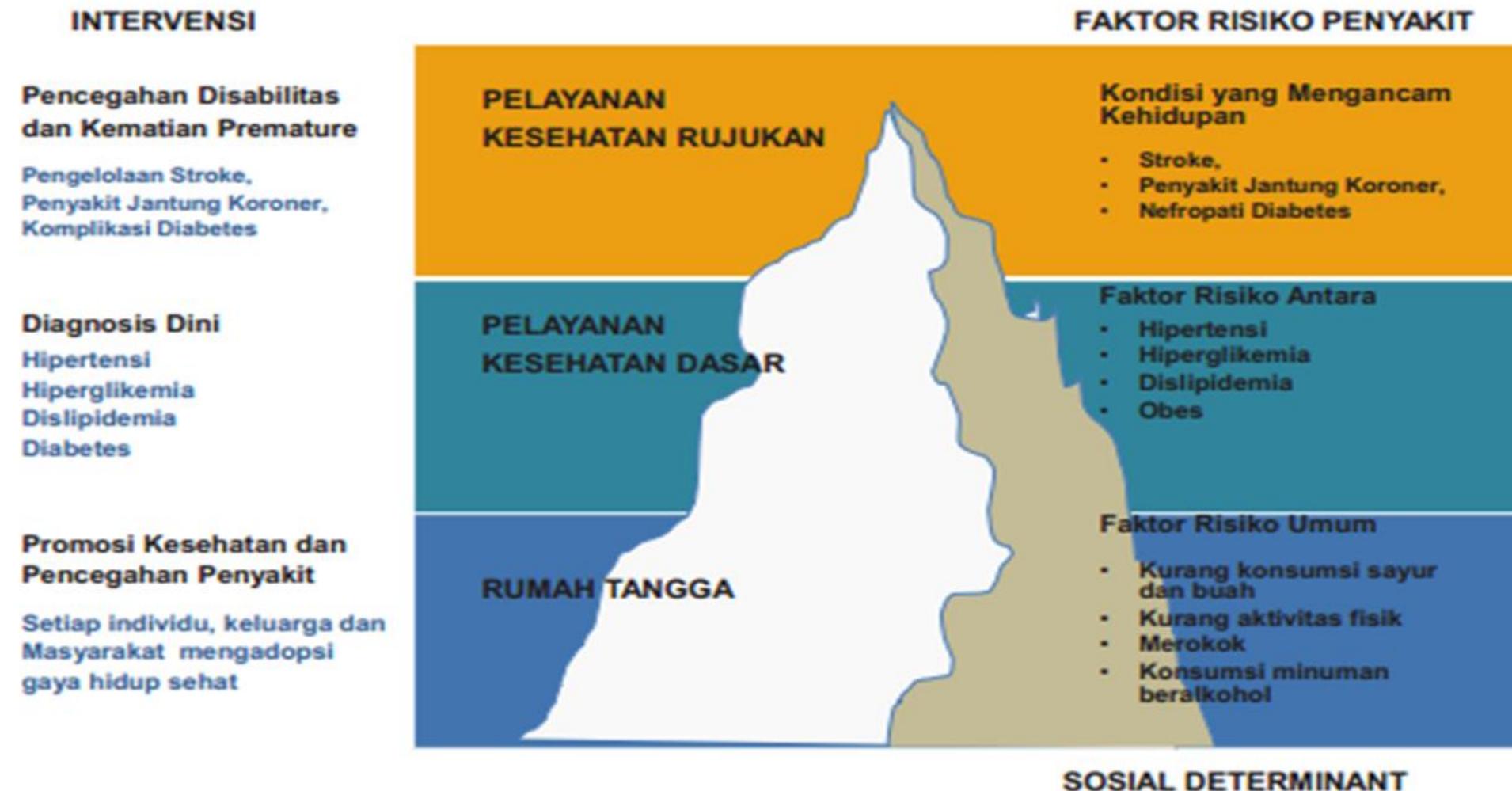


### Keterangan:

Pengukuran beban penyakit dengan Disability-adjusted Life Years (DALYs) → hilangnya hidup dalam tahun akibat kesakitan dan kematian prematur

Sumber : Double Burden of Diseases & WHO NCD Country Profiles (2014)

# FENOMENA GUNUNG ES PENYAKIT TIDAK MENULAR

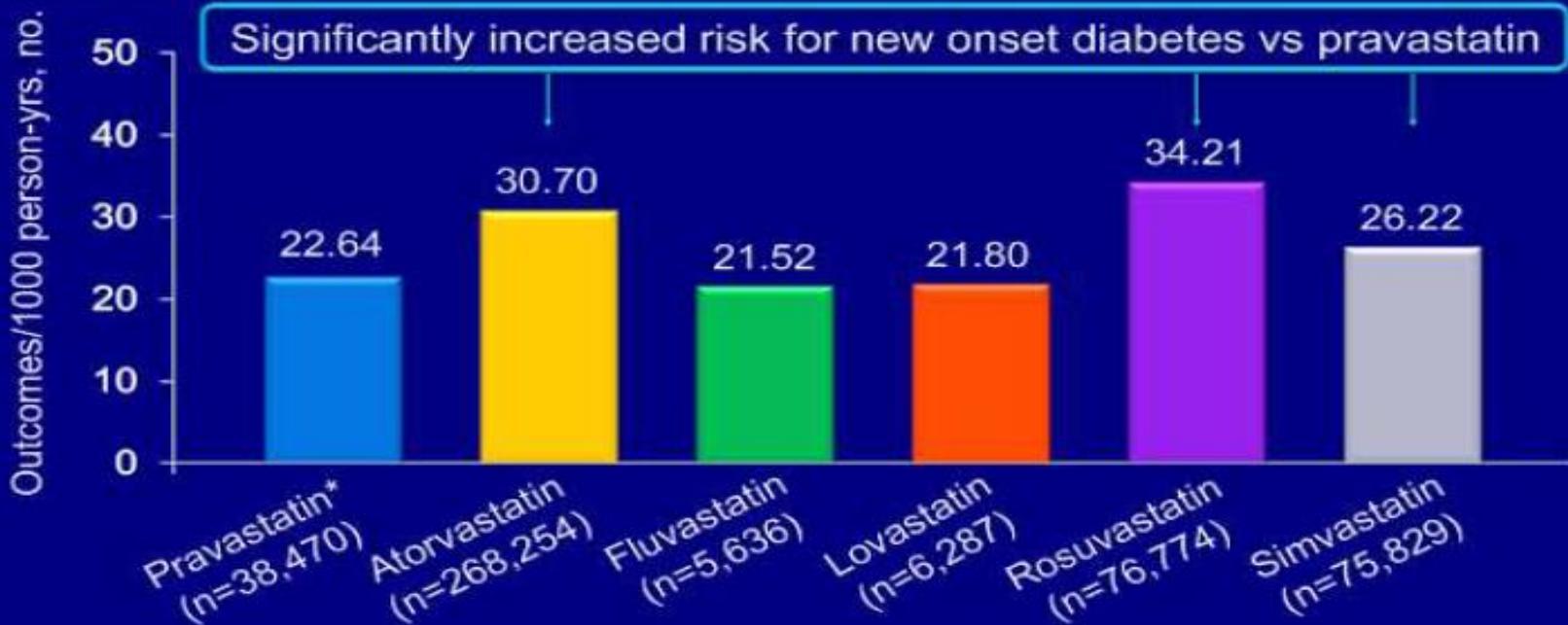


Mereka yang *under-estimated*  
dengan *western medicine*



## Incident Diabetes Rate Highest for Atorvastatin, Rosuvastatin Vs Pravastatin Over 14 Years

Primary Outcome



\*Reference drug

Carter AA et al. BMJ. 2013;346:f2610 doi:10.1136/bmj.f2610.

Mereka yang *loyal* dengan  
pengobatan herbal

ARTIKEL PENELITIAN

## GAMBARAN KARAKTERISTIK PEMANFAATAN PELAYANAN KESEHATAN TRADISIONAL

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DOI: <https://doi.org/10.37012/jik.v12i1.183>

### ABSTRAK

Hasil Riskesdas 2018 menunjukkan anggota rumah tangga mendatangi panti sehat/fasyankestrad/fasyankes 31,4% dan melakukan upaya sendiri 12,9%. Proporsi ramuan jadi 48%, ramuan buatan sendiri 31,8%, keterampilan manual 65,3%, keterampilan pikir 1,9% dan keterampilan energi 2,1%. Proporsi Pemanfaatan TOGA 24,6%. Adanya hasil ini, maka peneliti tertarik mendeskripsikan karakteristik masyarakat memanfaatkan yankestrad. Metode menggunakan data sekunder dan deskriptif serta mencari tinjauan Pustaka. Hasil Provinsi terbanyak memanfaatkan ramuan jadi Kalsel (58,4%), ramuan sendiri Sulbar (85,5%), keterampilan manual Kalsel (83,3%) dan memanfaatkan TOGA Sulut (55,6%). Karakteristik menggunakan ramuan jadi lansia (53,7%), perempuan (49,6%), tamat SD (52%), petani/buruh (43,5%) dan tinggal di perkotaan (51,7%). Ramuan buatan sendiri paling banyak lansia (42,9%), perempuan (33,9%), tidak/belum pernah sekolah (35,9%), petani/buruh (43,5%) dan tinggal di pedesaan. Keterampilan manual paling banyak usia <1 tahun (93,9%), balita (79,7), dewasa (67,4%), laki-laki (68,4%), perguruan tinggi (69,2%), pegawai swasta (70,9%) dan tinggal di perkotaan (65,7%). Simpulan proporsi terbesar pemanfaatan yankestrad dan ramuan jadi berhubungan dengan status sosial ekonomi dan tinggal di kota. Sedangkan upaya sendiri dan membuat ramuan sendiri berhubungan dengan sosial ekonomi dan tempat tinggal di desa. Riskesdas 2018 belum meneliti alasan masyarakat memanfaatkan yankestrad berdasarkan jenis gangguan kesehatan, akses berobat dan kepuasan masyarakat berobat di fasyankestrad, sehingga perlu penelitian lebih lanjut.

**Kata Kunci:** Pelayanan Kesehatan Tradisional, Obat Tradisional, *Traditional Complementary Medicine*.

**Tabel 1. Proporsi Pemanfaatan Pelayanan Kesehatan Tradisional Menurut Provinsi, Riskesdas 2018**

No	Provinsi	Memanfaatkan Yankeestrad (%)	95%CI	Melakukan Upaya Sendiri (%)	95%CI	n	Tertimbang
1	Aceh	15,9	15,1 - 16,7	8,6	8,0 - 9,2	20.244	
2	Sumatera Utara	35,2	34,0 - 36,4	9,6	8,9 - 10,3	55.351	
3	Sumatera Barat	31,3	29,9 - 32,8	12,3	11,4 - 13,3	20.663	
4	Riau	31,5	30,2 - 32,9	8,7	8,0 - 9,5	26.085	
5	Jambi	24,2	22,4-26,1	10,5	9,3-11,8	13.692	
6	Sumatera Selatan	29,5	27,8-31,2	9,9	8,9-10,9	32.126	
7	Bengkulu	31,2	29,3-33,2	8,1	7,3-8,9	7.531	
8	Lampung	42,7	41,3-44,1	9,6	8,8-10,5	32.148	
9	Kep.Bangka Belitung	28,4	26,6 - 30,3	11,1	9,9 - 12,4	5.592	
10	Kepulauan Riau	20,6	18,2 - 23,3	13,6	10,8 - 16,9	8.173	
11	DKI Jakarta	39,2	37,3 - 41,2	11,0	9,7 - 12,4	40.210	
12	Jawa Barat	23,3	22,5 - 24,2	9,2	8,8 - 9,7	186.809	
13	Jawa Tengah	33,0	32,2 - 33,7	13,9	13,4 - 14,5	132.565	
14	DI Yogyakarta	48,1	46,3 - 50,0	13,4	12,2 - 14,6	14.602	
15	Jawa Timur	48,3	47,4 - 49,2	15,5	14,9 - 16,2	151.878	
16	Banten	35,5	33,8 - 37,3	14,1	12,7 - 15,6	48.621	
17	Bali	19,2	18,1 - 20,5	23,6	22,2 - 25,1	16.481	
18	Nusa Tenggara Barat	31,5	29,9 - 33,2	13,1	12,0 - 14,3	19.247	
19	Nusa Tenggara Timur	17,1	16,0 - 18,3	23,0	21,8 - 24,2	20.599	
20	Kalimantan Barat	19,7	18,3 - 21,1	8,9	8,1 - 9,7	19.190	
21	Kalimantan Tengah	28,1	26,1 - 30,1	12,3	11,1 - 13,6	10.189	
22	Kalimantan Selatan	54,1	52,1 - 56,2	9,6	8,5 - 10,7	16.043	
23	Kalimantan Timur	29,7	28,0 - 31,5	16,6	15,3 - 18,1	13.977	
24	Kalimantan Utara	17,4	15,2 - 19,8	11,9	10,1 - 14,0	2.733	
25	Sulawesi Utara	24,7	23,3 - 26,1	19,1	17,7 - 20,7	9.542	
26	Sulawesi Tengah	22,0	20,4 - 23,7	23,9	22,7 - 25,3	11.548	
27	Sulawesi Selatan	9,3	8,7 - 10,0	18,8	18,0 - 19,7	33.693	
28	Sulawesi Tenggara	19,5	17,7 - 21,3	12,4	11,2 - 13,7	10.167	
29	Gorontalo	37,8	34,7 - 40,9	11,4	9,8 - 13,3	4.547	
30	Sulawesi Barat	8,5	7,2 - 9,9	20,5	18,4 - 22,7	5.195	
31	Maluku	14,5	13,1 - 16,0	19,5	17,9 - 21,2	6.801	
32	Maluku Utara	24,1	22,5 - 25,8	20,2	18,5 - 22,0	4.723	
33	Papua Barat	15,1	13,3 - 17,0	18,1	16,3 - 20,1	3.588	
34	Papua	9,5	8,4 - 10,6	18,3	16,4 - 20,4	12.736	
	<b>INDONESIA</b>	<b>31,4</b>	<b>31,1 - 31,6</b>	<b>12,9</b>	<b>12,7 - 13,2</b>	<b>1.017.290</b>	

**Tabel 2. Proporsi Jenis Pelayanan Kesehatan Tradisional Yang Dimanfaatkan Menurut Provinsi, Riskesdas 2018**

No	Provinsi	Ramuan Jadi %	Ramuan Buatan Sendiri %	Keterampilan Manual %	Keterampilan Olah Pikir %	Keterampilan Energi %	n	Tertimbang
1	Aceh	37,0	60,3	45,2	2,9	3,6	4.812	
2	Sumatera Utara	48,9	28,4	72,8	2,0	2,0	24.033	
3	Sumatera Barat	22,8	55,7	66,0	1,8	2,4	8.748	
4	Riau	43,7	27,5	69,2	2,0	1,8	10.193	
5	Jambi	50,5	45,2	59,2	1,4	2,8	4.613	
6	Sumatera Selatan	34,6	24,4	79,9	1,7	1,8	12.257	
7	Bengkulu	29,5	41,8	67,0	2,1	2,4	2.871	
8	Lampung	48,2	37,0	72,7	1,6	1,4	16.320	
9	Kep.Bangka Belitung	43,5	21,6	73,1	3,3	3,5	2.141	
10	Kepulauan Riau	51,7	28,6	55,5	1,5	2,8	2.712	
11	DKI Jakarta	59,6	18,7	68,6	2,0	2,3	19.587	
12	Jawa Barat	51,9	28,1	59,3	2,0	2,4	58.997	
13	Jawa Tengah	55,5	18,5	64,0	1,9	1,7	60.323	
14	DI Yogyakarta	56,1	26,0	62,7	1,7	1,6	8.713	
15	Jawa Timur	51,1	28,7	78,4	1,9	2,0	94.054	
16	Banten	55,6	20,8	70,1	1,6	1,8	23.406	
17	Bali	37,5	49,4	46,6	2,2	2,3	6.848	
18	Nusa Tenggara Barat	33,9	36,5	57,5	1,5	3,3	8.328	
19	Nusa Tenggara Timur	28,9	69,3	40,6	1,2	1,9	8.013	
20	Kalimantan Barat	47,5	40,4	56,6	2,3	2,4	5.312	
21	Kalimantan Tengah	54,7	30,4	69,4	2,0	1,9	3.988	
22	Kalimantan Selatan	58,4	17,9	83,3	1,6	1,8	9.914	
23	Kalimantan Timur	53,8	27,9	62,3	2,2	1,9	6.288	
24	Kalimantan Utara	49,8	29,5	50,9	2,6	1,6	777	
25	Sulawesi Utara	22,4	70,5	49,4	1,6	1,5	4.056	
26	Sulawesi Tengah	25,5	60,8	50,5	1,9	1,7	5.149	
27	Sulawesi Selatan	31,2	70,5	15,6	1,8	2,7	9.207	
28	Sulawesi Tenggara	25,5	55,8	52,2	2,4	2,8	3.145	
29	Gorontalo	25,8	42,6	76,5	2,3	2,4	2.172	
30	Sulawesi Barat	21,9	85,5	9,3	1,6	1,5	1.458	
31	Maluku	21,0	78,2	31,0	1,6	2,1	2.241	
32	Maluku Utara	25,2	75,6	28,0	1,5	2,1	2.032	
33	Papua Barat	24,9	70,8	25,3	1,1	0,8	1.154	
34	Papua	18,9	81,7	17,2	1,7	3,0	3.432	
	<b>INDONESIA</b>	<b>48,0</b>	<b>31,8</b>	<b>65,3</b>	<b>1,9</b>	<b>2,1</b>	<b>437.291</b>	

*Menghasilkan formula OBA yang  
rasional/ilmiah adalah menyesuaikan dengan  
market demand sehingga produk benar-  
benar dibutuhkan masyarakat*

# HASIL SENSUS PENDUDUK 2020

Berita Resmi Statistik No. 07/01/Th. XXIV, 21 Januari 2021

## Jumlah Penduduk Indonesia Hasil SP2020 (September 2020)

**270,20** Juta Jiwa

Bertambah 32,56 juta jiwa dibandingkan SP2010

Laju Pertumbuhan Penduduk per Tahun, 2010-2020

**1,25%**

Melambat dibandingkan periode 2000-2010 yang sebesar **1,49%**

Penduduk Usia Produktif (15-64) Tahun

**70,72%**

Indonesia masih dalam masa bonus demografi

Percentase Penduduk Lansia

**9,78%**

Naik dibandingkan tahun 2010 yang sebesar **7,59%**



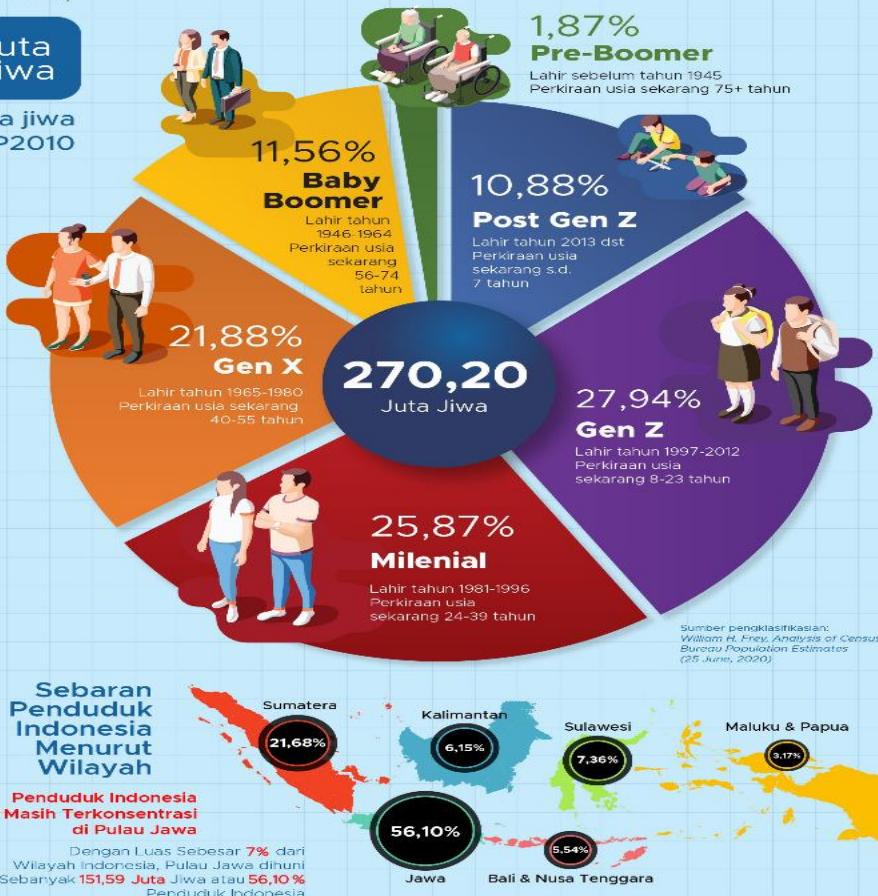
Rasio Jenis Kelamin

**102**

Terdapat 102 penduduk laki-laki untuk setiap 100 penduduk perempuan



## Komposisi Penduduk Indonesia



**BADAN PUSAT STATISTIK**  
<https://www.bps.go.id>

## SOCIAL MEDIA MARKETING PLATFORMS

PEOPLE	CONTENT	STRATEGIES	CONS
• 25-34 • Boomers	• Photos & links • Information • Live video	• Local mktng • Advertising • Relationships	• Weak organic reach
• 18-25 • 26-35	• How-tos • Webinars • Explainers	• Organic • SEO • Advertising	• Video is resource-heavy
• 18-24, 25-34 • Millennials	• Inspiration & adventure • Questions/polls	• Ecommerce • Organic • Influencer	• High ad costs
• 25-34, 35-49 • Educated/wealthy	• News • Discussion • Humor	• Customer service • Ads for males	• Small ad audience
• 46-55 • Professionals	• Long-form content • Core values	• B2B • Organic • International	• Ad reporting & custom audience
• 10-19 • Female (60%)	• Entertainment • Humor • Challenges	• Influencer marketing • Series content	• Relationship building
• 13-17, 25-34 • Teens	• Silly • Feel-good • Trends	• Video ads • Location-based mktng • App mktng	• Relationship building

WordStream  
By LOCALIQ

# Applicable



# Perspektif Pengembangan Peran Tanaman Obat & Jamu

Drug discovery and  
drug development

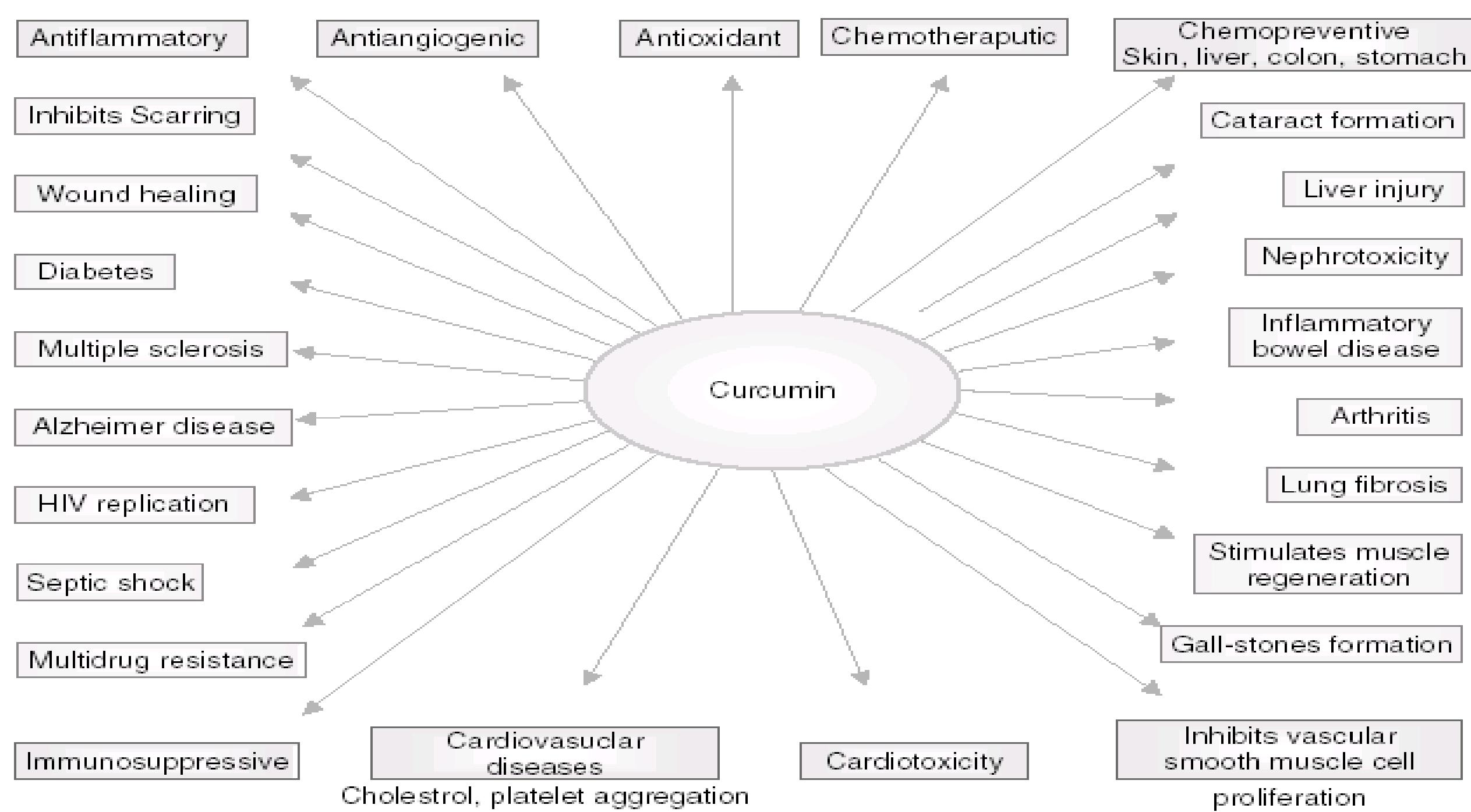
Jamu Saintifik  
(untuk Fasyankes)  
PP 103/2014)

Rakyat Mandiri  
Sehat  
(TOGA dan *self care*)

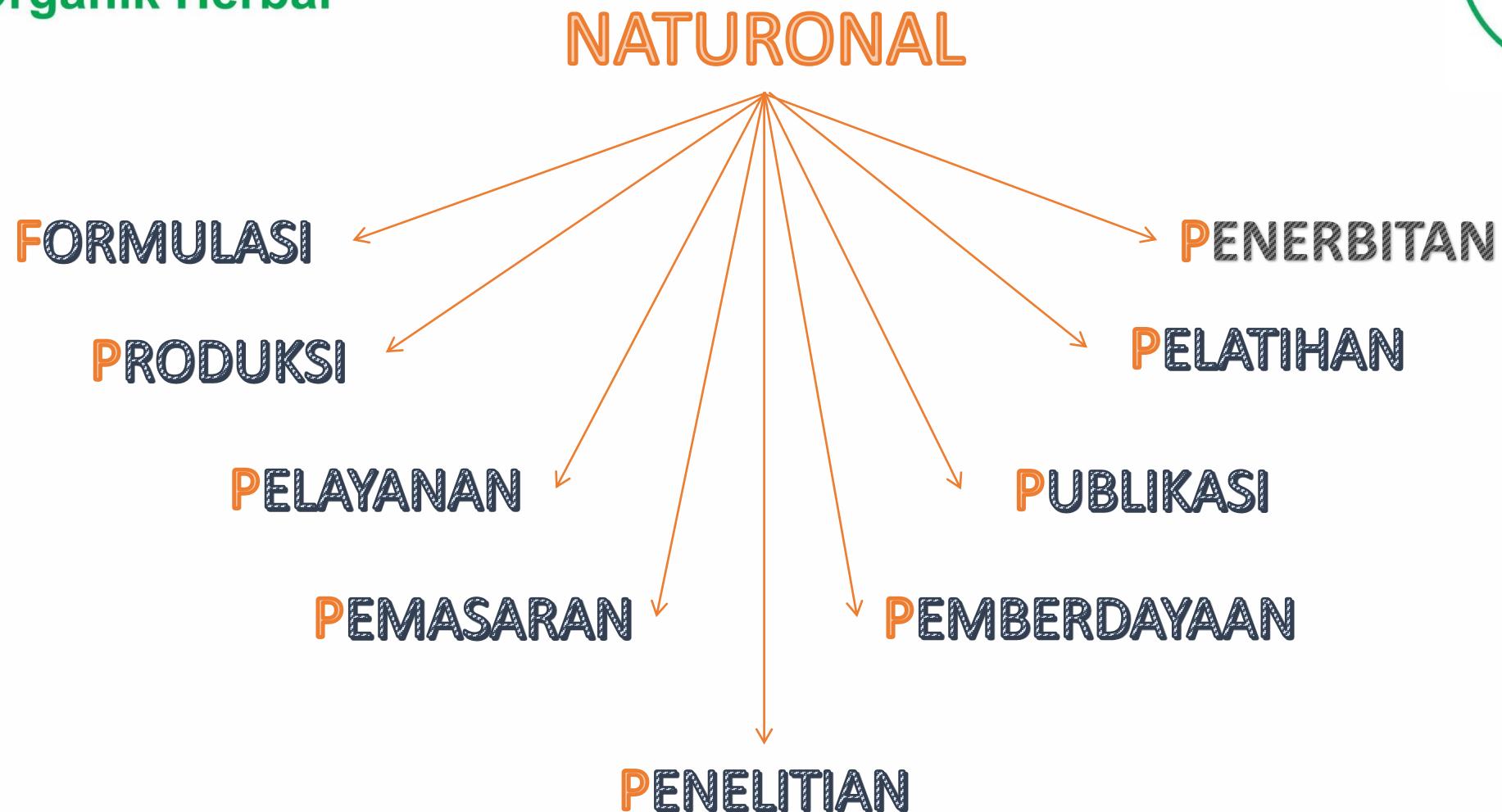
*Nutraceutical:*  
pangan fungsional  
pewarna mak-min

Tumbuhnya  
mainstream  
ekonomi baru

***Health Tourism***  
(garden, spa, trad.  
massage, museum  
Jamu)



*Menghasilkan formula OBA yang  
rasional/ilmiah adalah dengan menerapkan  
multipurpose baik jenis zat aktif maupun  
klaster sediaan produk ke dalam model bisnis*



# PENELITIAN KOLABORATIF

1. Melibatkan tingkat S1, S2 dan S3
2. Melibatkan 41 kampus kesehatan, kedokteran dan farmasi
3. Melibatkan beberapa UKOT
4. Terdiri dari dokter, apoteker, perawat

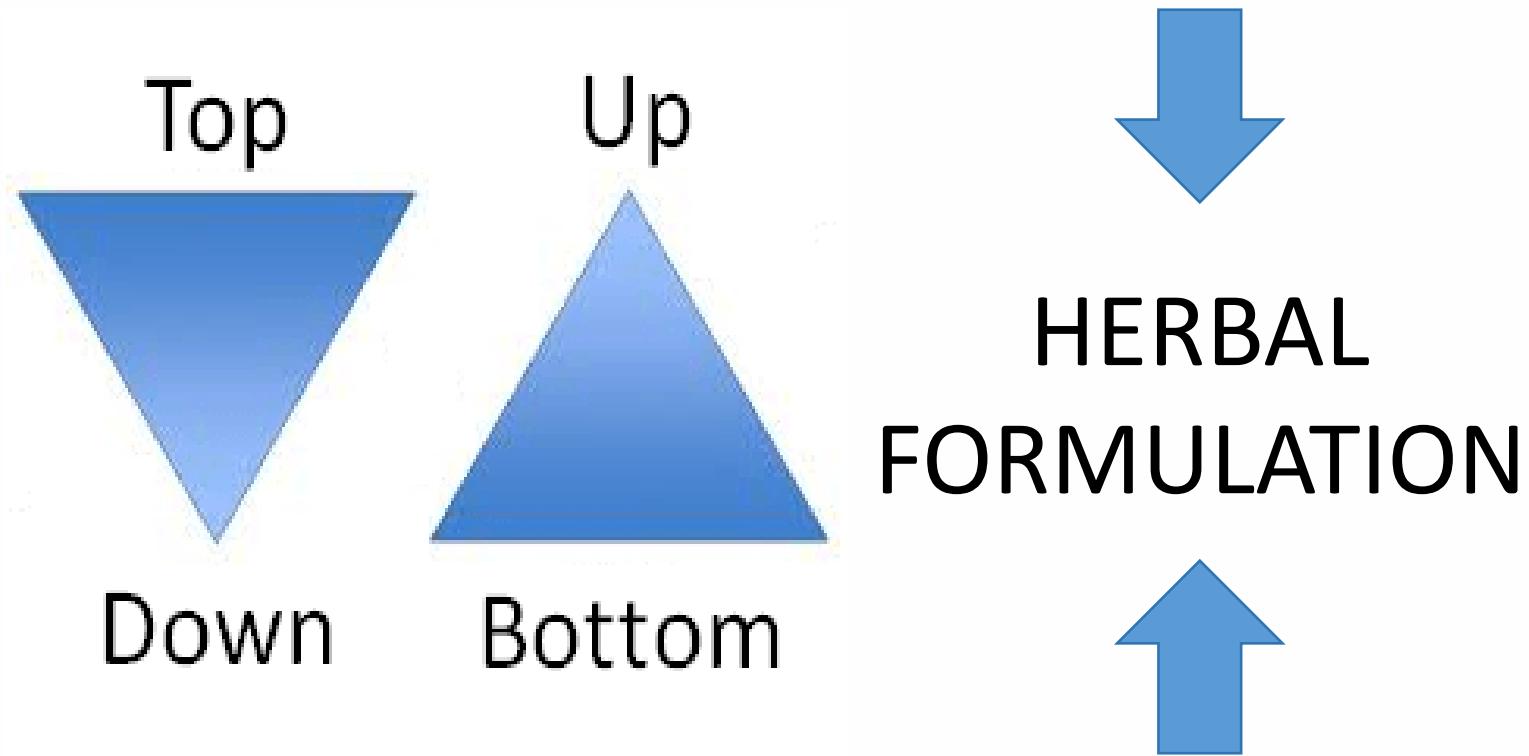
# APOTEKER



# APOTEKER

1. Apoteker adalah **insan profesional** dalam pengelolaan sediaan farmasi, termasuk diantaranya obat tradisional.
2. Apoteker dituntut dapat mengembangkan diri dalam 10 dimensi bintang farmasis WHO, diantaranya yaitu **care giver, communicator, agent of positive change, manager, decision maker, life long learner, teacher, researcher, entrepreneur, dan leader.**
3. Berkomitmen memberikan **formula obat bahan alami yang rasional/ilmiah** kepada masyarakat.
4. Berminat untuk kolaborasi dengan perguruan tinggi dalam hilirisasi hasil riset bidang obat bahan alami dengan pola *Triple Helix* dibuktikan dengan **kerjasama kemitraan.**
5. Program peningkatan kapasitas dan kapabilitas Apoteker melalui **Continuing Education.**





## MODEL TOP DOWN

1. Dari riset ke pasar

2. Contoh: EDRAS--> Ethnomedicine  
& Reverse

## General Drug Development Process

### Classical Pharmacology

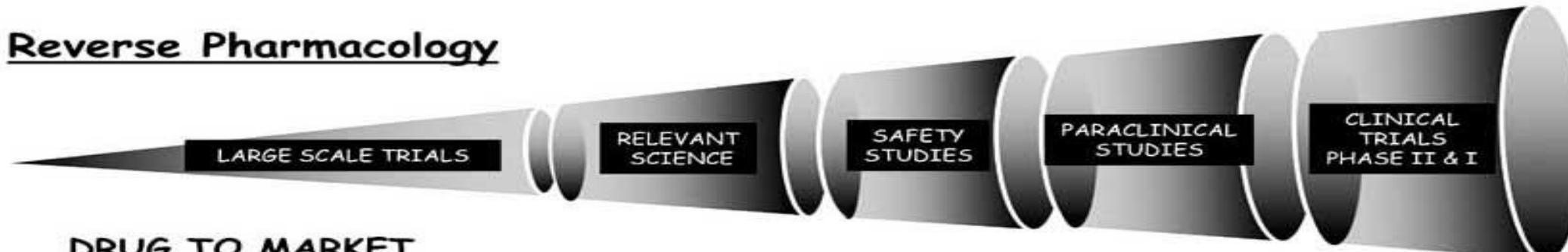
Expensive, time consuming, numerous bottlenecks



Economical, time sparing, least bottlenecks

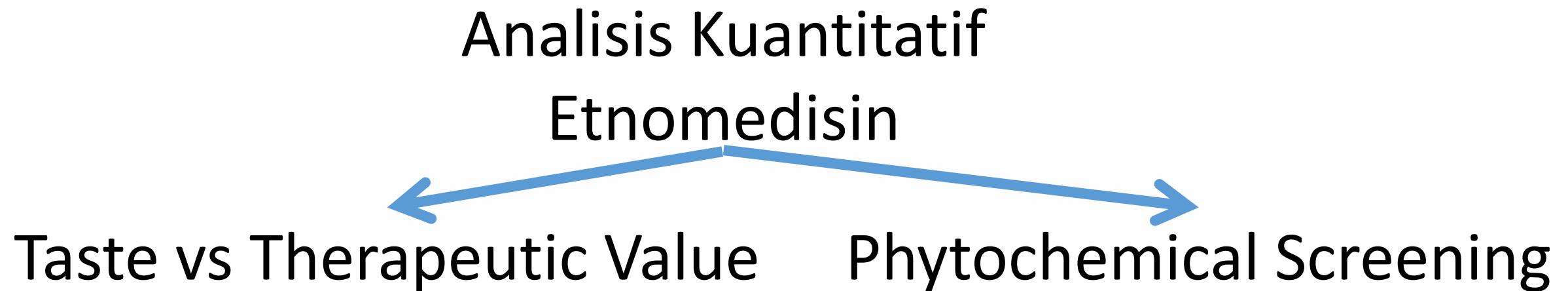
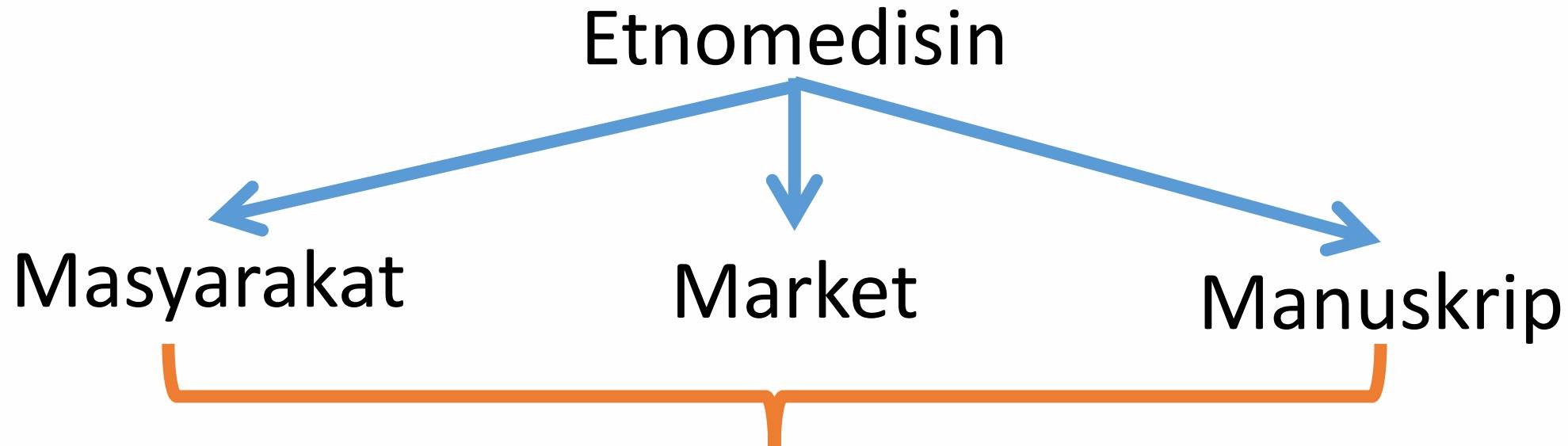
### Reverse Pharmacology

DRUG TO MARKET  
4 to 5 yrs



# EDRAS

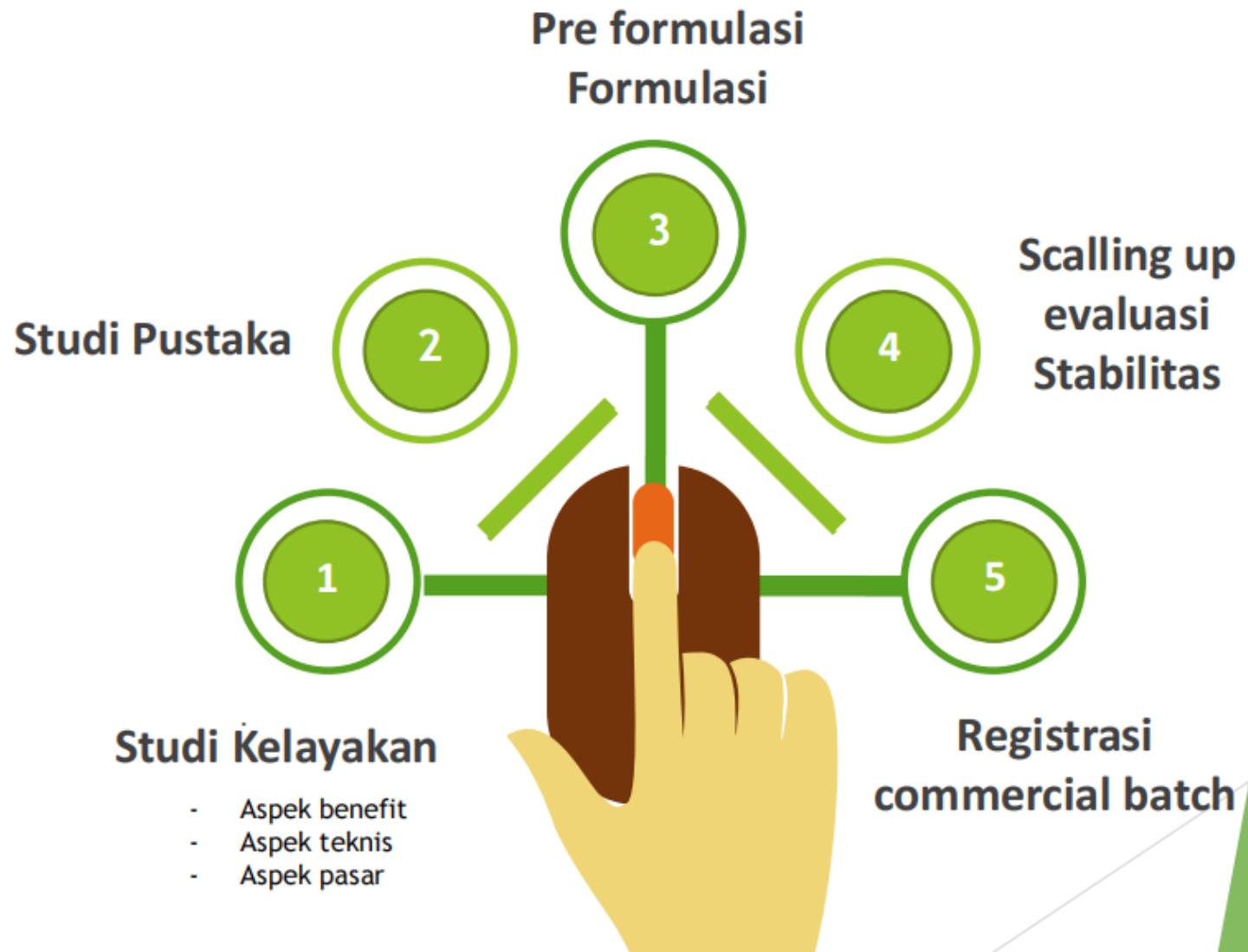
1. Proses drafting paten
2. Pengembangan obat baru berbasis etnomedisin dengan pendekatan reverse
3. Lebih hemat, akurat, cepat, merakyat dan sedikit terhambat
4. Menggunakan mixed method
5. Kolaboratif, sequant, simultant/paralel



# MODEL BOTTOM UP

1. Dari pasar ke riset
2. Contoh: UJI PUBLIK & OBSERVASI  
**KLINIK**

## TRIAL PRODUCT



# UJI PUBLIK & OBSERVASI KLINIK

1. Produk obat alam di pasaran dianalisis secara terstruktur berdasarkan testimoni (eksklusi= gimik)
2. Dilakukan analisis chart radar untuk menentukan skala prioritas berdasarkan nilai optimal (minimal 3 variabel)
3. Dilakukan uji keamanan dan mutu
4. Uji publik pada komunitas ter inklusi
5. Uji observasi klinik pada pelayanan kesehatan integrasi



## Participants (6)

- |    |                                 |            |            |
|----|---------------------------------|------------|------------|
| KK | KINTOKO KINTOKO (Me)            | Microphone | Screen     |
| AW | Arko Wicaksono (Host)           | Up arrow   | Cloud      |
|    | apt. Arko Jatmiko ... (Co-host) | Cloud      | Microphone |
|    | iwan santoso                    | X          | X          |
|    | Rio Jati Kusuma Kusuma          | X          | X          |
| WT | Wahyu Titis APHI                | X          | X          |

Case Series: The Effect of Court-Type Thai Traditional Massage and Hot Herbal Compression Combined with Standard Rehabilitation Treatment in Stroke Patients

Wipavee Jongkoldee  
Center of Applied Thai Traditional Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University

Chanticha Darunsawat  
Center of Applied Thai Traditional Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University

Thanapak Chaowpeerapong  
Center of Applied Thai Traditional Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University

Supakij Suwannatrai  
Center of Applied Thai Traditional Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University

Published: Jan 1, 2022

DOI:  
<https://doi.org/10.33192/smb.v15i1.251281>

Mute Stop Video Participants Chat Share Screen Record Reactions Apps Leave Invite Mute Me

27°C Hujan sekarang 20:17 25/10/2022

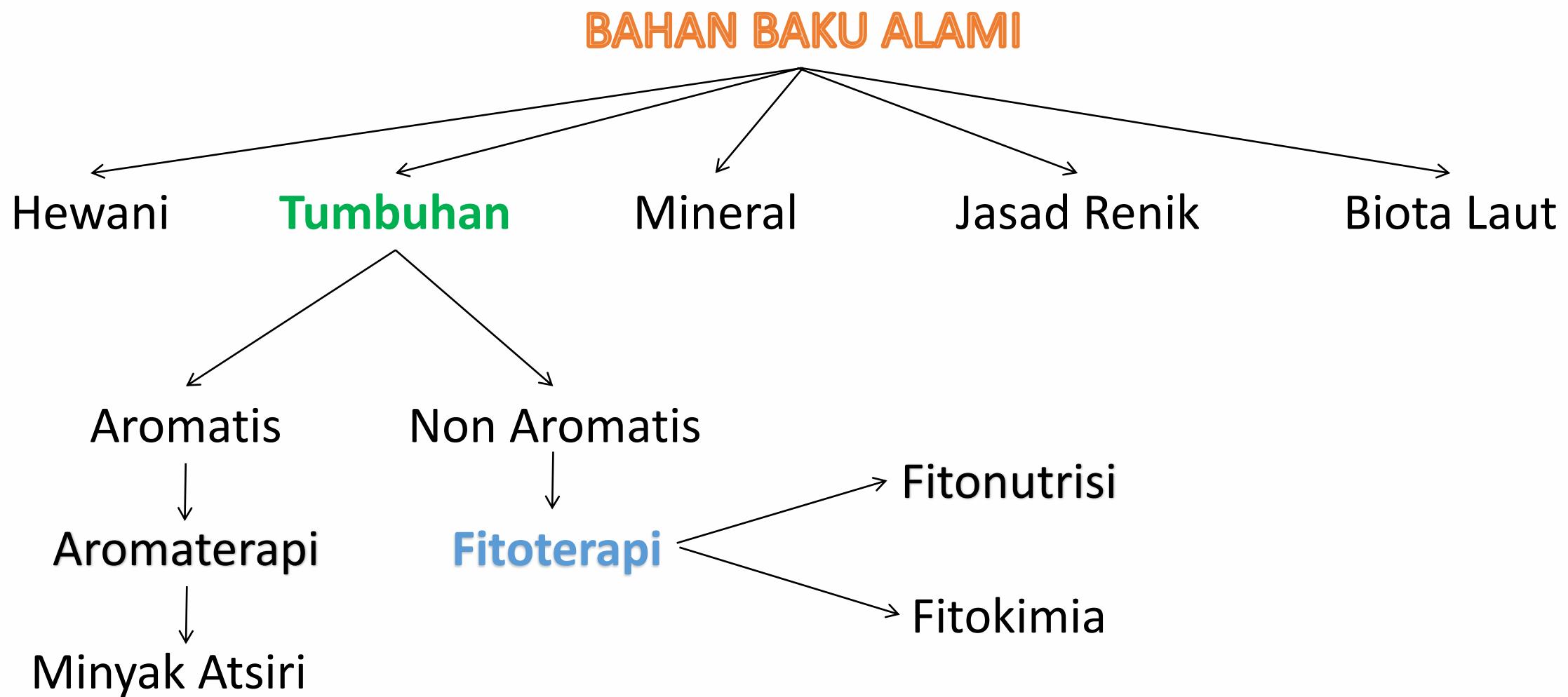
# **Model Kemitraan Komersialisasi Hasil Riset**

- 1. Model Jual-Beli Teknologi**
- 2. Model Royalti**
- 3. Model Konsultan**
- 4. Model “Karyawan Perusahaan”**
- 5. Model Suplai Bahan Baku**
- 6. Model Komisaris**
- 7. Model Kerjasama Penuh**

*Menghasilkan formula OBA yang  
rasional/ilmiah adalah tanggung jawab  
profesional seorang apoteker melalui  
kolaborasi berbagai pihak*

# BAHAN BAKU ALAMI





# Bahan Baku Basah



# Bahan Baku Kering Rajangan



# Bahan Baku Kering Bubuk



# Bahan Baku Ekstrak



# Bahan Baku Minyak Atsiri



# Mapping Sentral Biofarmaka Riau Berbasis Indeks Organoleptik dalam Meningkatkan Ketersediaan Bahan Baku Obat Bermutu untuk Industri

**Pengusul-UNRI**

Ketua : Dr. Deviona., S.P., M.P.

Anggota : Dr. Irwin Mirza Umami, SP.,M.P

Dr. Ir. Evy Rossi, M.Sc

Apt. Yuli Haryani., MSc

Chairul., ST., M.T

Sri Yoseva S.P.,M.P

Jum'atri Yusri S.Pt., M.Si

Fak.Pertanian- Agroteknologi – Pemuliaan

Fak.Agroteknologi – Ilmu Tanah

Fak.Pertanian-Teknologi Hasil Pertanian

FMIPA-Kimia-Biokimia

Fak.Teknik-Teknik Kimia-Bioproses

Fak. Pertanian-Agroteknologi-Budidaya

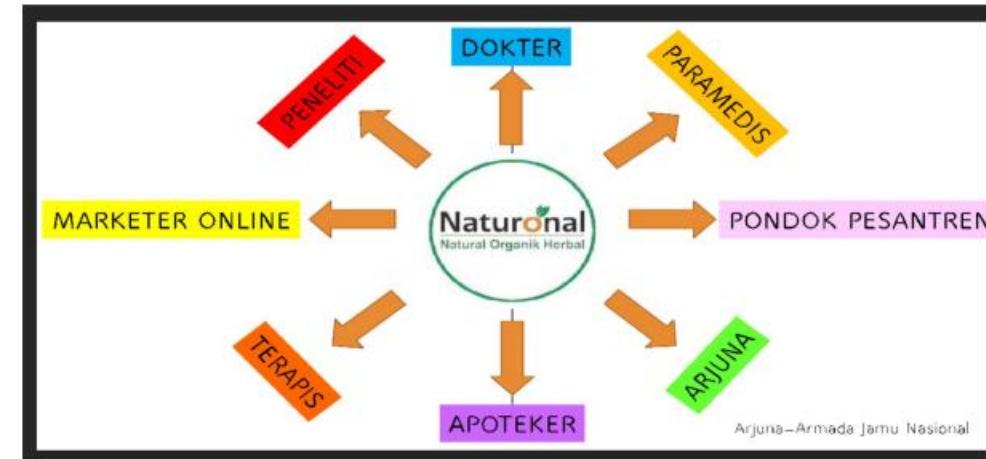
Fak. Pertanian- Agribisnis

**Mitra-DuDi**

CEO : Dr. Apt. Kintoko., MSc. Alumni GuangXi Medical University- Ketua SP3T

**CV. Naturonal Creatama Indonesia-Produksi dan Pemasaran Produk Herbal.**  
**(AHU-0028063-AH.01.14 tahun 2022)**

Visi: Terwujudnya kelestarian budaya jamu dan sumber daya alam Indonesia yang berdampak pada peningkatan kesehatan, kesejahteraan dan kemandirian bangsa atas landasan kebersamaan

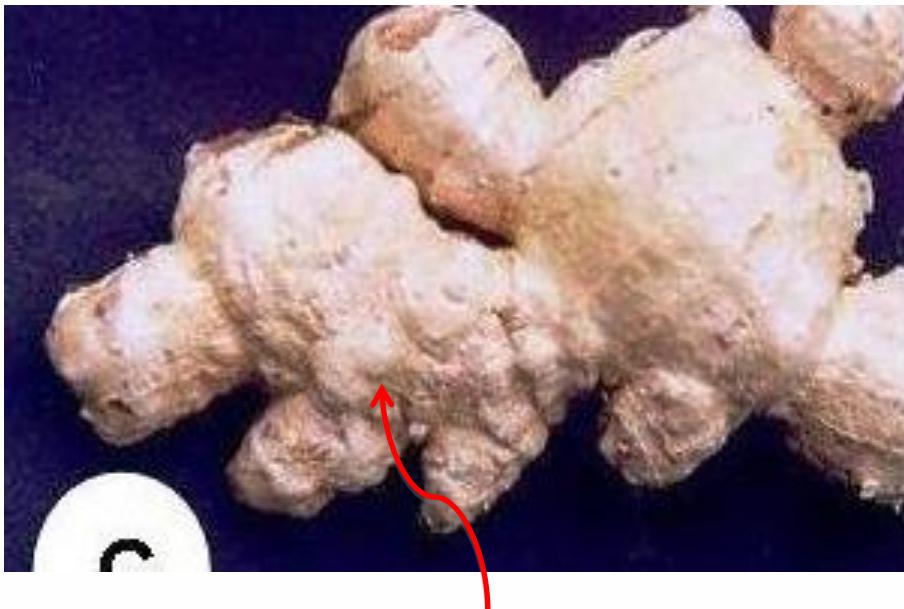




IPB



# Jahe



Rimpang jahe mengandung telur nematoda



Jahe segar, namun ada bagian rimpang yang luka

Bagian yang luka-tempat masuknya mikroba (bakteri, jamur) – bakteri *E.coli* atau jamur yang menghasilkan aflatoksin

# Kunyit



Gambar 1. Pengeringan simplisia di bawah sinar matahari



Gambar 2. Pengeringan simplisia dengan penutup kain hitam



Gambar 3. Hasil pengeringan simplisia di bawah sinar matahari



Gambar 4. Hasil pengeringan simplisia di bawah sinar matahari dengan ditutup kain hitam





### III. Sample / Contoh Uji

- 3.1. Sample Code / Kode Sample : -
- 3.2. Production Date / Tanggal Produksi : -
- 3.3. Expire Date / Tanggal Kadaluarsa : -
- 3.4. Trade Mark / Nama Dagang : -
- 3.5. Packaging / Kemasan : Plastik Klip
- 3.6. Sample Name / Nama Sampel : EKSTRAK IKAN MUJAIR
- 3.7. Date of Acceptance / Tanggal Terima : June 21, 2023
- 3.8. Date of Analysis / Tanggal Uji : June 21, 2023 – July 03, 2023
- 3.9. Type of Analysis / Jenis Uji : Terlampir

Berdasarkan hasil analisis dengan nomor Laporan Hasil Uji

No : VICMALAB.LHP.2023.VI.0873

Informasi nilai gizi contoh adalah sebagai berikut :

#### INFORMASI NILAI GIZI

Ukuran Porsi : 100 gram (g)

##### Energi Total

465 kkal

Energi dari Lemak

150 kkal

##### Lemak Total

Per Porsi  
17 g

% AKG\*  
25 %

##### Protein

54 g

90 %

##### Karbohidrat Total

25 g

8 %

\* % AKG berdasarkan kebutuhan energi 2150 kkal.

Kebutuhan energi anda mungkin lebih tinggi atau lebih rendah.

Bogor, 04 Juli 2023

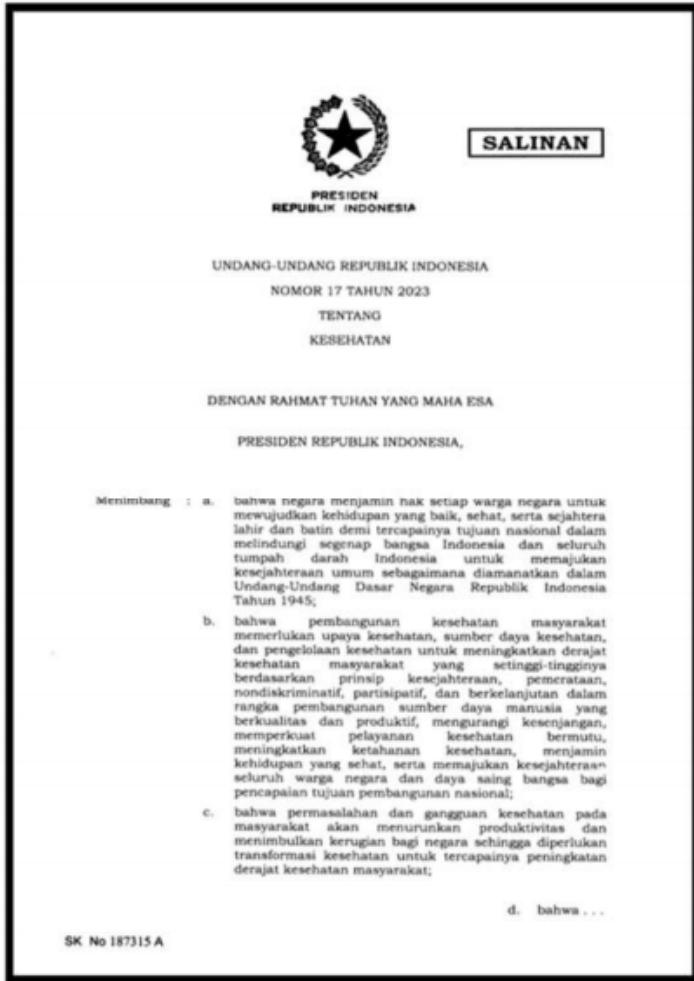


*Menghasilkan formula OBA yang  
rasional/ilmiah adalah dimulai dari proses  
penyiapan bahan baku yang terjamin  
keasliannya*

# EVIDENCE-BASED



# UU NOMOR 17 TAHUN 2023 TENTANG KESEHATAN



## PASAL 1

**Sediaan Farmasi** adalah Obat, Bahan Obat, Obat Bahan Alam, termasuk bahan Obat Bahan Alam, kosmetik, suplemen kesehatan, dan obat kuasi.

**Obat bahan alam** adalah bahan, ramuan bahan, atau produk yang berasal dari sumber daya alam berupa tumbuhan, hewan, jasad renik, mineral, atau bahan lain dari sumber daya alam, atau campuran dari bahan tersebut yang telah digunakan secara turun temurun, atau sudah dibuktikan berkhasiat, aman, dan bermutu, digunakan untuk pemeliharaan kesehatan, peningkatan kesehatan, pencegahan penyakit, pengobatan, dan/atau pemulihan kesehatan berdasarkan pembuktian secara empiris dan/ atau ilmiah.

## Pasal 321

### Penggolongan Obat Bahan Alam



#### Jamu

bersumber dari pengetahuan tradisional/ warisan budaya Indonesia

Jumlah: **>14.000\***



#### Obat Herbal Terstandar (OHT)

Keamanan dan khasiat dibuktikan secara ilmiah melalui **uji praklinik**. Bahan baku telah distandarisasi.

Jumlah: **81\***



#### Fitofarmaka

Keamanan dan khasiat dibuktikan secara ilmiah melalui **uji praklinik dan uji klinik**. Bahan baku dan produknya telah distandarisasi.

Jumlah: **22\***



#### Obat Bahan Alam Lainnya

Pemerintah Pusat dapat menetapkan penggolongan Obat Bahan Alam selain penggolongan tersebut dan/atau perubahan penggolongan Obat Bahan Alam dalam hal terdapat perkembangan ilmu pengetahuan dan teknologi.

\*Data BPOM hingga Agustus 2023

## Pasal 324

Pemerintah Pusat dan Pemerintah Daerah bertanggung jawab terhadap pelaksanaan penelitian, pengembangan, pemanfaatan, dan pemeliharaan bahan Obat Bahan Alam.

## Pasal 325

Tujuan penelitian dan pengembangan Obat Bahan Alam:

1. Mewujudkan kemandirian industri farmasi nasional guna mendukung ketahanan kefarmasian
2. Memanfaatkan sumber daya alam dan ramuan tradisional secara berkelanjutan dalam peningkatan ilmu pengetahuan dan penyelenggaraan Pelayanan Kesehatan
3. Menjamin pengelolaan potensi alam sehingga mempunyai daya saing yang tinggi sebagai sumber ekonomi masyarakat
4. Menyediakan obat bahan alam untuk memelihara kesehatan yang terjamin mutu, khasiat, dan keamanannya serta teruji secara ilmiah dan dimanfaatkan secara luas untuk pencegahan, pengobatan, perawatan dan/atau pemeliharaan Kesehatan.

# **EMPIRICAL-EVIDENCE**

# BIOKULTURAL



Relief  
Karmawibhangga  
candi Borobudur



Kata jamu (jampi)  
ditemukan pada  
naskah kuno  
Gathotkacasraya  
karya Mpu Panuluh



Serat Centhini  
(1814)



Serah kawruh bab  
jampi-jampi jawi  
(1831)

# ARKEOLOGI JAMU

Relief Candi Borobudur, Prambanan, Penataran, Sukuh dan Tegalwangi, yang dibangun pada masa Kerajaan Hindu dan Buddha.

Relief Karmawibhangga di candi Borobudur tahun 772 M



Relief orang menumbuk jamu di Candi Sukuh

# The identification of plant reliefs in the Lalitavistara story of Borobudur temple, Central Java, Indonesia

**DESTARIO METUSALA<sup>1,\*</sup>, FAUZIAH<sup>1,\*\*\*</sup>, DEWI AYU LESTARI<sup>1,\*\*\*</sup>, JANIS DAMAIYANI<sup>1</sup>,  
SHOFIYATUL MAS'UDAH<sup>1</sup>, HARI SETYAWAN<sup>2</sup>**

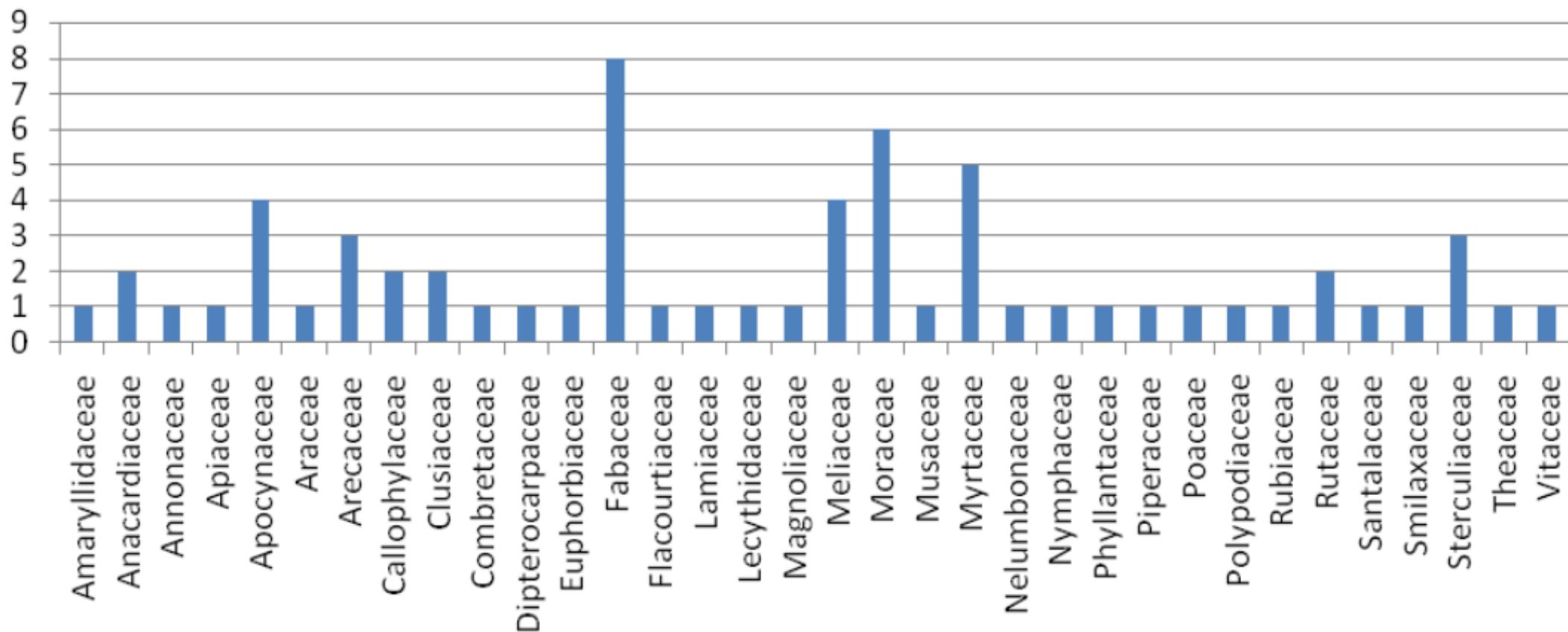
<sup>1</sup>Purwodadi Botanic Gardens, Research Center for Plant Conservation and Botanic Gardens, Indonesian Institute of Sciences. Jl. Surabaya-Malang Km. 65, Purwodadi, Pasuruan 67163, East Java, Indonesia. Tel./fax.: +62-341-426046, \*email: metusala.destario@gmail.com, \*\*fauziahkrp@gmail.com,  
\*\*\*chunyang\_dee@yahoo.co.id

<sup>2</sup>Borobudur Conservation Office. Jl. Badrawati, Borobudur, Magelang 56553, Central Java, Indonesia

Manuscript received: 26 February 2020. Revision accepted: 25 April 2020.

**Abstract.** *Metusala D, Fauziah, Lestari DA, Damaiyani J, Mas'udah S, Setyawan H. 2020. The identification of plant reliefs in the Lalitavistara story of Borobudur temple, Central Java, Indonesia. Biodiversitas 21: 2206-2215.* The Lalitavistara sutra is one of the central texts in the Mahayana tradition and it describes the life of the Buddha. This sutra has been carved in a good detail into 120 relief panels. These reliefs showed many plant figures that have often been carved in proper shape, so that made it possible for identification. The identification results showed that there were at least 63 species of plants in the Lalitavistara relief at Borobudur and these more various than species mentioned in the Lalitavistara sutra. Some species even only be found on reliefs but not in the text. These findings have indicated several important points; (i). the ancient Javanese community at that time already had a high awareness of the plant diversity, (ii). the plant figures as component in building atmosphere/background have been used by the carver as an opportunity for improvisation, (iii). the plant reliefs in Borobudur can be seen to reflect the surrounding plant diversity at the time, and (iv). the identification of plant reliefs in Borobudur can be used as an approach to understand the perspective of an ancient Javanese community on the importance of plant diversity.

**Keywords:** Borobudur, Lalitavistara, plant diversity, relief



**Figure 3.** Families of plant species in Lalitavistara relief, Borobudur temple

**Table 1.** The identification results of plant species crafted in Lalitavistara relief, Borobudur Temple, Indonesia

Plant species	
<i>Aegle marmelos</i> (L.) Correa	<i>Ficus elastica</i> Roxb. Ex Hornem
<i>Aglaia argentea</i> Blume	<i>Ficus microcarpa</i> L.f.
<i>Aglaia odorata</i> Lour.	<i>Ficus religiosa</i> L.
<i>Aleurites moluccanus</i> (L.) Willd.	<i>Garcinia dulcis</i> (Roxb.) Kurz
<i>Alocasia macrorrhizos</i> (L.) G.Don	<i>Garcinia mangostana</i> L.
<i>Alstonia scholaris</i> (L.) R.Br.	<i>Gluta velutina</i> Blume
<i>Antidesma bunius</i> (L.) Spreng	<i>Kleinhowia hospita</i> L.
<i>Areca catechu</i> L.	<i>Lagerstroemia speciosa</i> (L.) Pers.
<i>Artocarpus altilis</i> (Parkinson) Fosberg	<i>Limonia acidissima</i> L.
<i>Artocarpus heterophyllus</i> Lam.	<i>Leptochilus pteropus</i> subsp. <i>Pteropus</i>
<i>Barringtonia asiatica</i> (L.) Kurz	<i>Mangifera</i> sp.
<i>Bauhinia purpurea</i> L.	<i>Maniltoa brownneoides</i> Harms
<i>Borassus flabellifer</i> L.	<i>Mesua ferrea</i> L.
<i>Calophyllum inophyllum</i> L.	<i>Magnolia champaca</i> (L.) Baill. Ex Pierre
<i>Calotropis gigantea</i> (L.) W.T. Aiton	<i>Mimusops elengi</i> L.
<i>Cayratia trifolia</i> (L.) Domin	<i>Morinda citrifolia</i> L.
<i>Centella asiatica</i> (L.) Urb.	<i>Musa</i> sp.
<i>Cerbera odollam</i> Gaertn.	<i>Nelumbo nucifera</i> Gaertn.
<i>Cocos nucifera</i> L.	<i>Nymphaea rubra</i> Roxb. ex Andrews
<i>Crinum asiaticum</i> L.	<i>Piper betle</i> L.
<i>Dysoxylum parasiticum</i> (Osbeck) Kosterm.	<i>Pterocarpus indicus</i> Willd.
<i>Erythrina variegata</i> L.	<i>Pterospermum acerifolium</i> (L.) Willd.
<i>Flacourtie rukam</i> Zoll. & Moritzi	<i>Pterospermum diversifolium</i> Blume
<i>Ficus benjamina</i> L.	<i>Saccharum officinarum</i> L.
	<i>Sandoricum koetjape</i> (Burm.f.) Merr.
	<i>Santalum album</i> L.
	<i>Saraca asoca</i> (Roxb.) J.J. de Wilde
	<i>Schima wallichii</i> (DC) Korth.
	<i>Shorea robusta</i> C.F. Gaertn.
	<i>Smilax leucophylla</i> Blume
	<i>Stelechocarpus burahol</i> (Blume) Hook.f. & Thomson
	<i>Syzygium jambos</i> (L.) Alston
	<i>Syzygium aqueum</i> (Burm.f.) Alston
	<i>Syzygium malaccense</i> (L.) Merr. & L.M. Perry
	<i>Syzygium samarangense</i> (Blume) Merr. & L.M. Perry
	<i>Tamarindus indica</i> L.
	<i>Tectona grandis</i> L.f.
	<i>Terminalia catappa</i> L.
	<i>Voacanga foetida</i> (Blume) Rolfe

# "Melacak Pengobatan Tradisional Melalui

(*Prajnaparamita*, edisi 6/2018, hal. 103-110)



# PRASASTI MADHAWAPURA

- ▶ Pada zaman Majapahit, jamu menjadi minuman kebesaran raja di upacara-upacara kerajaan.
- ▶ Jamu yang diminum raja itu melambangkan delapan arah mata angin sekaligus lambang surya Majapahit, *Wilwatika*.
- ▶ Delapan jenis jamu tersebut adalah **kunir-asam**, **beras-kencur**, **cabe-puyang**, **paitan**, **kunci-suruh**, **kudu-laos**, **uyup-uyup** (**gepyokan**) dan **tawar-sinom**.
- ▶ Urutan meminum jamu yang ideal dimulai dari **manis-asam**, **sedikit pedas-hangat**, **pedas**, **pahit**, **tawar**, hingga **manis kembali**, sesuai dengan siklus kehidupan manusia.

# FILOLOGI JAMU

Naskah kuno jamu ada pada buku:

1. Perpustakaan museum Sonobudaya;

- ▶ Primbon
- ▶ Serat Primbon Sarat Warna-warni
- ▶ Serat Primbon Jampi Jawi

2. Perpustakaan Pura Pakualaman;

- ▶ Punika Kagungan nDalem Jampi

### 3. Perpustakaan Widya Budaya Kraton

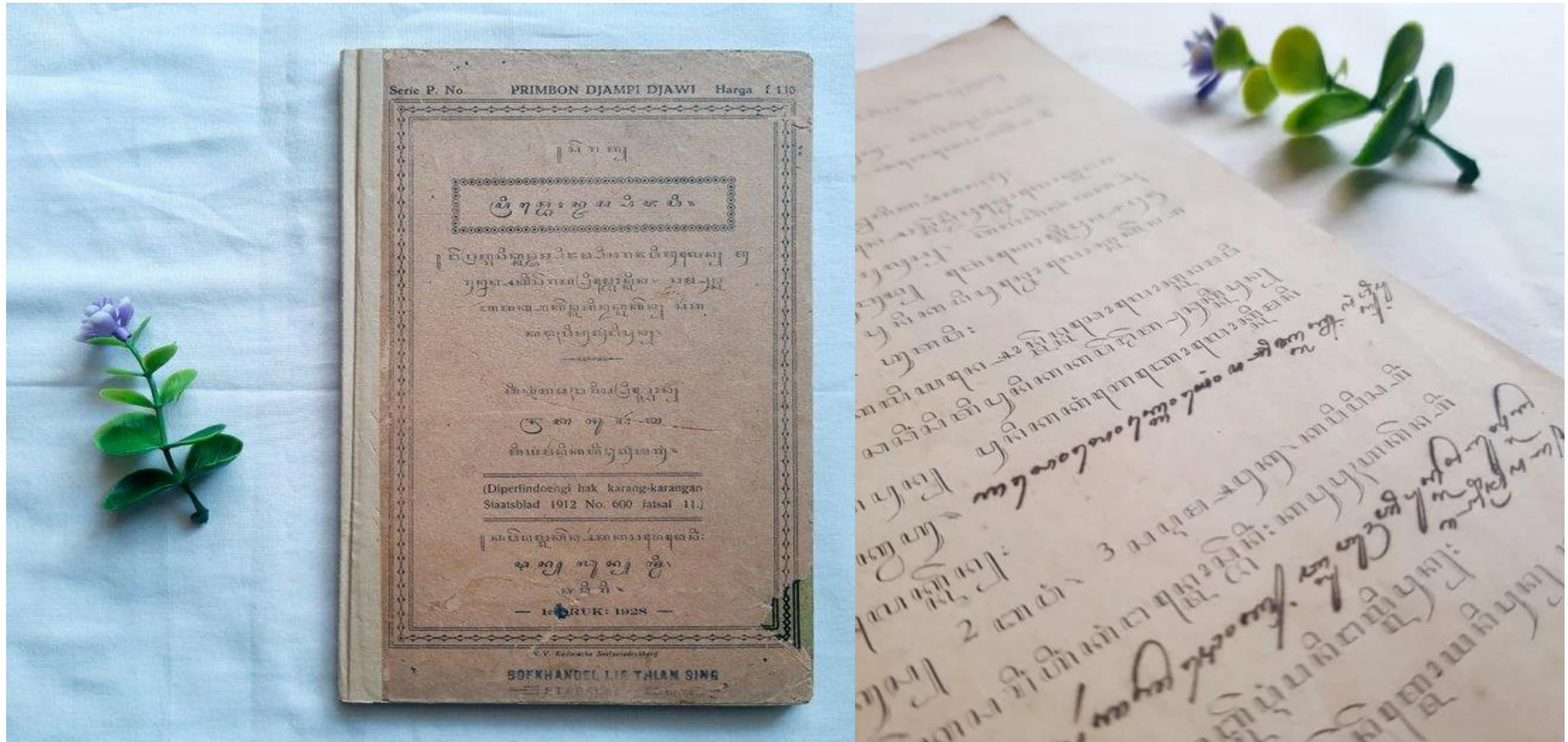
- ▶ Catatan Jamu Tradisional 1
- ▶ Buku Kitab Betaljemur Adammakna

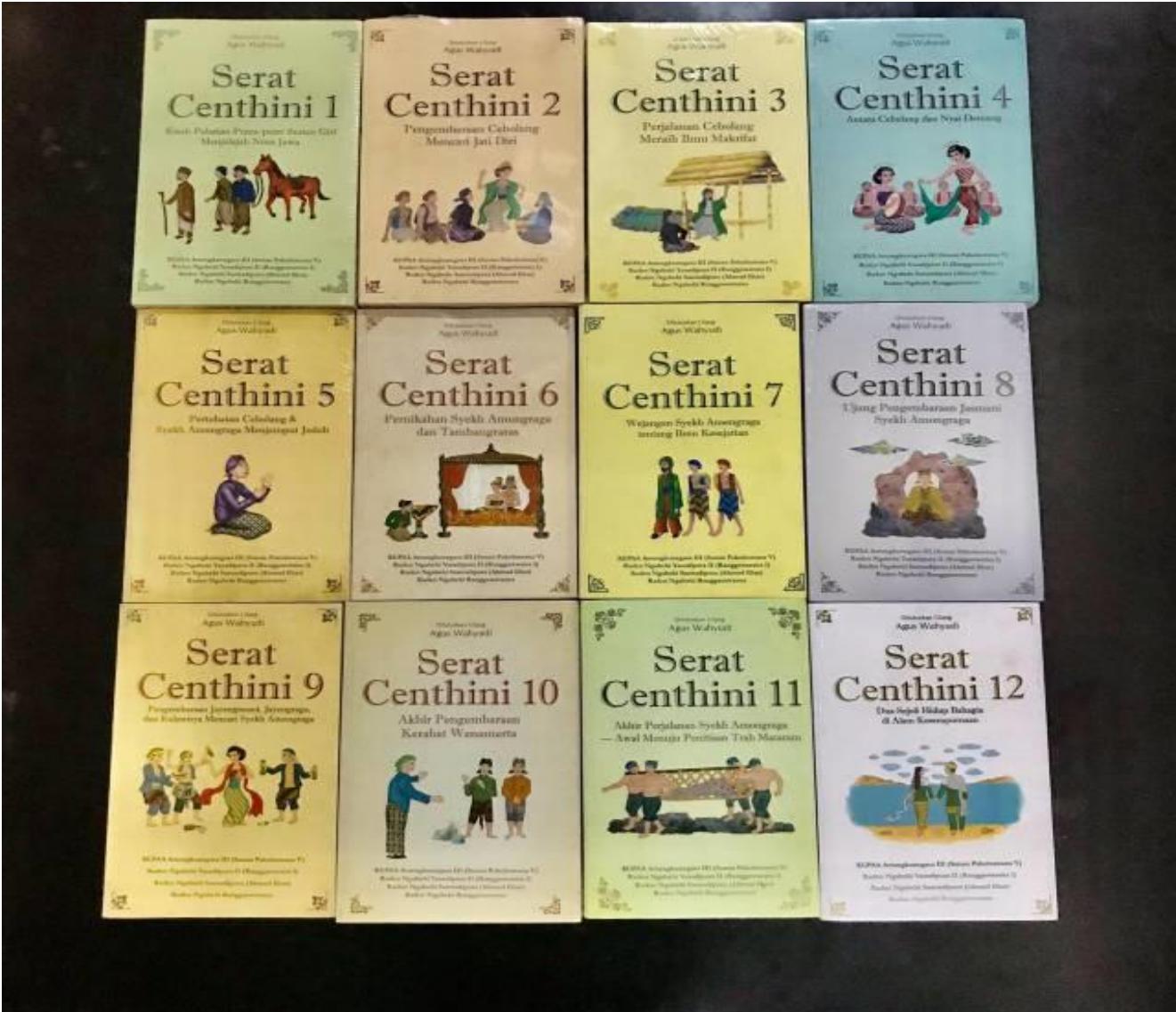
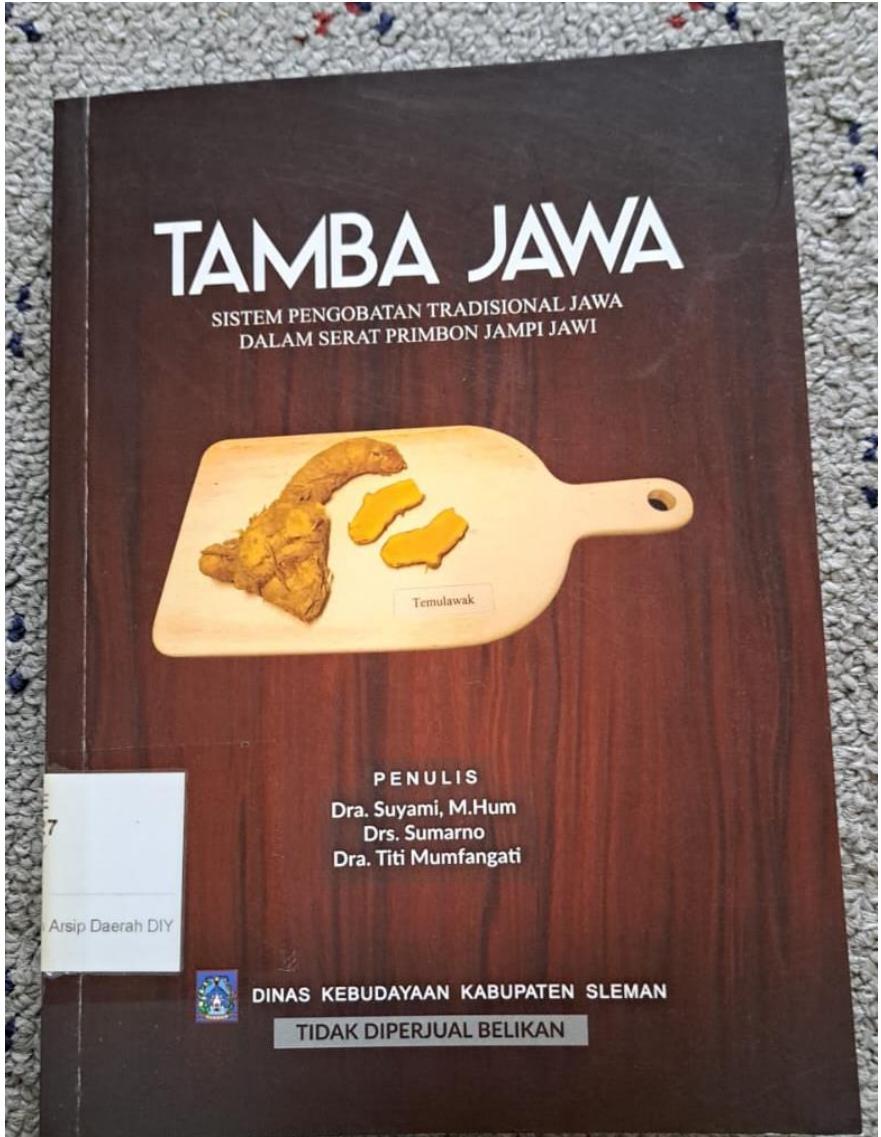
### 4. Perpustakaan museum Radya Pustaka

- ▶ Buku berhuruf jawa berjudul Serat Primbon

### 5. Perpustakaan Widya Budaya Kraton Surakarta

- ▶ Kawruh Bab Jampi-jampi Jawi





Serat Primbон Jampi Jawi berisi resep pengobatan tradisional jawa untuk mengobati 291 penyakit dengan resep sebanyak 398 ramuan yang sudah diklasifikasi berdasarkan jenis penyakit serta manfaat dari beberapa bahan jamu

Serat Centhini merupakan dokumentasi pengetahuan jamu tradisional yang pernah lestari di Jawa pada masa silam. Dicermati ada **80-an ramuan dan jenis penyakit yang tersurat dalam Serat Centhini**

# FILOLOGI JAMU ERA KOLONIAL

Naskah Jamu oleh Orang Eropa (era kolonial)

- Historia Naturalist et Medica Indiae (Yacobus Bontius, 1627)
- Herbarium Amboinense (Gregorius Rhumpius)
- Het Javaansche Receptenboek (Buku Resep Pengobatan Jawa) (Van Hien, 1872)
- Indische Planten en Haar Geneeskraft (Tumbuhan Asli dan Kekuatan Penyembuhannya) (Kloppenburg-Versteegh, 1907)
- De Nuttige Planten van Indonesie (K. Keyne, 1913)
- Heilkunde und Volkstum auf Bali (W. Weck, 1937)



# The Ambonese Herbal

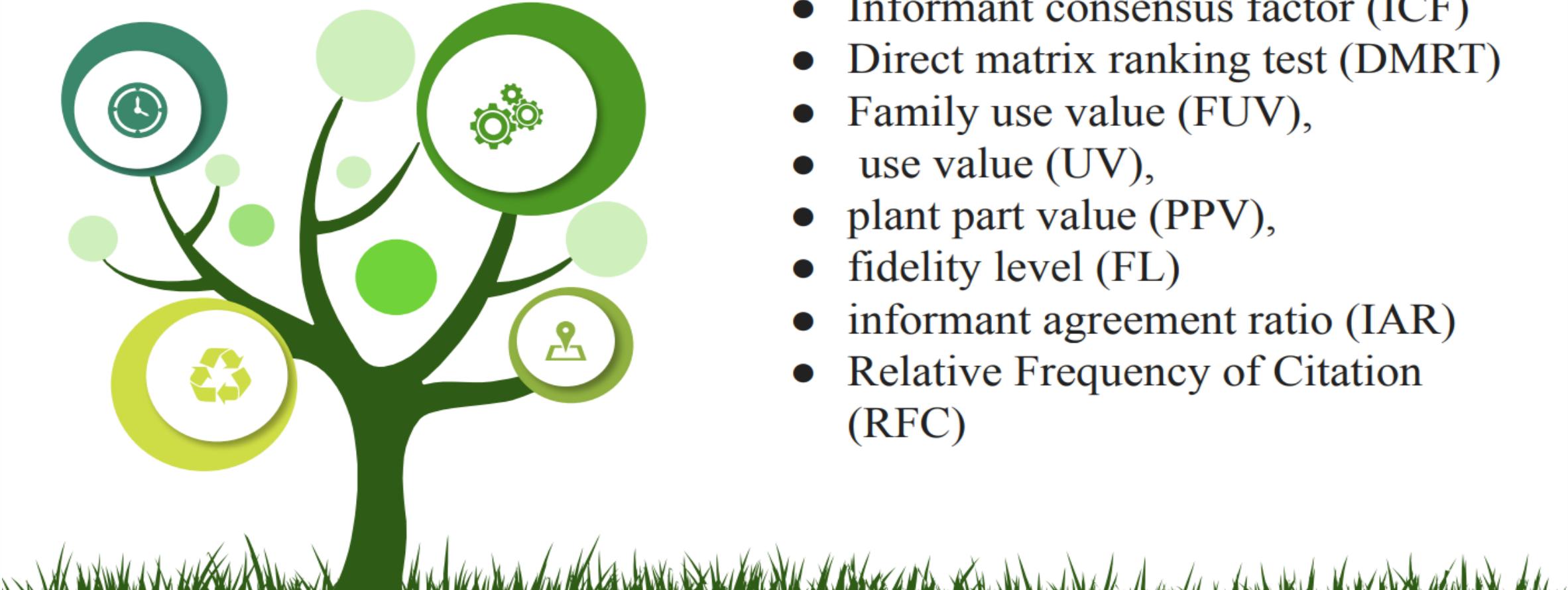
## Georgius Everhardus Rumphius

Translated, edited, annotated,  
and with an introduction by

E.M. Beekman



# 9 PARAMETER ANALISIS KUANTITATIF ETNOMEDISIN



- Rasio kesepakatan informan (RKI)
- Informant consensus factor (ICF)
- Direct matrix ranking test (DMRT)
- Family use value (FUV),
- use value (UV),
- plant part value (PPV),
- fidelity level (FL)
- informant agreement ratio (IAR)
- Relative Frequency of Citation (RFC)

# SKRIPSI

## STUDI ETNOMEDISIN TENTANG PEMANFAATAN TANAMAN OBAT SEBAGAI PENURUN TEKANAN DARAH TINGGI DI PADUKUHAN SELANG BENDUNGAN KARANGMOJO GUNUNGKIDUL



Diajukan Oleh :

**Titik safitri**  
1800023008

Dosen Pembimbing  
**Dr. apt. Kintoko, M.Sc**

Dosen Penguji I  
**apt. Ginanjar Z. Saputri, M.Sc**

Penguji II  
**Dr. dr. Akrom, M.Kes.**



**FAKULTAS FARMASI**  
**UNIVERSITAS AHMAD DAHLAN**  
**YOGYAKARTA**  
**2022**



# **Kajian Etnomedisin Manfaat Tanaman Obat Sebagai Penurun Tekanan Darah Tinggi di Padukuhan Watudalang Bendungan Karangmojo Gunungkidul**

Diajukan oleh  
Fransisca Tania Adellia Narulita  
1800023156

Dosen Pembimbing : Dr. apt. Kintoko, M.Sc

**FAKULTAS FARMASI  
UNIVERSITAS AHMAD DAHLAN  
2021**



- Seminar Pendadaran Penelitian

## STUDI ETNOMEDISIN DAUN SIRIH HIJAU *(PIPER BETLE L.)* YANG DIMANFAATKAN OLEH MASYARAKAT DUSUN NGLEGI DESA NGLEGI KAPANEWON PATUK KABUPATEN GUNUNGKIDUL

- Diajukan oleh
- Dwi Prasetya Giwantari
- 1800023007
- Dosen Pembimbing : Dr. apt. Kintoko, M.Sc

•FAKULTAS FARMASI  
UNIVERSITAS AHMAD DAHLAN  
•2022



- Seminar Pendadaran Penelitian

## **STUDI ETNOMEDISIN TANAMAN TERMAS (*Poikilospermum suaveolens* (Blume) Merr.) YANG DIMANFAATKAN OLEH MASYARAKAT DUSUN KLPEU DESA NGLEGI KAPANEWON PATUK KABUPATEN GUNUNGKIDUL**

- Diajukan oleh
- Syifa Dhuha Yuliasari
- 1800023010
- Dosen Pembimbing : Dr. apt. Kintoko, M.Sc

**•FAKULTAS FARMASI  
UNIVERSITAS AHMAD DAHLAN  
•2022**



- Seminar Pendadaran

**STUDI ETNOMEDISIN  
PENGGUNAAN TUMBUHAN  
OBAT UNTUK HIPERTENSI DI  
PADUKUHAN BENDUNGAN  
BENDUNG KARANGMOJO  
GUNUNGKIDUL**

Dosen Penguji:  
**Dr.rer.nat. Apt Sri Mulyaningsih, M.Si  
Lolita, M.Sc., Apt.**

Dosen Pembimbing :  
**Dr. apt. Kintoko, M. Sc**

**FAKULTAS FARMASI  
UNIVERSITAS AHMAD  
DAHLAN  
2023**



- Seminar Pendadaran

## **Studi Etnomedisin Daun binahong (*Anredera cordifolia* (Ten.) Steenis) yang Dimanfaatkan oleh Masyarakat Dusun Trukan, Kapanewon Patuk, Kabupaten Gunungkidul**

- Diajukan oleh
- Nofia Dewi Salsabil
- 1800023004
- Dosen Pembimbing : Dr. apt. Kintoko, M.Sc.

**•FAKULTAS FARMASI  
UNIVERSITAS AHMAD DAHLAN  
•2022**



## **'Doctrine of Signatures'; An Age Old Theory With Special Reference to Some Ayurvedic Medicinal Plants**

Vidhi Kumath \*

Department of Dravyaguna, J. S. Ayurved College, Nadiad, Gujarat, India

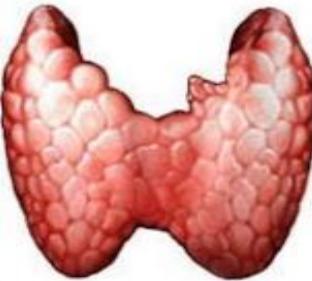
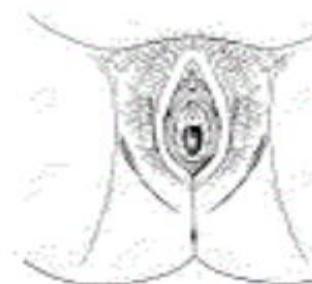
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### **Abstract**

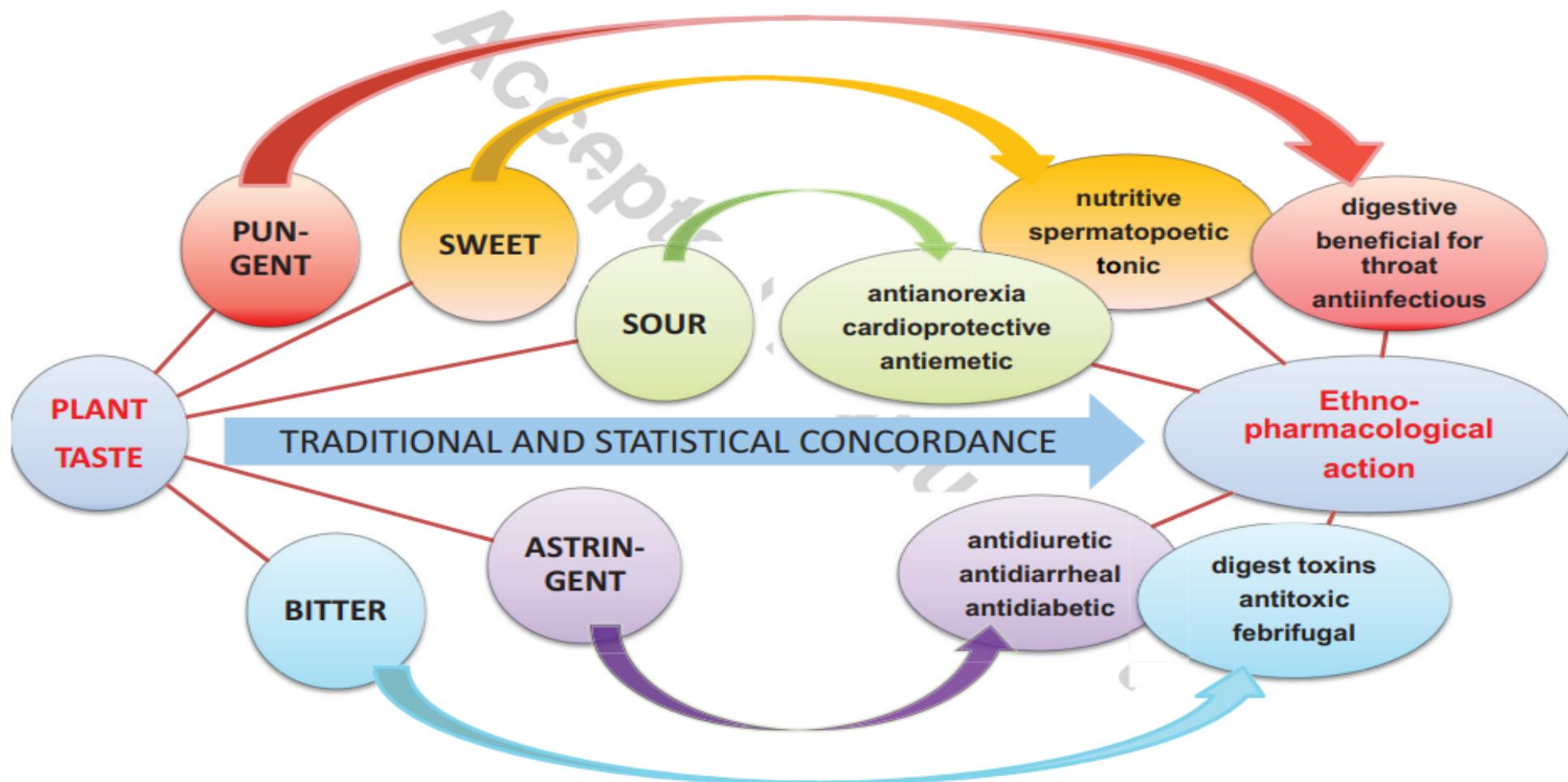
*The Doctrine of Signatures is a theory believed by many herbalists since centuries. The doctrine states that herbs that resemble various parts of the body can be used to treat ailments of that part of the body. A theological justification was made for this philosophy: It was reasoned that the Almighty must have set his sign upon the various means of curing disease which he provided. A plant bearing parts that resembled human body-parts, animals, or other objects were thought to have useful relevance to those parts, animals or objects. This doctrine was observed in some Indian medicinal plants which are presented in this article.*

**Key words:** *Doctrine, Signatures, Ayurveda, Medicinal Plants*

**Table 1** Indian medicinal plants with their Ayurvedic indications

S. No.	Sanskrit name of plant	Botanical name of plant	Analog y to human organ	Action as per Ayurveda	Picture of the plant	Picture of related organ/Disease
1.	Kāncanāra	<i>Bauhinia variegata</i> Linn.	Leaves look like thyroid gland	Gaṇdmālān aśana (One which is useful in treatment of Thyroid disorders)		
2.	Kapikacchu	<i>Mucuna pruriata</i> Hook.	Seeds looks like testes	Vṛṣya <sup>6</sup> (Aphrodisia- c)		
3.	Aśvatha	<i>Ficus religiosa</i> Linn.	Leaves look like female genital organs	Yoniviśodh ana <sup>7</sup> (one which purifies the female genital organs)		

## TASTE OF MEDICINAL PLANTS: A POTENTIAL TOOL IN PREDICTING ETHNOPHARMACOLOGICAL ACTIVITIES?





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Research paper

## Can organoleptic properties explain the differential use of medicinal plants? Evidence from Northeastern Brazil



Patrícia Muniz de Medeiros <sup>a,\*</sup>, Bárbara Luzia Santos Pinto <sup>a</sup>,  
Viviany Teixeira do Nascimento <sup>b</sup>

<sup>a</sup> Universidade Federal do Oeste da Bahia, Centro das Ciências Biológicas e da Saúde, Estrada para o Barrocão, s/n, Morada Nobre, 47800-000 Barreiras-BA, Brazil

<sup>b</sup> Universidade do Estado da Bahia, Campus IX. Rodovia BR 242, km 4, s/n, Loteamento Flamengo, 47800-000 Barreiras-BA, Brazil

**Table 1**

Attributes of taste and smell for the most cited parts of the most versatile (higher Relative Importance) medicinal plants of the community of Sucruiu, Northeasten Brazil.

Species	Voucher number <sup>a</sup>	Main part	%	Most cited taste	%	Most cited smell	%
<i>Melissa officinalis</i> L.	<sup>b</sup>	Leaf	100	Good taste	75	Good smell	87.5
<i>Cymbopogon citratus</i> (DC.) Stapf	BRBA 5.551	Leaf	85.7	Good taste	66.7	Good smell	83.3
<i>Amburana cearensis</i> (Allemão) A.C. Sm.	BRBA 5.484	Seed	88.9	Bitter taste	50	Good smell	50
<i>Aloe vera</i> (L.) Burm. f.	<sup>b</sup>	Leaf	71.4	Bad taste	60	Tick-like smell No smell	33
<i>Pterodon emarginatus</i> Vogel	BRBA 5.621	Seed	54.5	Bitter taste	83.3	No smell	33

%=percentage of participants that indicated a plant part or organoleptic attribute for a given plant, considering only the participants that mentioned that plant.

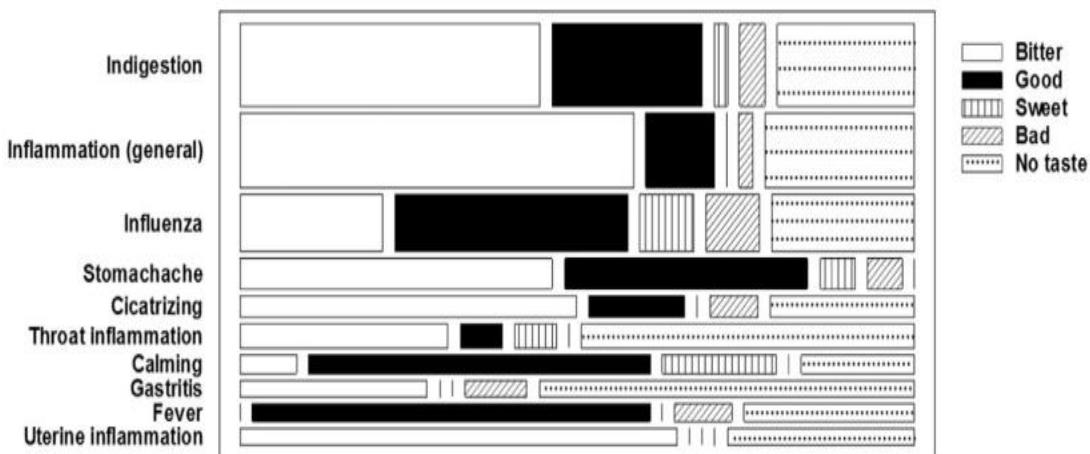
<sup>a</sup> Voucher numbers for the herbarium of the Universidade Federal do Oeste da Bahia.

<sup>b</sup> Plant identification in the field.

**Table 2**

Therapeutic indications with more than 10 citations in the community of Sucruiu, Northeastern Brazil.

Therapeutic indication	No. of citations
Indigestion	57
Inflammations in general	49
Influenza	40
Stomachache	20
Cicatrizing	15
Throat inflammation	14
Calming	13
Gastritis	12
Fever	12
Uterine inflammation	11

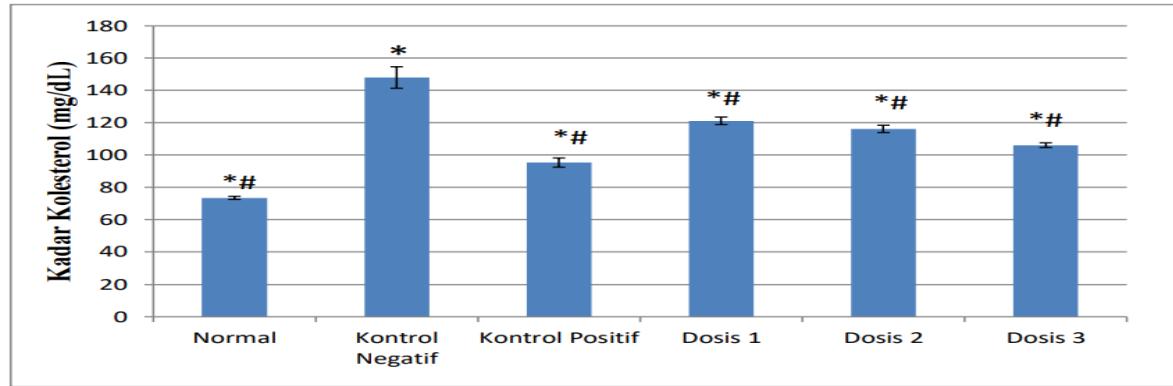


**Fig. 2.** Predominance (in terms of citations) of plant tastes for the most cited therapeutic indications in the community of Sucruiu, Northeastern Brazil (only tastes and indications with more than 10 citations). Therapeutic indications with wider bars were more cited than indications with narrower bars.

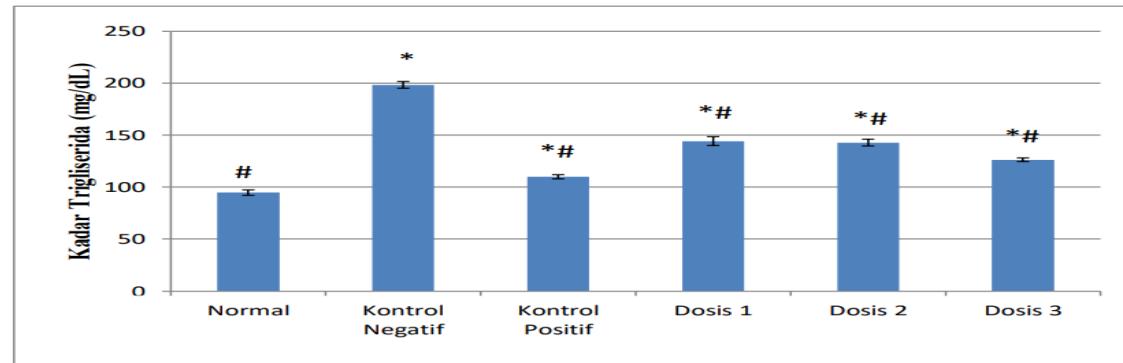
# Filosof organoleptis jamu

1. Bentuk : spt organ tubuh
2. Warna : kuning, merah, ungu,
3. Bau : aromatikum, kentut, pesing
4. Rasa : pahit, manis, asam, asin
5. Tekstur : lembek, gel, keras,

# **PRECLINICAL-EVIDENCE**

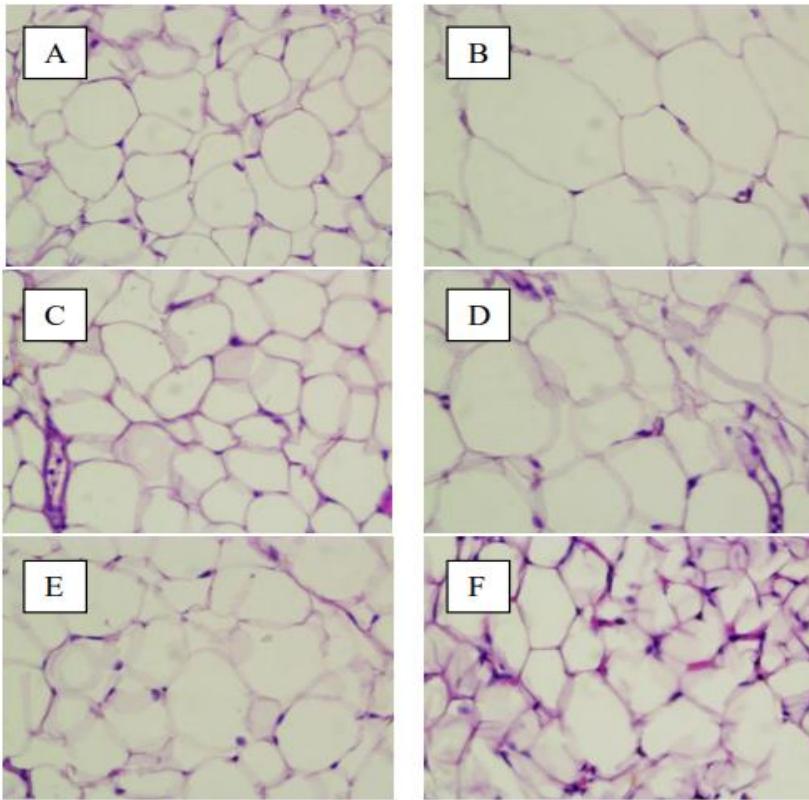


**Gambar 24.** Grafik Kadar kolesterol serum darah tikus pada hari ke-36. Keterangan : Kelompok normal : diet normal; Kelompok kontrol negatif : HFD; Kelompok kontrol positif: HFD + Orlistat(Xenical); kelompok Dosis 1 : HFD + trigonella reborn 1gr/grBB; Kelompok dosis 2: HFD + Trigonella reborn 2gr/grBB; Kelompok dosis 3; HFD + 4gr/grBB.  
\*Berbeda signifikan ( $p<0,05$ ) terhadap kelompok normal, #Berbeda Signifikan ( $p<0,05$ ) terhadap kelompok negatif.

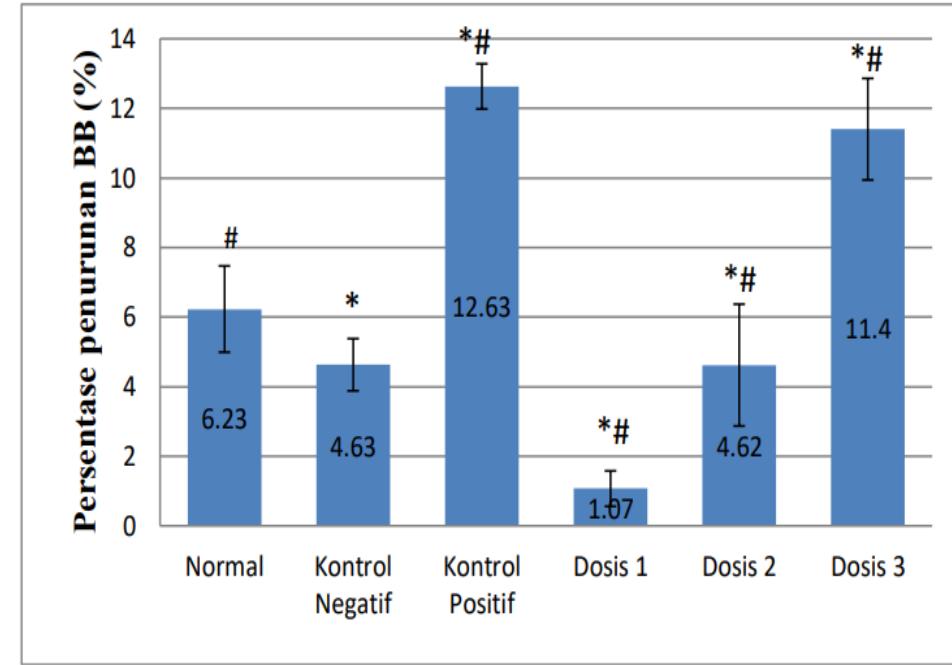


**Gambar 25.** Grafik kadar trigliserida serum darah tikus pada hari ke-36. Keterangan : Kelompok normal : diet normal; Kelompok kontrol negatif : HFD; Kelompok kontrol positif: HFD + Orlistat(Xenical); kelompok Dosis 1 : HFD + trigonella reborn 1gr/grBB; Kelompok dosis 2: HFD + Trigonella reborn 2gr/grBB; Kelompok dosis 3; HFD + 4gr/grBB.  
\*Berbeda signifikan ( $p<0,05$ ) terhadap kelompok normal, #Berbeda Signifikan ( $p<0,05$ ) terhadap kelompok negatif.

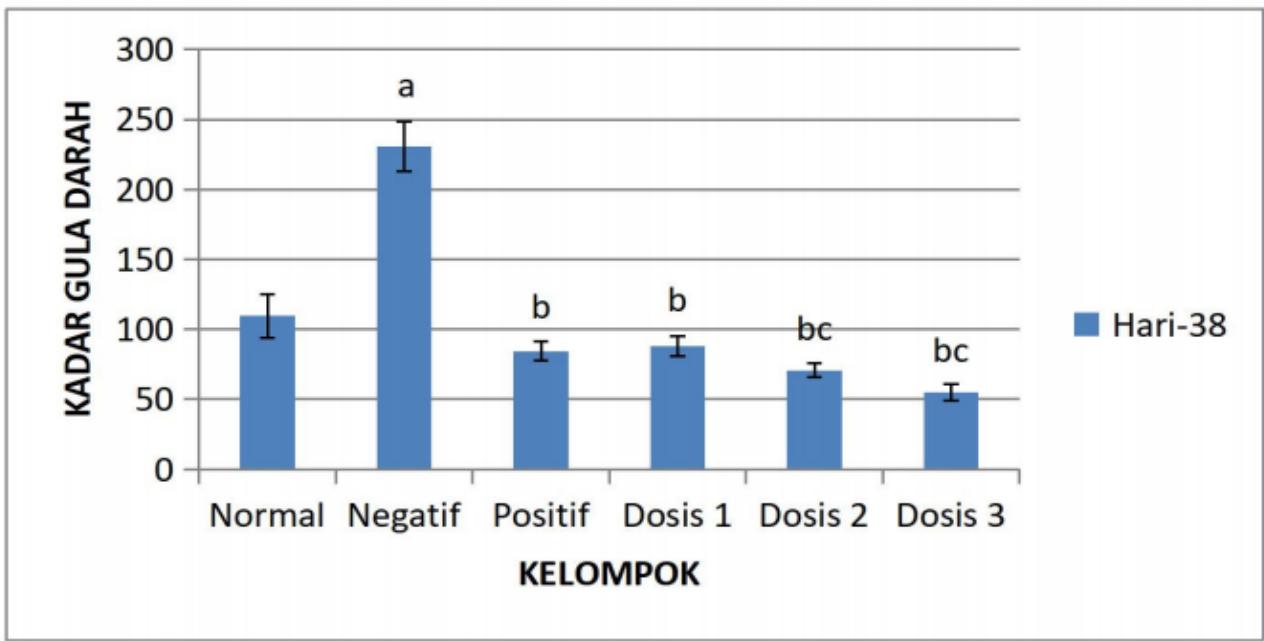




**Gambar 26.** Gambaran Histopatologi jaringan adiposa perbesaran 40X, pengecatan H&E. Keterangan : A. Kelompok Normal (Diet Normal); B. Kelompok kontrol negatif (HFD); C. Kelompok kontrol positif (HFD + Orlistat); D. kelompok dosis 1 (HFD + Trigonella Reborn 1gr/grBB); E. kelompok dosis 2 (HFD + Trigonella Reborn 2gr/grBB); F. kelompok dosis 3 (HFD + Trigonella Reborn 4gr/grBB).



**Gambar 23.** Persentase penurunan BB. Keterangan : Kelompok normal : diet normal; Kelompok kontrol negatif : HFD; Kelompok kontrol positif: HFD + Orlistat(Xenical); kelompok Dosis 1 : HFD + trigonella reborn 1gr/grBB; Kelompok dosis 2: HFD + Trigonella reborn 2gr/grBB; Kelompok dosis 3; HFD + 4gr/grBB. \*Berbeda signifikan ( $p<0,05$ ) terhadap kelompok normal, #Berbeda Signifikan ( $p<0,05$ ) terhadap kelompok negatif.



Gambar 8. Grafik rata-rata KDG  $\pm$  SD H38 (hari ke-14 setelah perlakuan). Keterangan: Kelompok normal (tanpa perlakuan), negatif (aquadest), positif (glibenklamid dengan dosis 0,09 mg/200 gBB), dosis 1 (“Trigonella” dosis 18 mg/200 gBB tikus), dosis 2 (“Trigonella” dosis 36 mg/200 gBB tikus), dosis 3 (“Trigonella” dosis 72 mg/200 gBB tikus). <sup>a</sup>sig.  $<0,05$  terdapat perbedaan secara signifikan antar kelompok dibandingkan kelompok normal. <sup>b</sup>sig.  $<0,05$  terdapat perbedaan secara signifikan antar kelompok dibandingkan kelompok negatif. <sup>c</sup>sig.  $<0,05$  terdapat perbedaan secara signifikan antar kelompok dibandingkan kelompok positif.



Tabel 8. rata-rata persentase penurunan KGD

KELOMPOK	PENURUNAN (%)
Normal	-
Negatif	17,204
Positif	70,082
Dosis 1	65,807
Dosis 2	71,736
Dosis 3	79,726



Keterangan : Kelompok normal (tanpa perlakuan), negatif (aquadest), positif (glibenklamid dengan dosis 0,09 mg/200 gBB), dosis 1 (“Trigonella” dosis 18 mg/200 gBB tikus), dosis 2 (“Trigonella” dosis 36 mg/200 gBB tikus), dosis 3 (“Trigonella” dosis 54 mg/200 gBB tikus).

# **CLINICAL-EVIDENCE**

## 5 jenis Fitofarmaka dalam Formularium Fitofarmaka tahun 2022

### Fraksi dari ekstrak Kulit kayu manis

Meringankan gangguan lambung.



### Ekstrak Herba meniran

Memperbaiki sistem imun.



### Kombinasi ekstrak Herba seledri dan ekstrak Daun kumis kucing

Menurunkan tekanan darah sistolik maupun diastolik pada penderita hipertensi ringan hingga sedang tanpa mempengaruhi kadar elektrolit plasma, kadar lipid plasma maupun kadar gula darah.

### Fraksi dari ekstrak campuran Daun bungur dan Kulit kayu manis

Sebagai terapi kombinasi dengan obat antidiabetes oral lainnya pada pasien diabetes melitus tipe 2.

### Kombinasi ekstrak Ikan gabus, ekstrak Buah jeruk, dan ekstrak Rimpang kunyit

Membantu meningkatkan kadar albumin pada kondisi hipoalbuminemia.

*Menghasilkan formula OBA yang  
rasional/ilmiah adalah melandaskan klaim  
pembuktianya baik secara empiris,  
praklinis maupun klinis*

# KAIDAH RASIONALITAS KOMPOSISI



*Review*

## **Herb-Herb Combination for Therapeutic Enhancement and Advancement: Theory, Practice and Future Perspectives**

**Chun-Tao Che<sup>1,\*</sup>, Zhi Jun Wang<sup>2</sup>, Moses Sing Sum Chow<sup>2</sup> and Christopher Wai Kei Lam<sup>3</sup>**

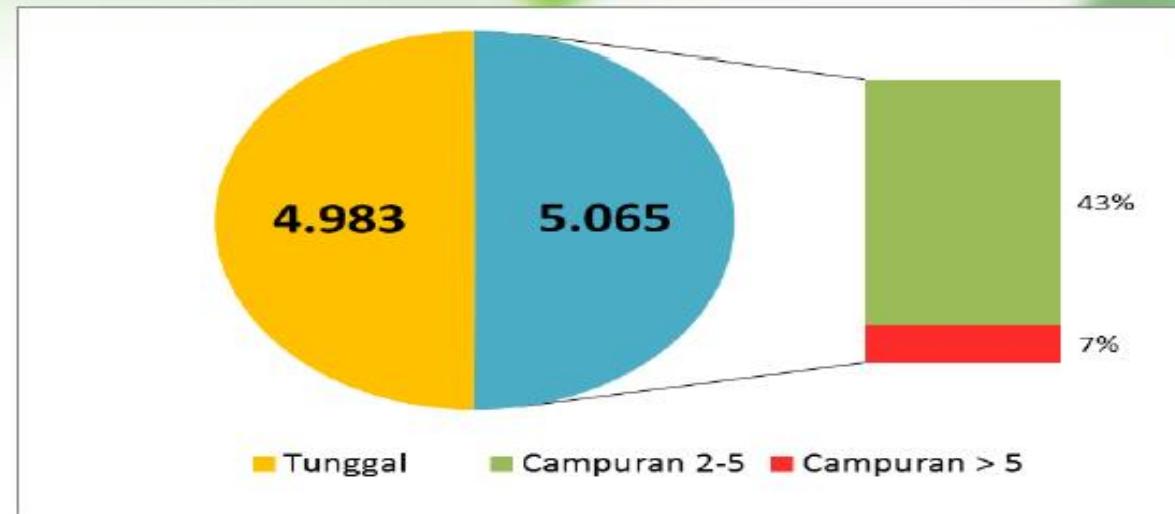
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<sup>2</sup> Center for Advancement of Drug Research and Evaluation, College of Pharmacy, Western University of Health Sciences, Pomona, CA 91766, USA

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\* Author to whom correspondence should be addressed; E-Mail: chect@uic.edu;  
Tel.: +1-312-996-5234; Fax: +1-312-996-7107.

# Komposisi ramuan Ristoja tahun 2015



Komposisi ramuan pada battra :

- ❖ 43% merupakan campuran antara 2 sampai 5 jenis tumbuhan obat,
- ❖ 21 ramuan dengan komposisi lebih dari 30 jenis tumbuhan obat



# An *in vitro* study of the immunomodulatory effects of *Piper nigrum* (black pepper) and *Elettaria cardamomum* (cardamom) extracts using a murine macrophage cell line

Anuradha Vaidya<sup>1</sup> and Maitreyi Rathod<sup>2</sup>

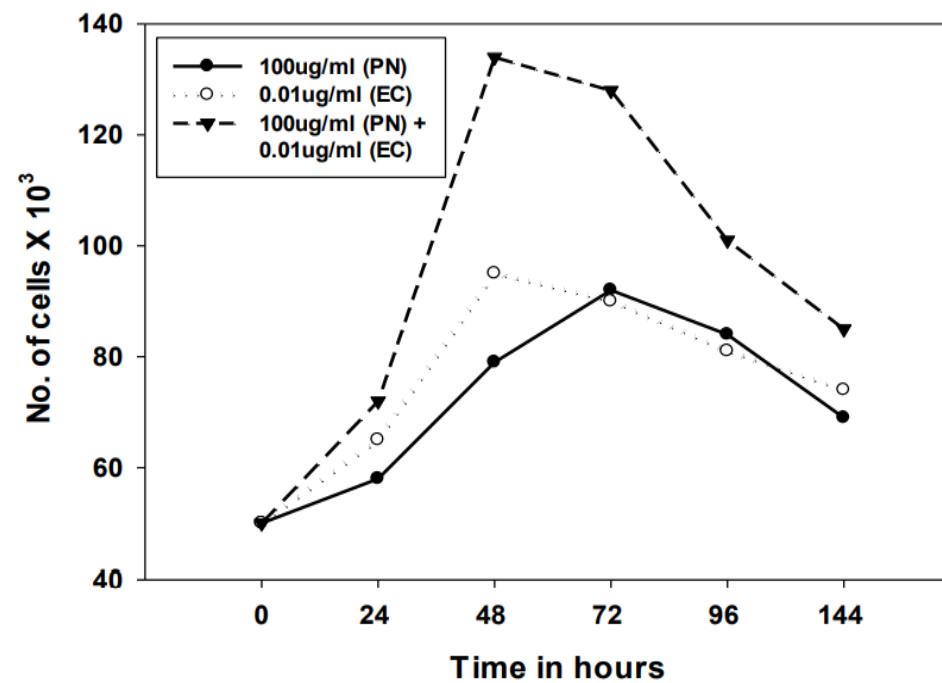
<sup>1</sup>Deputy Director

<sup>1,2</sup>Symbiosis School of Biomedical Sciences (SSBS), Symbiosis International University (SIU),  
Symbiosis Knowledge Village, Gram- Lavale, Taluka- Mulshi,  
Pune 412115, Maharashtra, INDIA.

**Abstract:** Cardamom and black pepper have been used as spices in many different cultures of the world and the medicinal properties attributed to these are extensive. Although the immunomodulatory activities of many herbs have been studied, research related to possible immunomodulatory effects of various spices on macrophages is relatively scarce. Hence in this study, we have explored the potential immunomodulatory effects of black pepper and cardamom on macrophages. We show that black pepper and cardamom extracts act as potent modulators of the macrophages in a dose-dependent “see-saw” like manner. Our findings suggest that perhaps black pepper and cardamom could be used individually or synergistically (at appropriate concentrations) as candidates for developing potential therapeutic tools to regulate the responses of the immune system depending upon the type of disease.

**Keywords:** Immunomodulation; Black pepper; Cardamom; MTT assay; Doubling time

**Figure 4:** Synergistic effect of aqueous extracts of black pepper and cardamom on cell yield of P388D1 cells. The extracts of black pepper and cardamom were used at concentrations of  $100\mu\text{g/ml}$  and  $0.01\mu\text{g/ml}$  in combination or individually. The cells were harvested after every 24 hours and live cell count was taken using trypan blue exclusion method. The P388D1 cells that were treated with a combination of favourable concentrations of aqueous extracts of black pepper and cardamom ( $\text{PN}=100\mu\text{g/ml} + \text{EC}=0.01\mu\text{g/ml}$ , dashed line with arrows) doubled rapidly as compared to the P388D1 cells treated with extract of only black pepper ( $\text{PN}=100\mu\text{g/ml}$ , dashed line with closed circles) or cells treated with extract of only cardamom ( $\text{EC}=0.01\mu\text{g/ml}$ , dotted line with open circles).



**Table 1:** List of commercially available polyherbal product

<b>Commercial Name</b>	<b>Formulation with scientific names</b>	<b>Country</b>	<b>Pharmacological Activity</b>	<b>Scientific evaluation</b>	<b>Reference</b>
Diabrid	<i>Gymnema sylvestre, Momordica charantia, Eugenia Jambolana, Trigonella graeceum</i>	India	Anti-diabetic	Clinical trial Phase-1	22
Hepax-A	<i>Plumbago zeylanica, Picrorrhiza kurroa, Piper nigrum, Zingiber officinale, Sodii carbonas impura, Phyllanthus emblica, Terminalia chebula, Calcii oxidum Potassii carbonas impura.</i>	India	Hepatoprotective	In-vivo	23
Majoon Suranjan	<i>Lawsonia inermis, Foeniculum vulgare, Capparis spinosa, Terminalia chebula, Ipomoea turpethum, Apium graveolens, Zingiber officinalis, Convulvulus scammony, Colchicum luteum, Cassia angustifolia, Piper nigrum, Coriandrum sativum, Rosa damascus, Origanum vulgare, Pyrethrum indicum, Plumbago zelanicum, Verbascum thapus, Ricinus communis oil</i>	India/Pakistan	Antiarthritic activity	In-vivo	14,24
Praneem	<i>Azadirachta indica (Neem) along with purified Saponins from Sapindus mukerosi and Mentha citrata oil</i>	India	Vaginal microbicides	Clinical trial Phase-2	25,26
Zyflamend	<i>Ocimum sanctum, Curcuma longa, Zingiber officinale, Camellia sinensis, Rosmarinus officinalis, Polygonum cuspidatum, Berberis vulgaris, Origanum vulgar, Scutellaria baicalensis and Coptis chinensis</i>	The United State of America	Prostate cancer	In-vitro	27

# PENGGUNAAN BAHAN RAMUAN YANG DILARANG

Kecubung (alkaloid tropan-midriasis, paralisis),

Oleander (glikosida jantung-gagal jantung),

Komfrei (alkaloid pirolisidin-hepatotoksik),

Dlingo (asaron-karsinogenik),

Jungrahab\* (teratogenik)

Kava-kava (hepatotoksik)

Tapakdara (alkaloid vinkristin-penurunan kadar leukosit)

Artemisia annua (artemisinin-anti malaria → resistensi)

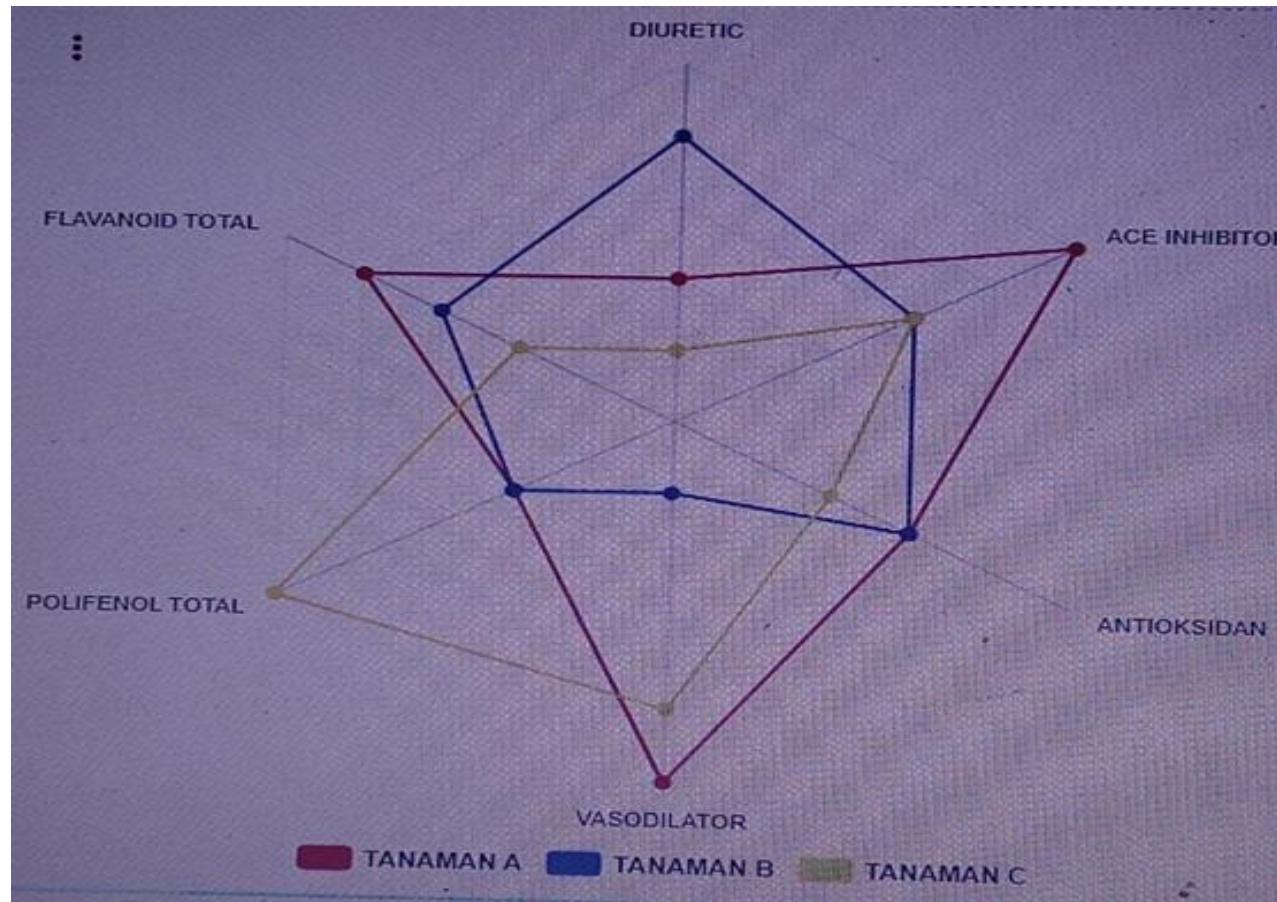
# KONTRAINDIKASI

- Temulawak: kurkumin menurunkan kolesterol, tetapi minyak atsirinya menambah nafsu makan
- Kelembak : antrakinon bersifat laksatif, taninnya anti peristaltik usus
- Daun jati cina mengandung antrakinon bersifat laksatif, teh mengandung tanin bersifat anti laksatif
- Pegagan : triterpenoid dan flavonoid menurunkan tekanan darah, kopi mengandung kafein yang dapat menaikkan tekanan darah

# KASUS JINTEN HITAM DAN MENIRAN

- Hasil uji toksisitas subkronik Staf Pengajar UMS ekstrak jinten hitam yang dikombinasi dengan ekstrak meniran meningkatkan SGOT secara signifikan dibanding kelompok kontrol negatif
- Hasil yang sama dilaporkan oleh tim peneliti Fakultas Farmasi UGM
- Laporan kasus di RS Sarjito, 3 pasien yang mengkonsumsi jinten hitam yang dikombinasi dengan bahan lain dimana ada meniran menunjukkan adanya peningkatan SGOT-SGPT

## Gambar Ilustrasi *Radar Analysis*



# The interaction effect and optimal formulation of selected polyherbal extracts towards antioxidant activity

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Interaction effect,  
Optimization,  
Phytochemical content

## DOI:

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## Abstract

Past study showed that lemongrass (*Cymbopogon citratus*), curry leaves (*Murrya koenigii*), turmeric (*Curcuma longa*) and ginger (*Zingiber officinale*) contain phytochemicals associated with antioxidant properties. However, all the herbs are tested individually and rarely mix together. This study was conducted to examine the antioxidant properties and interaction effect when combined. The plants studied were decocted with distilled water. Eighteen formulations of aqueous extracts were established using simplex lattice mixture design that was generated by Design Expert software. The antioxidant properties were analyzed by 2-diphenyl-2-picryl hydrazyl radical scavenging (DPPH), ferric reducing antioxidant power (FRAP), total phenolic content (TPC) and total flavonoid content (TFC) assays. The result showed that the mixture of lemongrass and curry leaves extracts gave the highest reading in DPPH assay (91.14%), FRAP assay (215.66 mM) and TFC (22.62 µg Rutin/mL). In the DPPH assay, the ratio of one to one (1:1) mixture of lemongrass with other plants extracts showed antagonistic interaction. There were five (5) formulations that showed synergistic interaction in all assays. However, there were two (2) formulations that showed antagonistic interactions on both DPPH and FRAP assays. No additive effect was observed in all formulations. The suggested optimum formulation contains 53.7% lemongrass, 43.4% curry leaves, 2.9% ginger and 0.0% turmeric. Most of the mixtures presented synergistic interactions. This indicated the potential of plant extract mixtures to be developed into nutraceutical products in the future by conducting *in-vivo* study.

Table 1. Formulation layout

Number of formulations	Lemongrass (mL)	Curry Leaves (mL)	Turmeric (mL)	Ginger (mL)
1	10	0	0	0
2	5	5	0	0
3	5	0	5	0
4	5	0	0	5
5	0	10	0	0
6	0	5	5	0
7	0	5	0	5
8	0	0	10	0
9	0	0	5	5
10	0	0	0	10
11	6.25	1.25	1.25	1.25
12	1.25	6.25	1.25	1.25
13	1.25	1.25	6.25	1.25
14	1.25	1.25	1.25	6.25
15	2.5	2.5	2.5	2.5
16	0	10	0	0
17	0	0	10	0
18	0	0	0	10

## DECIPHERING THE ACTION MECHANISM OF INDONESIA HERBAL DECOCTION IN THE TREATMENT OF TYPE II DIABETES USING A NETWORK PHARMACOLOGY APPROACH

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### ABSTRACT

**Objective:** The aim of this research was to investigate action mechanism of Indonesia herbal decoctions in the treatment of Type 2 Diabetes (T2D) using network pharmacology approaches.

**Methods:** Drug target profile analysis via Markov clustering was performed to identify the potent antidiabetic ingredients in the four herbs. Network target base identification of multicomponent synergy was applied to predict the ingredients synergistic effect. The multi-level and integrated target networks were contracted to identify the herbs major ingredients and their presumed targets. Further enrichment analysis and molecular docking were performed to validate network targets.

**Results:** 278 ingredients from the four herbs were linked to antidiabetic drugs with an overall clustering success rate of 98.58% and 5 ingredient pairs had significant synergistic effects. Enrichment analysis demonstrates herbs candidate presumed targets were frequently involved in the significant biological process and pathways associated with progression of Type 2 diabetes (T2D) diseases. Finally, molecular docking validation revealed there was high binding site similarity between momordicoside F2 (78%), beta-sitosterol (67%) and cis-N-Feruloyltyramine (67%) with miglitol drug. In addition, the four ligands presented the higher binding affinity to Maltase-glucoamylase (MGA) receptor an enzyme responsible for the digestion of dietary starch to glucose.

**Conclusion:** This study revealed the pharmacological mechanism of action of Indonesia herbal decoctions in the treatment of Type 2 diabetes. The herbs major presumed target played a significant biological role in the progression of Type 2 diabetes (T2D) while major herbal ingredients indicates the potential of curing Type 2 diabetes by inhibiting Maltase-glucoamylase (MGA) activity.

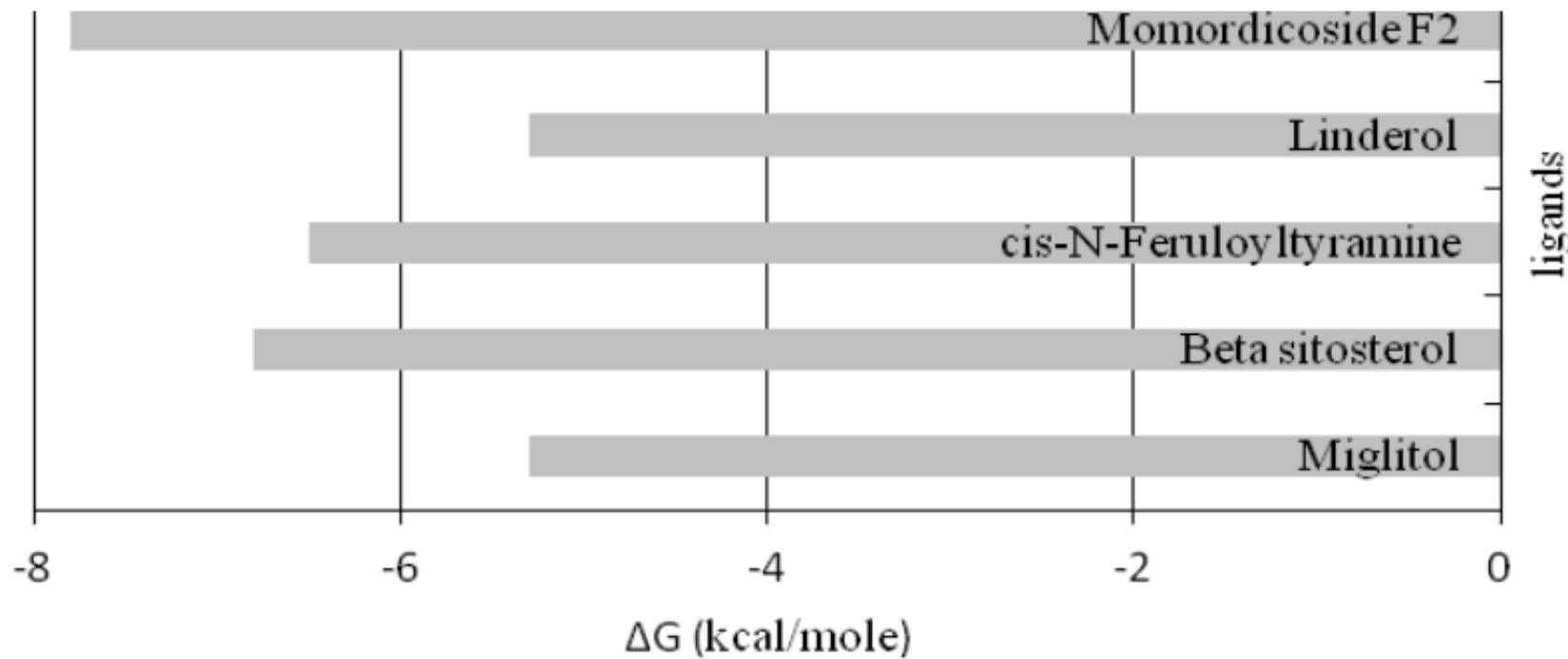
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**Keywords:** Type 2 diabetes, Indonesia herbal decoction, Network pharmacology

**Table 1: Herbal ingredient with significant antidiabetic synergistic effects**

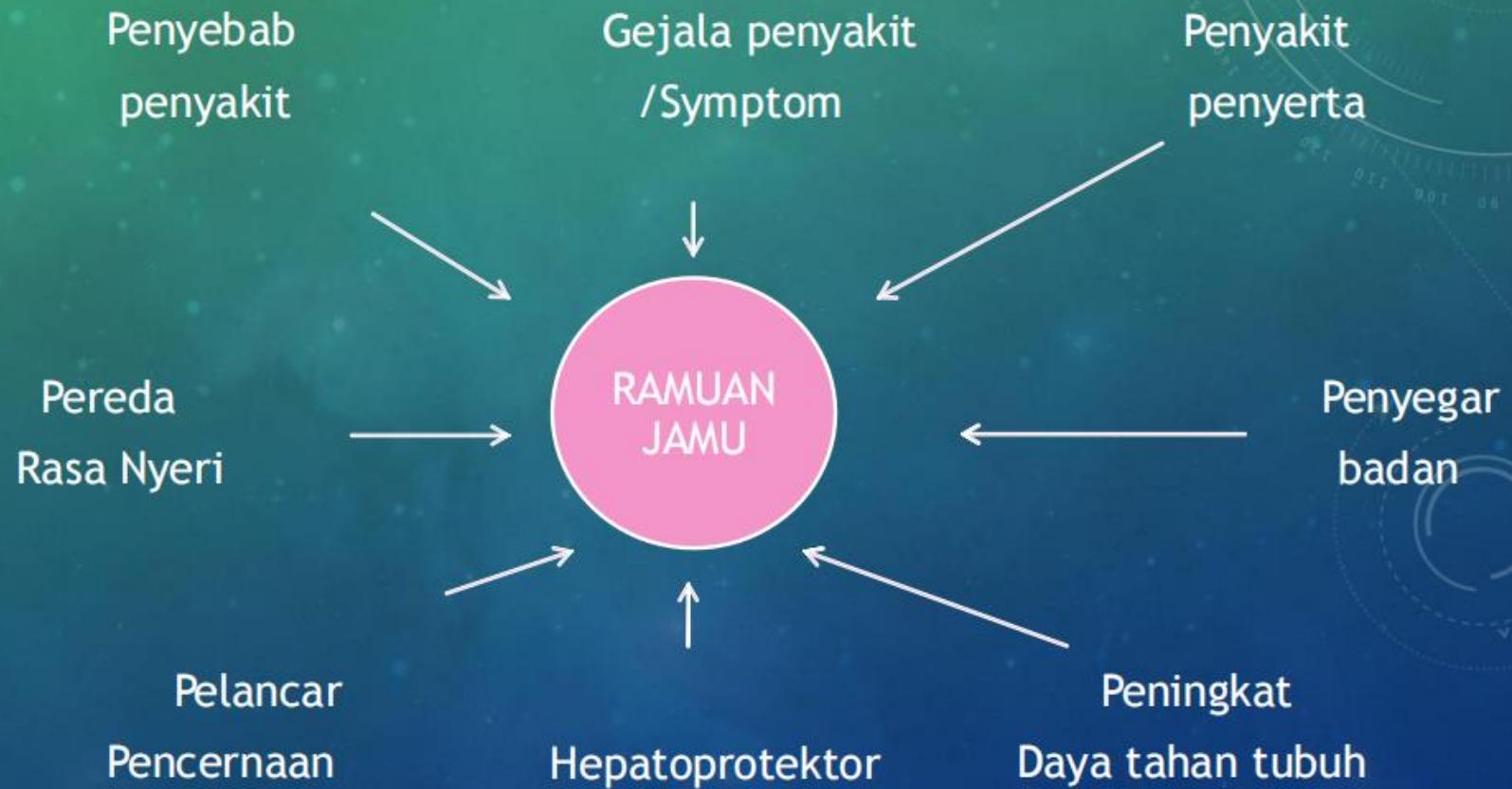
<b>Herbs</b>	<b>Chemical ingredients</b>	<b>Synergy score</b>	<b>P-value</b>
<i>Zingiber officinale</i>	Beta-sitosterol	0.4332*	1.0E-03
<i>Zingiber officinale</i>	(S)-10-gingerol	0.4129*	1.0E-03
<i>Zingiber officinale</i>	[6]-shogaol	0.4810	9.9E-02
<i>Tinospora cordifolia</i>	Berberine bisulfate	0.3973	2.1E-02
<i>Tinospora cordifolia</i>	Cis-N-Feruloyltyramine	0.3711*	1.0E-03
<i>Tinospora cordifolia</i>	Columbamine	0.3987	2.3E-02
<i>Tinospora cordifolia</i>	Oxyberberine	0.4001	6.0E-03
<i>Blumea balsamifera</i>	Linderol	0.3071*	1.0E-03
<i>Blumea balsamifera</i>	Jatrorrhizine	0.3912	2.0E-03
<i>Blumea balsamifera</i>	Magnoflorine	0.4992	9.0E-03
<i>Blumea balsamifera</i>	Palmatine	0.5617	1.6E-02
<i>Blumea balsamifera</i>	Blumeatin	0.4110	1.9E-02
<i>Momordica charantia</i>	Momordicoside F2	0.3976*	6.0E-03
<i>Momordica charantia</i>	Goyaglycoside-B	0.4881	1.2E-02
<i>Momordica charantia</i>	Charantoside VII	0.4117	1.1E-02
<i>Momordica charantia</i>	Momordicoside I	0.3991	4.1E-02

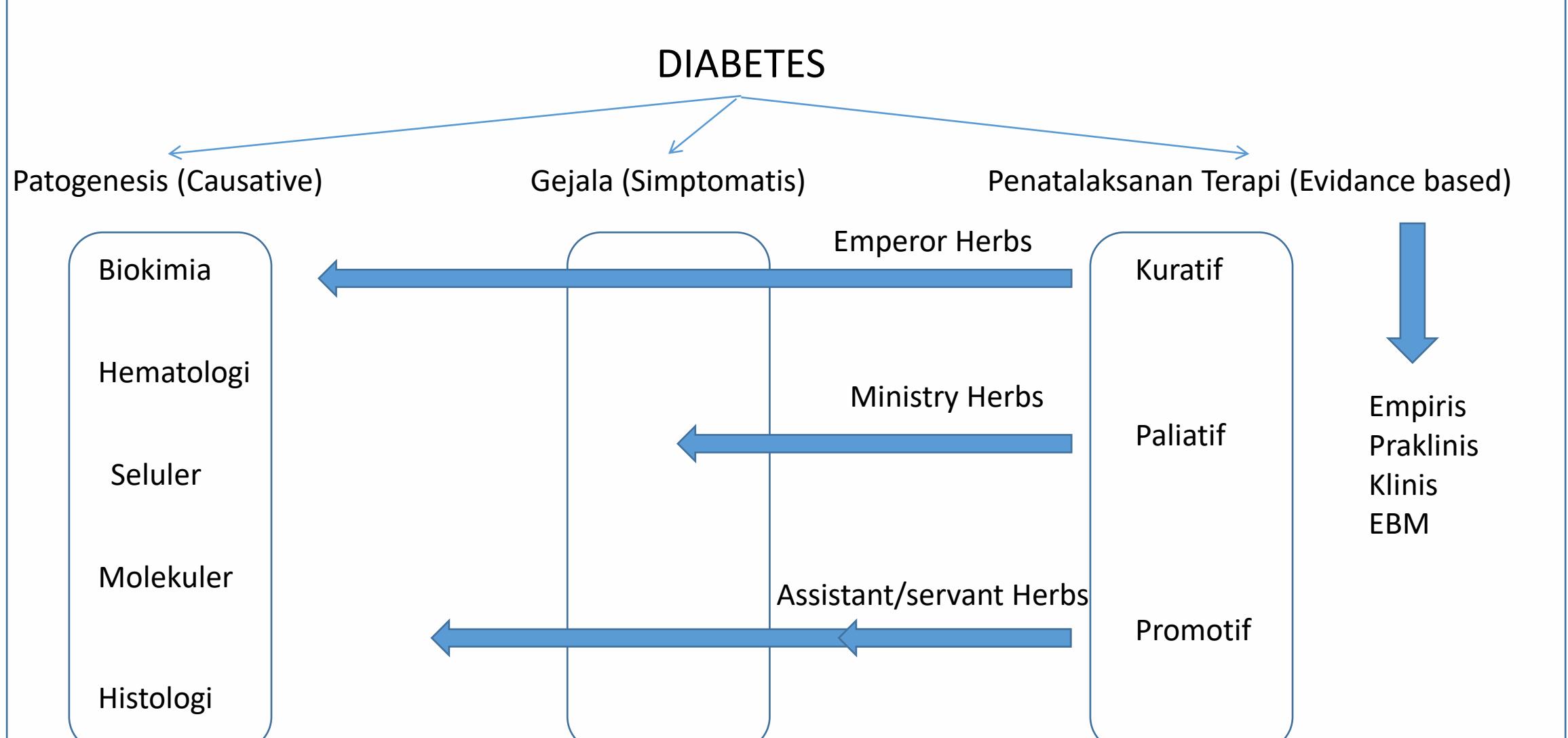
\*berberine-ingredient pairs with significant synergy scores



**Fig. 5: The binding affinity of herbs major ingredient compounds compared with miglitol drug (control ligand)**

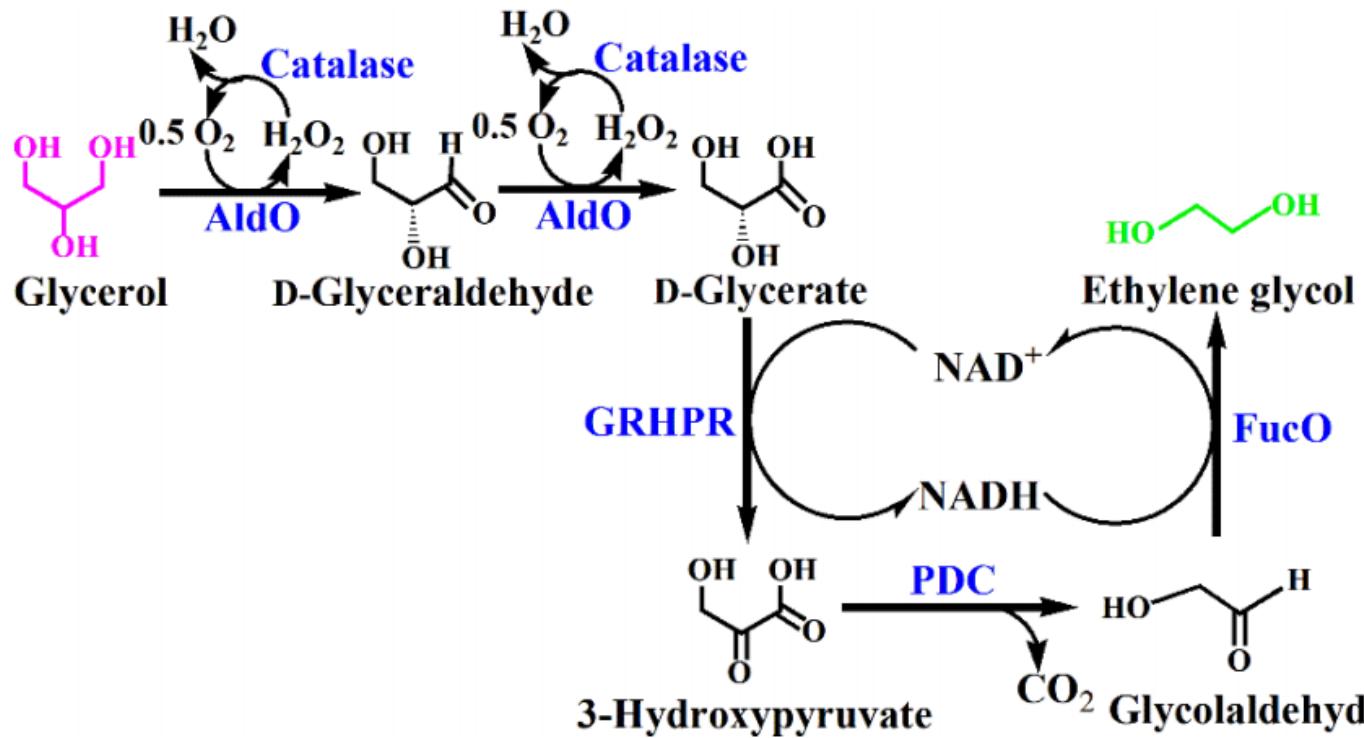
# PENDEKATAN HOLISTIK FORMULA RAMUAN





# FENOMENA EG/DEG





**Figure 1.** Scheme of ethylene glycol production from glycerol based on the artificial in vitro enzymatic cascade. The enzymes are alditol oxidase (AldO) from *Streptomyces coelicolor* A3(2), catalase from *Aspergillus niger*, glyoxylate/hydroxypyruvate reductase (GRHPR) from *Pyrococcus furiosus*, pyruvate decarboxylase (PDC) from *Zymomonas mobile*, and lactaldehyde:propanediol oxidoreductase (FucO) from *Escherichia coli*.

**Table 1** Quantitative DEG/TEG testing results and product information for samples with positive results for DEG ( $n=15$ )

Sample ID	DEG level (mcg/ml)	TEG level (mcg/ml)	% DEG volume by volume <sup>b</sup>	% TEG volume by volume <sup>b</sup>	Product name	General classification	Origin
0003	5.7 <sup>a</sup>	<LOD	0.0005	<LOD	Cough Be Gone	Throat/Cough syrup	China
0016	73.4	<LOD	0.007	<LOD	White Flower Analgesic balm	Topical agent	Hong Kong
0017	110.0	<LOD	0.01	<LOD	PH Balance Plus (Tong Fong Ning)	Dietary/Herbal supplement	China
0022	0.791 <sup>a</sup>	<LOD	0.00007	<LOD	Sansheden Chuanbei Ye—HEI Brand	Dietary/Herbal supplement	China
0027	2.22 <sup>a</sup>	<LOD	0.0002	<LOD	Hanban Liquid	Topical agent	China
0029	15.2	<LOD	0.0014	<LOD	First Lady Cough and Cold Syrup	Throat/Cough Cold syrup	China
0032	1.61 <sup>a</sup>	<LOD	0.00014	<LOD	Chwan poi pei pa lo Natural Herb Loquat Extract	Dietary/Herbal supplement	Hong Kong
0045	10.6	12.8	0.0009	0.0012	Yin Chiao Herbal Extract	Dietary/Herbal supplement	China
0046	13.7	20.2	0.0012	0.0018	Liuwei Dihuang Herbal extract	Dietary/Herbal supplement	China
0068	13.4	<LOD	0.0012	<LOD	Leren Herbal Extract	Dietary/Herbal supplement	China
0069	6.5	<LOD	0.00058	<LOD	Angelica Jujube Extract	Dietary/Herbal Supplement	China
0072	7.1	<LOD	0.00064	<LOD	Unknown energy tonic	Dietary/Herbal supplement	China
0075	6.18	<LOD	0.00055	<LOD	Yi Wang Jiang	Dietary/Herbal supplement	China
0080	4.87 <sup>a</sup>	<LOD	0.00044	<LOD	Fritillary and Loquat Extract—Royal King Brand	Dietary/Herbal supplement	China
0081	10.7	<LOD	0.001	<LOD	Shenji Royal Jelly in honey base	Dietary/Herbal supplement	China

The Panama 2006 DEG mass poisoning had products with percent DEG v/v of 8.1% as a comparison value

<sup>a</sup>These results were initially below the LOD (6.3 mcg/ml) and therefore determined to be “detectable but not quantifiable”. To provide a quantitative determination, the sample was reanalyzed using ten times the original volume and the correct initial concentration back-calculated

<sup>b</sup>Converted mcg to gram and divided by density (1.1 g/ml) to determine the ml of DEG and TEG. The value was then converted to percentage by multiplying by 100%

LOD = Level of Detection

Dalam uji laboratorium, sejumlah sampel memiliki kandungan EG dengan kadar 52 persen hingga 99 persen. Angka itu sangat jauh dari yang seharusnya yakni 0,1 persen.

# Betamethasone-in-cyclodextrin-in-liposome: The effect of cyclodextrins on encapsulation efficiency and release kinetics

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## Abstract

Lipophilic drugs have limited solubility in phospholipid systems, hence maximum entrapment levels in liposomes are known to be low. “Drugs-in-cyclodextrin-in-liposome” systems were previously proposed to overcome this drawback but studies were limited to  $\beta$ CD and HP $\beta$ CD. In some cases, other cyclodextrins may be more interesting than  $\beta$ CD or HP $\beta$ CD, such as methylated cyclodextrins. However, these cyclodextrins are known to extract lipid components from the lipid membrane, which may destabilize liposomes.

We tested the influence of several cyclodextrins ( $\beta$ CD,  $\gamma$ CD, Dimeb, Trimeb, Crysmeb, Rameb, HP $\beta$ CD and HP $\gamma$ CD) on the aqueous solubility of betamethasone by phase solubility diagrams and on the encapsulation efficiency in liposomes. The release kinetics of betamethasone was studied using Franz diffusion cells. We showed that release kinetics are directly correlated with encapsulation efficiency, which is closely related to betamethasone concentration in cyclodextrin complex solution. No liposome destruction was observed, even with the testing of methylated cyclodextrins at the highest concentration (40 mM). This can be explained by the fact that these cyclodextrins have a higher affinity for betamethasone than for cholesterol. This was proved by the comparison of phase solubility diagrams of both betamethasone and cholesterol.

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**Keywords:** Liposome; Cyclodextrin; Cholesterol; Betamethasone; Release kinetics

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Article

# Cyclodextrins-in-Liposomes: A Promising Delivery System for *Lippia sidoides* and *Syzygium aromaticum* Essential Oils

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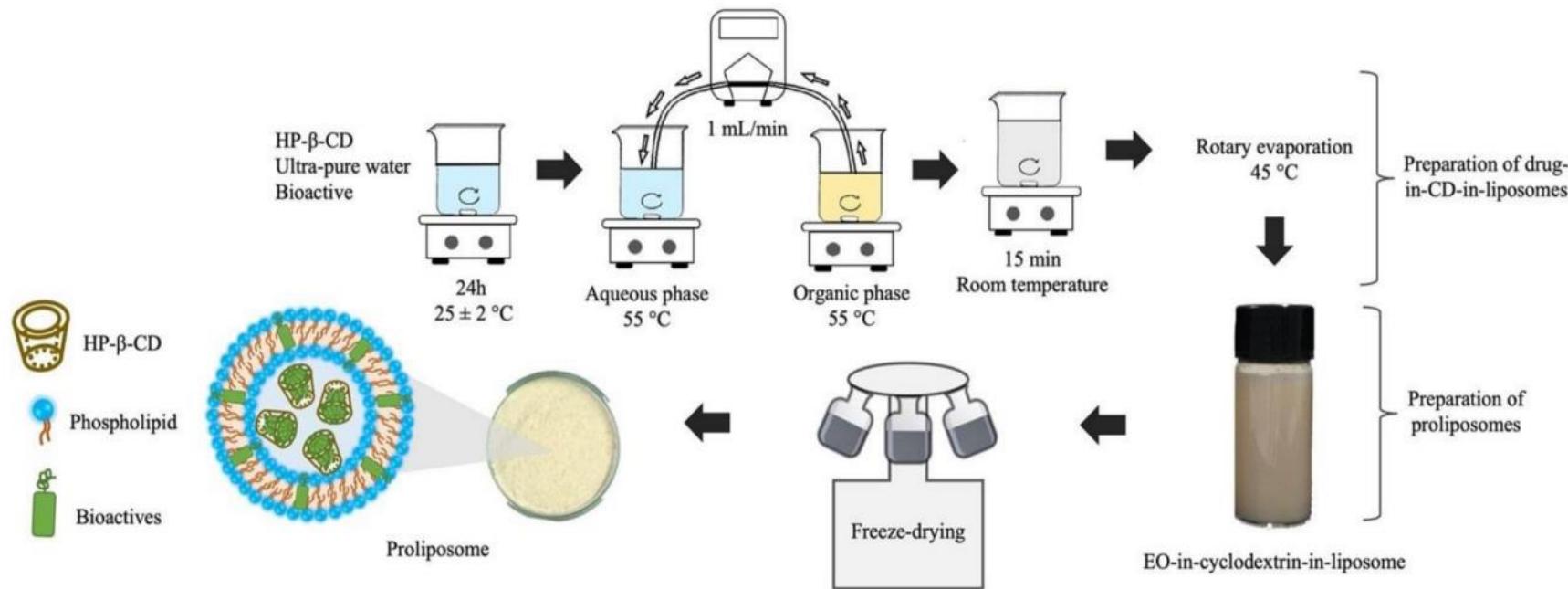
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**Abstract:** Biological activity of essential oils (EOs) has been extensively reported; however, their low aqueous solubility, high photosensitivity, and volatility compromise a broad industrial use of these compounds. To overcome these limitations, we proposed a nanoencapsulation approach to protect EOs, that aims to increase their stability and modulate their release profile. In this study, drug-in-cyclodextrin-in-liposomes encapsulating two essential oils (*Lippia sidoides* and *Syzygium aromaticum*) and their respective major compounds (thymol and eugenol) were produced by ethanol injection and freeze-dried to form proliposomes and further physicochemically characterized. Liposomes showed high physical stability over one month of storage at 4 °C, with slight changes in the mean size, polydispersity index (PDI), and zeta potential. Reconstituted proliposomes showed a mean size between 350 and 3300 nm, PDI from 0.29 to 0.41, and zeta potential between −22 and −26 mV. Differential scanning calorimetry and X-ray diffraction of proliposomes revealed a less-ordered crystalline structure, leading to high retention of the major bioactive compounds (between 73% and 93% for eugenol, and 74% and 84% for thymol). This work highlights the advantages of using drug-in-cyclodextrin-in-liposomes as delivery systems to retain volatile compounds, increasing their physicochemical stability and their promising potential to be utilized as carriers in products in the pharmaceutical, food, and cosmetic industries.

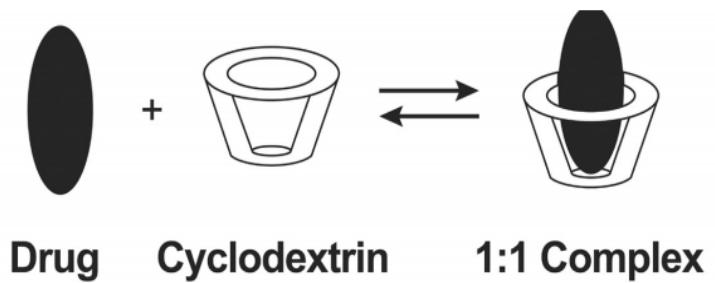


**Citation:** Baldim, I.; Oliveira, A.M.; Souto, E.B.; Oliveira, W.P. Cyclodextrins-in-Liposomes: A Promising Delivery System for *Lippia sidoides* and *Syzygium aromaticum* Essential Oils. *Life* **2022**, *12*, 95. <https://doi.org/10.3390/life12010095>

**Keywords:** proliposomes; cyclodextrins; thymol; eugenol; *Lippia sidoides*; *Syzygium aromaticum*



**Figure 1.** Diagram of EO-in-cyclodextrin-in-liposome and proliposomes production.



SCHEME 1.—Equilibrium binding of a drug with a cyclodextrin to form a 1:1 inclusion complex.



**TO CURE IS SOMETIMES  
TO RELIEVE IS OFTEN  
TO COMFORT IS ALWAYS**

Untitled. Benyamin Lampson.  
Academic Medicine 2007;82:1112-3



*The White Egret Orchid*

**Terima Kasih**