Antinephrolithiasis Activity of Ethanolic Extract of Uncaria gambir Roxb leaves

by Khoirun Nisyak

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Antinephrolithiasis Activity of Ethanolic Extract of *Uncaria gambir* Roxb leaves

Khoirun Nisyak, Hardiansyah, and A'yunil Hisbiyah

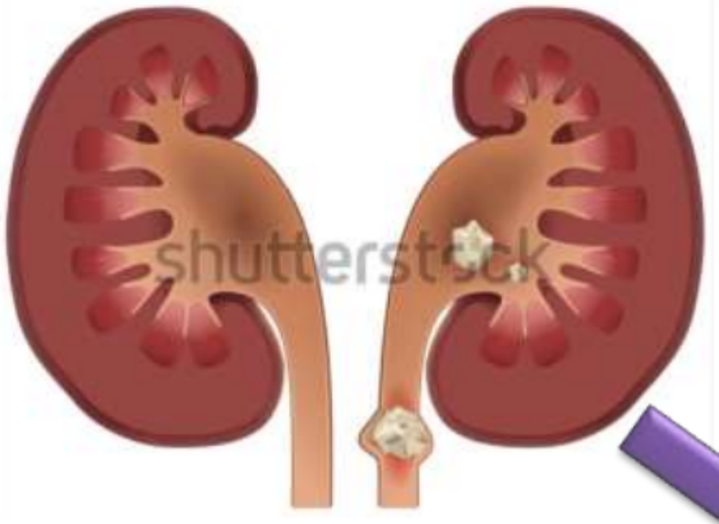
STIKES Rumah Sakit Anwar Medika

2 – 4 November 2021

7th International Conference on Pharmacy and Advanced Pharmaceutical Sciences (ICPAPS 2021) &

12th Annual Conference of the Indonesian Society for Cancer Chemoprevention (ISCC

BACKGROUND



renal calculi = crystal concretions formed typically in the kidney

Nephrolithiasis = Kidney Stones

2013

0,6% Indonesia
0,7% Jawa timur
0,7% Sidoarjo

Ca-oxalate &
Ca-phosphate

SURGICAL INTERVENTION

high costs and results in risks, such as tissue damage, and bacteriuria infection

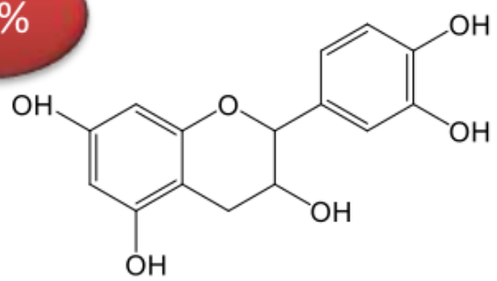
GAMBIR

Uncaria gambir Roxb.

antioxidant, antidiabetic, antimicrobial, anticancer, and anticariogenic

catechins, polyphenols, alkaloids, saponins, tannins, epicatechins, and caffeic acid

73%



prevent renal calcium crystallization *in vivo* and *in vitro*

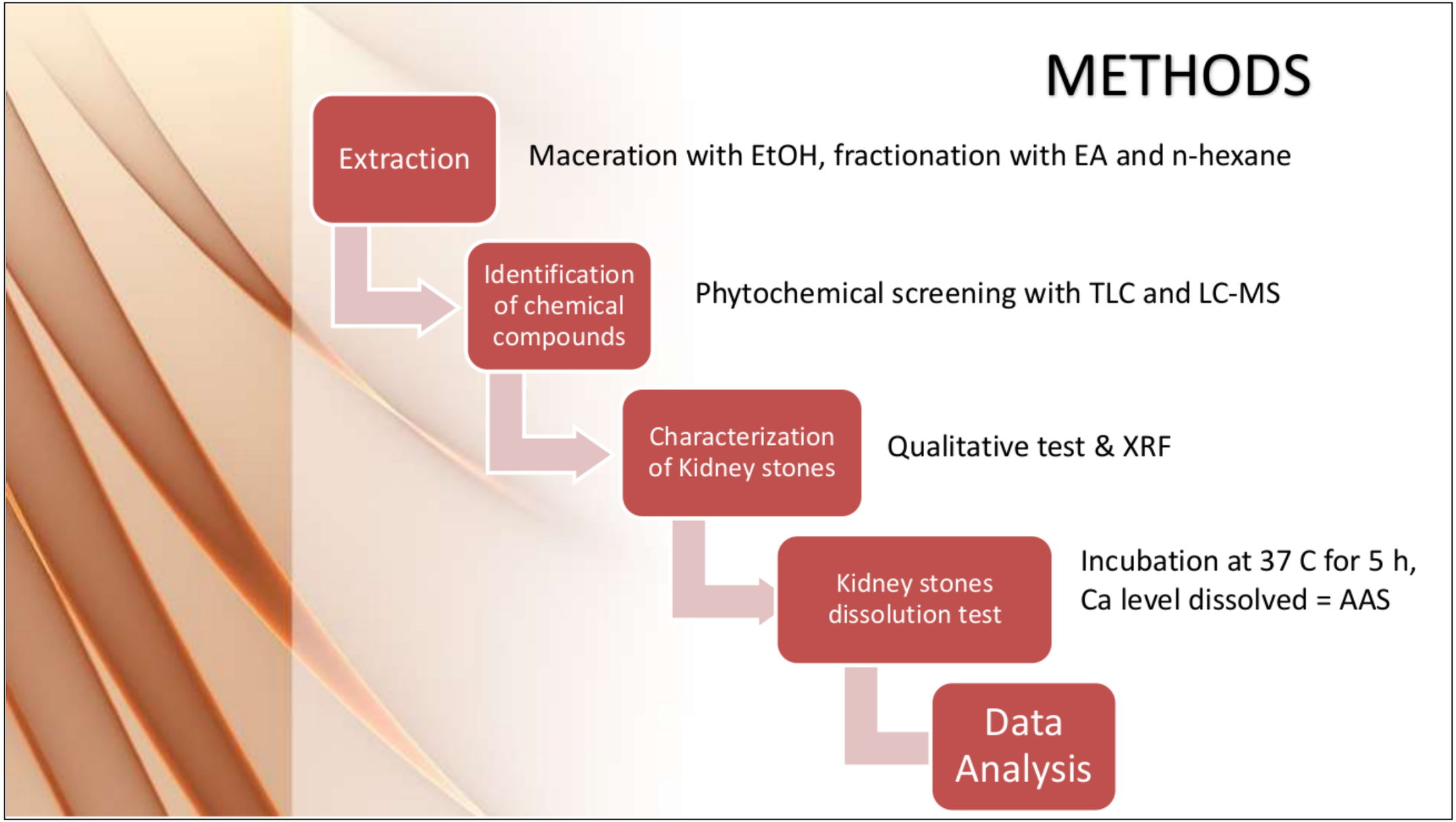
Ca-Catechin Complex

Soluble in water

OBJECTIVE

The purpose of this study was to determine the effect and activity of ethanol extract of gambier leaves on the destruction of kidney stones in vitro.

METHODS


Extraction
Maceration with EtOH, fractionation with EA and n-hexane
Identification of chemical compounds
Phytochemical screening with TLC and LC-MS
Characterization of Kidney stones
Qualitative test & XRF
Kidney stones dissolution test
Incubation at 37 C for 5 h,
Ca level dissolved = AAS
Data Analysis

RESULT AND DISCUSSION

PEMERINTAH PROVINSI JAWA TIMUR
DINAS KESEHATAN
UPT LABORATORIUM HERBAL MATERIA MEDICA BATU
Jalan Lahor No.87 Telp. (0341) 593356, e-mail :
KOTA BATU 65313

Nomor : 070/ 541A/ 102.7/ 2020
Sifat : Biasa
Perihal : Determinasi Tanaman Gandrit

Menerangkan permohonan sebagai :

Nama : HARDIYANTYAH
NIM : 1931010030
Fakultas : FARMASI STIKES RUMAH SAKIT ANWAR MEDIKA

1. Berikut determinasi tanaman gandrit
   Kingdom : Plantae (Tumbuhan)
   Subkingdom : Tracheobionta (Tumbuhan berpembuluh)
   Super Divisi : Spermatophyta (Menghasilkan biji)
   Divisi : Magnoliophyta (Tumbuhan berbunga)
   Kelas : Dicotyledoneae
   Bangsa : Rubiales
   Suku : Rubiaceae
   Marga : Syzygium
   Jenis : *Uncaria gambir* (Hunter) Roxb.
   Nama Umum : Gandrit, kapukh kalabweh
   Kunci Determinasi : 1b-2b-3b-4b-5b-7b-9b-10b-11b-12b-13b-14b-16a-210b-243b- 244b-248b-249b-250a-251b-252.
2. Morfologi : Habitus: Tanaman perdu, tinggi 1-3 cm. Batang: Batang tegak, bulat, percabangan simpodial, warna cokelat pucat. Daun: Daun tunggal, berhadapan, bentuk lonjong, tepi bergerigi, pangkal bulat, ujung meruncing, panjang 8-13 cm, lebar 4-7 cm, warna hijau. Bunga: Bunga majemuk, bentuk lonjong, di ketiak daun, panjang lebih kurang 5 cm, mahkota 5 helai berbentuk lonjong, warna ungu. Buah: Buah berbentuk bulat telur, panjang lebih kurang 1,5 cm, warna kuning.
3. Bagian yang digunakan : Daun
4. Penggunaan : Pengobatan
5. Daftar Pustaka
   - Syamsuhidayat, Sri Sugati dan Johny Ria Hutapea. 1991. *Inventaris Tanaman Obat Indonesia I*. Departemen Kesehatan Republik Indonesia: Badan Penelitian dan Pengembangan Kesehatan.
   - Van Steenis, CGGJ. 2008. *FLORA untuk Sekolah di Indonesia*. Pradnya Paramita, Jakarta.

Demikian surat keterangan determinasi ini kami buat untuk dipergunakan sebagaimana mestinya.

Batu, 16 November 2020
KEPALA UPT LABORATORIUM HERBAL MATERIA MEDICA BATU
PENGUJI
NIP. 19680205 199203 1 004

13,57%

Crude Ethanolic Extract

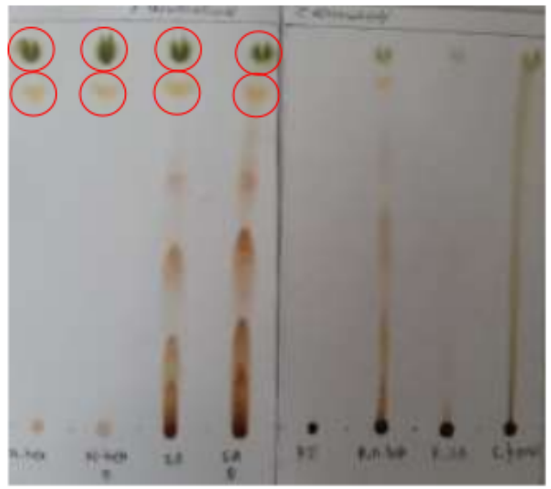
EA

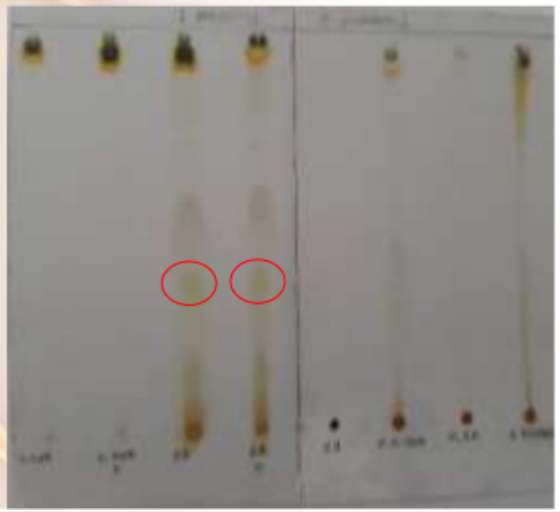
N-hexane

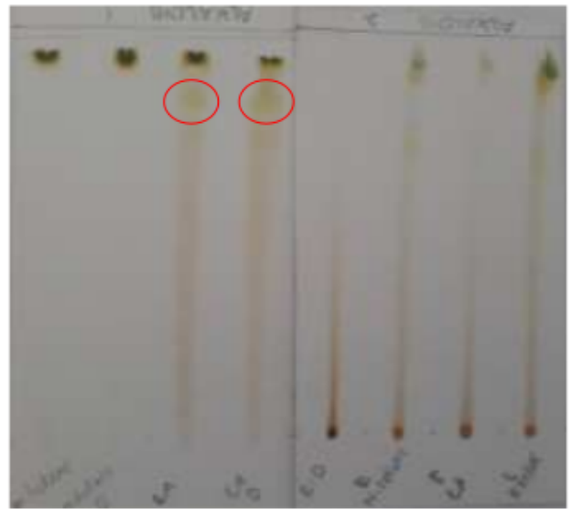
Residue

Phytochemical Screening of Gambir Leaves Extract

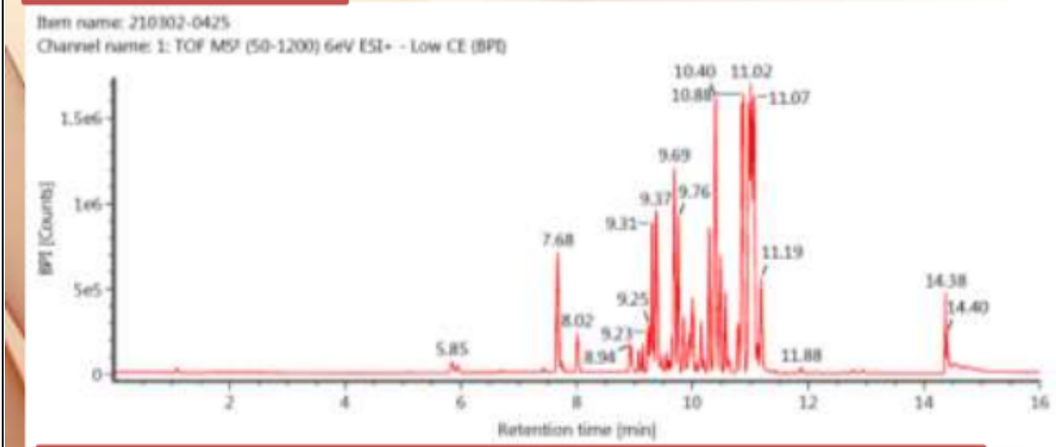
No.	Secondary Metabolite Compound	Results		
		F. EA	F. n-hexane	Residual fraction
1	Alkaloid	+	-	-
2	Flavonoid	+	-	+
3	Tannin	+	-	+
4	Terpenoid	-	-	-
5	Antrakuinon	+	+	-
6	Katekin	+	+	-





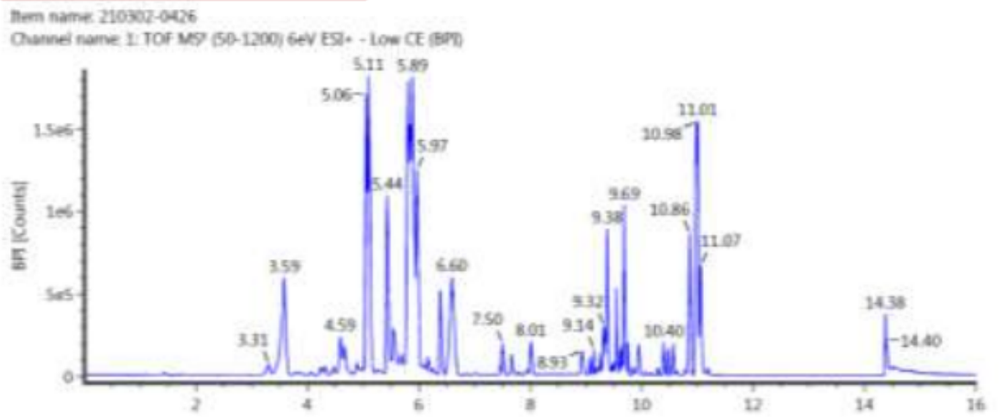


F. n-hexane



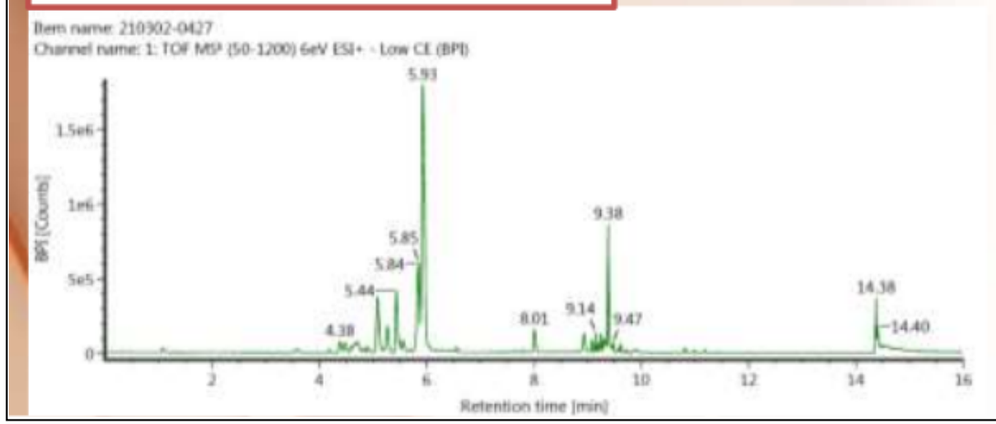
Stigmastan-3,6-dione 5.67%, $C_{45}H_{84}O_{14}$ (m/z 871) 20.04%, $C_{45}H_{84}O_{15}$ (m/z 887) 5.98%, $C_{36}H_{44}O_9$ (m/z 621) 3,95%, $C_{28}H_{46}O_2$ (m/z 415) 3.3%

F. Ethyl acetate



d-catechin 3,14%, Procyanidin A2 12,23%, $C_{23}H_{40}O_{19}$ (m/z 621) 17,89%, $C_{45}H_{84}O_{14}$ (m/z 871) 14,09%, $C_{23}H_{46}O_{20}$ (m/z 643) 5,87%

Residual Fraction



Grosvenorine 0.33%, Procyanidin A2 2%, Quercetin 0,41%, $C_{23}H_{40}O_{19}$ (m/z 621) 3,12%, $C_{23}H_{46}O_{20}$ (m/z 643) 2,24%

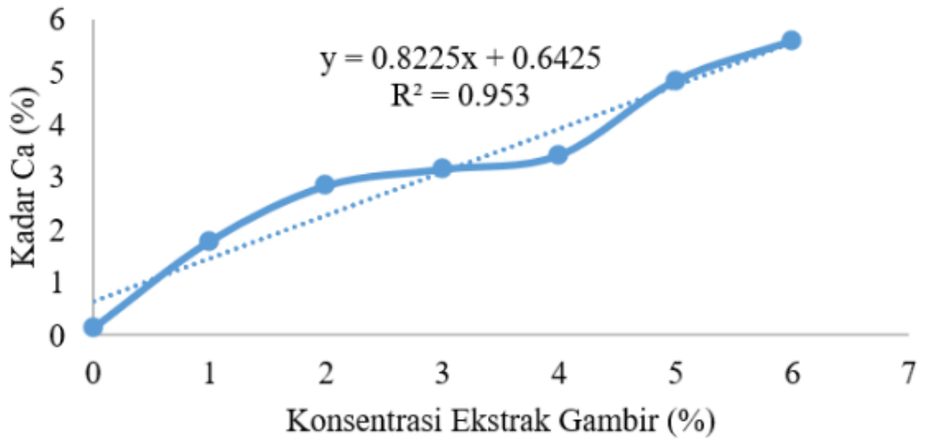
Characterization of Kidney Stones

Kidney Stones	
Component	**(% weight)**
Mg	0,1611
Si	0,201
P	2,7421
S	0,0783
Cl	0,0401
K	0,0512
Ca	16,2657
Zn	0,0221
Sr	0,0221
Ag	0,0378
Balance	80,3784

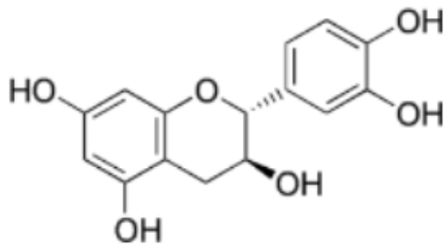
Kidney stone solubility test with ethanol extract of gambir leaves

No	Sampel	Kadar Ca						Rata-rata		SDV
		Ulangan 1		Ulangan 2		Ulangan 3				
		ppm	%	ppm	%	ppm	%	ppm	%	
1	Aquades	0,89	0,14	0,9	0,14	0,88	0,14	0,89	0,14	0,0082
2	Batugin	16,63	2,56	16,45	2,53	16,5	2,54	16,53	2,54	0,0759
3	EG 1%	11,61	1,78	11,83	1,82	11,42	1,76	11,62	1,79	0,1675
4	EG 2%	18,64	2,86	18,32	2,82	18,5	2,84	18,49	2,84	0,1310
5	EG 3%	20,51	3,15	20,32	3,12	20,62	3,17	20,48	3,15	0,1239
6	EG 4%	22,2	3,41	22,2	3,41	22,4	3,44	22,27	3,42	0,0943
7	EG 5%	31,56	4,85	31,23	4,80	31,66	4,87	31,48	4,84	0,1837
8	EG 6%	36,53	5,61	36,24	5,57	36,4	5,59	36,39	5,59	0,1186

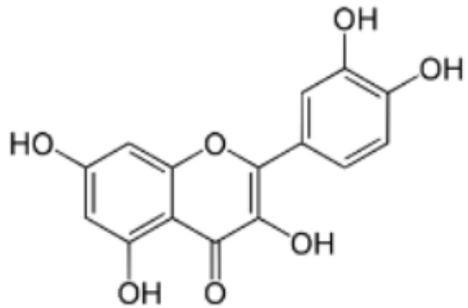
The higher the concentration of gambir leaf extract, the higher the dissolved calcium level of kidney stones



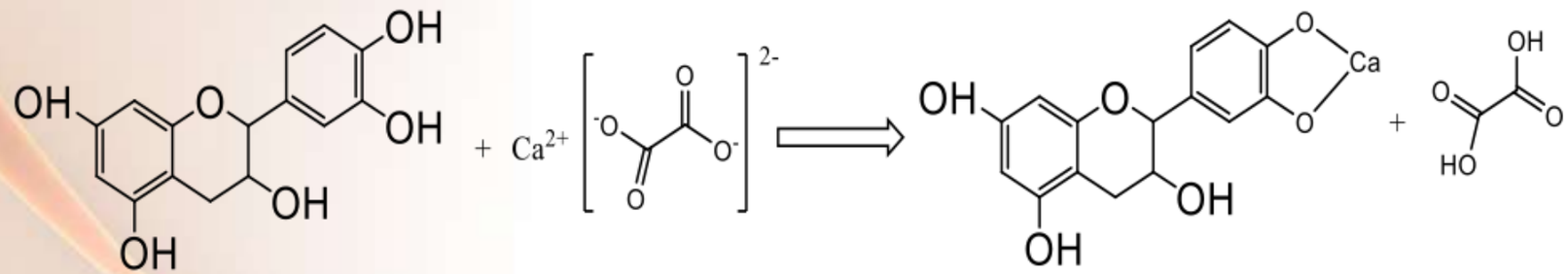
Plausible Mechanism of Reaction



catechins



quercetin



Data Analysis

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Unstandardized Residual	.227	7	.200*	.914	7	.426

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.942	1	18.942	101.292	.000[b]
	Residual	.935	5	.187		
	Total	19.877	6			

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.976[a]	.953	.944	.43244

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.643	.295		2.180	.081
	Konsentrasi Ekstrak Daun Gambir	.823	.082	.976	10.064	.000

F value > F table => the concentration of gambier leaf extract (X) has an influence on dissolved calcium levels (Y).

Conclusion

- There is an effect of ethanol extract of gambir leaf as antinephrolithiasis agent, the higher the concentration of ethanol extract gambier leaves, the higher the calcium levels of dissolved kidney stones.
- The presence of catechin compounds in gambier leaves can react with calcium in kidney stones to form a water-soluble Ca-catechin complex.

THANK YOU

Antinephrolithiasis Activity of Ethanolic Extract of Uncaria gambir Roxb leaves

GRADEMARK REPORT

FINAL GRADE

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GENERAL COMMENTS

Instructor

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