

SUPPLEMENTARY MATERIAL

Comparative analysis of active ingredients and potential bioactivities of essential oils from *Artemisia argyi* and *A. verlotorum*

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Supplementary material

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Table S1. Composition of the EOs from *Artemisia*.

Compound name	Content (%)				Mass	RI(exp)	RI(lit)	ID ^b
	YP-1 ^a	YP-2 ^a	YP-3 ^a	YP-4 ^a				
neointermedeol	9.69	8.02	4.72	2.79	222.2	1629		MS
caryophyllene	8.73	9.24	1.02	3.8	204.2	1396	1416	RI, MS
caryophyllene oxide	5.93	3.42	17.06	23.7	220.2	1557	1579	RI, MS
<i>cis</i> -chrysanthanol	5.92				152.2	1145	1161	RI, MS
eucalyptol	5.77	11.51			154.1	1013	1030	RI, MS
(-)-4-terpinenol	5.47	5.68			154.2	1159	1182	RI, MS
2-borneol	4.54	10.09	0.52	2.86	154.2	1147	1165	RI, MS
α -terpineol	3.21	3.23			154.2	1172	1187	RI, MS
(-)- <i>cis</i> -verbenol	2.81				152.2	1125	1140	RI, MS
caryophylladienol I	2.42	1.15	3.16	2.42	220.4	1607	1640	RI, MS
<i>cis</i> -carveol	2.35	3.06		0.12	152.2	1199	1226	RI, MS
germacrene D	1.7	1.98			204.2	1456	1478	RI, MS
spainulenol	1.58	1.06			220.4	1552	1574	RI, MS
<i>cis</i> -p-menth-2-en-1-ol	1.49	2.08			154.3	1111	1136	RI, MS
(<i>E</i>)- β -famesene	1.46				204.4	1432	1455	RI, MS
artemisia alcohol	1.38	2.63			154.2	1065	1083	RI, MS
<i>cis</i> -piperitol	1.33	1.4			154.2	1187	1193	RI, MS
chamazulene	1.25	0.53			184.3	1700		MS
humulene	0.97	0.97	0.36	5.87	204.4	1428	1451	RI, MS
β -selinene	0.95	0.82	1.15	1.36	204.4	1461	1483	RI, MS
<i>trans</i> -4-thujanol	0.83	1.45			154.2	1079	1065	RI, MS
γ -terpinene	0.72	0.81			136.2	1040	1057	RI, MS
4-thujanol	0.72				154.3	1048	1068	RI, MS
<i>n</i> -hexadecanoic acid	0.69		1.78		256.4	1933		MS
4(15),5,10(14)-Germacatrien-1-ol	0.68	0.3	1.07	0.73	220.4	1658		MS
phytol	0.57	0.12	1.46	0.31	220.4	2077		RI, MS
(\pm)-phytone	0.51	0.2	3.34	1.8	268.5	1812		RI, MS
selina-4,11-diene	0.49	0.3			218.3	1450	1492	RI, MS
eugenol	0.45	0.84			164.2	1335	1354	RI, MS
bicyclogermacren	0.43	0.45			204.4	1471	1491	RI, MS
copaene	0.4	0.39			204.4	1352	1375	RI, MS
eremophyllene	0.39	0.19			204.4	1564	1507	MS
τ -cadinol	0.34	0.23			222.4	1613	1638	RI, MS
yogomi alcohol	0.33	0.97			154.3	983	1000	RI, MS
γ -pironene	0.31	0.36			136.2	1313	1338	RI, MS
(+)- δ -cadinene	0.3	0.25			204.4	1497	1469	RI, MS
carveol	0.28	0.3			152.2	1209	1200	RI, MS
hexadecanoic acid, methyl ester	0.28				270.5	1893		RI, MS
junenol	0.26	0.2			222.4	1589	1606	RI, MS

(±)-piperitone	0.26	0.21			152.2	1232	1250	RI, MS
perillaldehyde	0.25	0.33			152.2	1252	1268	RI, MS
alloaromadendrene	0.24				204.4	1575	1463	RI, MS
nerolidol	0.23				222.4	1537	1560	RI, MS
(-)-carvone	0.23	0.3			150.2	1222	1190	RI, MS
Camphor	0.21				152.2	1263	1277	RI, MS
β -copaene	0.2	0.27			204.4	1403	1429	RI, MS
1-octen-3-ol	0.2	0.34			128.2	963	978	RI, MS
methyl isocostate	0.2				248.4	1754		MS
9,12-octadecadienoic acid, methyl ester	0.18				294.5	2059		MS
α -terpinene	0.18	0.4			136.2	999	1015	RI, MS
linolenic acid, methyl ester	0.18				292.5	2065		MS
o-cymene	0.17				134.2	1007	1020	RI, MS
(-)- β -bourbonene	0.17	0.12			204.4	1360	1381	RI, MS
methyleugenol	0.17	0.21			178.2	1382	1400	RI, MS
γ -costol	0.17				220.4	1718		MS
camphene	0.13				136.2	1570	954	RI, MS
<i>cis</i> -chrysanthanol acetate	0.13				194.3	1239	1260	RI, MS
α -bergamotene	0.13		0.84		204.4	1410	1431	RI, MS
<i>epi</i> - β -caryophyllene	0.13		0.2	0.53	204.4	1637		MS
bornyl isovalerate	0.12				238.4	1491	1468	RI, MS
(±)-filifolone	0.12	0.28			150.2	1084	1107	RI, MS
γ -muurolene	0.11		1.15		204.4	1488	1474	RI, MS
geranyl- α -terpinene	0.11				272.5	1919		MS
sclareol oxide	0.11				262.4	1849		MS
(1 α ,3 α ,5 α)-1,5-diethenyl-3-methyl-2-methylene-cyclohexane	0.1				216.2	1676		MS
β -costol		0.21	0.76	0.21	220.4	1737		MS
bornyl acetate		0.28		0.16	196.3	1263	1282	RI, MS
isogermacrene D		0.12			218.4	1418	1444	RI, MS
p-cymene		0.41			134.2	1006	1023	RI, MS
isoborneol, isovalerate		0.1			154.3	1490	1520	RI, MS
<i>cis</i> - β -farnesene		0.86	0.42	0.83	204.4	1431		MS
(+)-2-bornanone		5.14			152.2	1124	1132	RI, MS
2,3-dehydro-1,8-cineole		0.28			152.2	971	989	RI, MS
2-ethylidene-6-methyl-3,5-heptadienal		0.16			150.2	1375	1126	MS
1-(1-butynyl) cyclopentanol		0.37			138.2	1167		MS
γ -cadinene		0.14	0.66	0.59	204.2	1618		MS
β -elemene		0.11		0.4	204.4	1367	1390	RI, MS
β -bisabolene		0.1	0.35	0.46	204.4	1537	1511	RI, MS
trimethylenenorbornane		0.19			136.2	1135		RI, MS

chrysanthenone	0.35			150.2	1373	1127	RI, MS
alloaromadendrene oxide	0.23	0.5		220.4	1593	1462	RI, MS
α -himachalene	0.15		0.14	204.4	1572	954	RI, MS
ledane			0.32	204.4	1512	1497	RI, MS
palustrol		0.97	1.57	222.4	1540	1566	RI, MS
ledol		2.52	2.69	222.2	1575	1568	RI, MS
himbaccol		3.56	3.59	222.4	1565	1589	RI, MS
mustakone		1.84	1.1	218.3	1650		RI, MS
(+)- α -cyperone			0.74	218.3	1593	1739	RI, MS
(\pm)- α -curcumene		1.87	2.64	202.3	1457	1480	RI, MS
α -gurjunene		3.82	0.21	204.4	1384	1407	RI, MS
(+)- α -calacorene		0.56	0.86	200.3	1516	1539	RI, MS
(-)- α -muurolene			0.37	204.4	1474	1496	RI, MS
neoisolongifolene			2.75	220.4	1630		MS
aromandendrene		0.1	0.83	204.4	1636		MS
α -copaene			0.26	204.4	1351	1375	RI, MS
δ -cadinene			3.55	204.4	1497	1511	RI, MS
1,5-cadinadiene			0.44	204.4	1618	1495	RI, MS
eudesma-4,11-diene			0.63	204.4	1449		RI, MS
β -calacorene		0.19	0.47	200.3	1535	1560	RI, MS
isolekene		0.15	0.27	204.4	1466	1377	RI, MS
(-)-calamenene			0.53	202.3	1380	1518	RI, MS
α -neocallitropsene		1.04	0.48	206.4	1654		MS
<i>cis</i> -2,2-dimethyl-3-(3-methyl-2-butenyl)-6-methylene			0.36	158.2	1667		MS
cyclohexanemethanol							
(+)- β -eudesmol		6.67	3.52	222.4	1622		MS
isopathulenol		3.77	2.5	220.4	1600	1630	RI, MS
caryophylladienol II		1.25	1.06	220.4	1603	1633	RI, MS
τ -muurolol		0.17	1.04	222.4	1613	1640	RI, MS
isoaromadendrene epoxide			0.27	220.4	1662		MS
terpinen-4-ol			0.21	154.3	1156	1175	RI, MS
(-)-myrtenol			0.26	152.2	1174	1213	RI, MS
(-)- <i>trans</i> -pinocarveol			0.29	152.2	1117	1137	RI, MS
linalool			0.1	154.3	1081	1097	RI, MS
<i>l</i> -camphor			0.27	152.2	1122	1139	RI, MS
(1 <i>S</i>)-(-)-verbenone			0.12	150.2	1187	1204	RI, MS
4-methylene-5-hexenal			0.1	110.2	1085	897	RI, MS
2,5-dimethyl-3-methylene-1,5-heptadiene	0.31			136.2	1591	915	RI, MS
9-(1-methylethylidene)-1,5-cycloundecadiene			0.31	204.4	1736		MS
(-)-xanthorrhizol		0.63		218.3	1723		MS

1,1,7,7a-tetramethyl- 1a,2,6,7,7a,7b-hexahydro- 1 <i>H</i> -cyclopropa[a]- naphthalene	0.21	202.3	1761		MS
α -muurolene	0.2	204.4	1420	1440	RI, MS
<i>trans</i> - α -bergamotene	0.6	204.4	1469	1438	RI, MS
8,9-dehydro- neoisolongifolene	0.17	202.3	1795		MS
1-ethenyl-1-methyl-2,4- bis(1-methylethenyl)- cyclohexane	0.14	204.4	1367	1389	RI, MS
valerena-4,7(11)-diene	0.16	204.4	1756		MS
(-)-isocaryophyllene	0.37	204.4	1689		MS
pentamethylcyclopentadiene	0.53	136.2	1726		MS
isophytol	0.11	296.3	1913		MS
manool oxide	0.15	290.5	1978		MS
m-anisalcohol	3.36	138.2	1180	1198	RI, MS
chlorpyrifos	0.42	350.6	1957		MS
4-methylene-6-(1- propenylidene)-cyclooctene	0.11	160.3	1825		MS
monoterpenoids	38.71	31.29	1.05	4.4	
sesquiterpenoids	38.42	52.01	63.56	77.72	
diterpenoids	0.11		0.26		
aromatics	2.03	1.58	3.36		
aliphatics	3.11	1.03	6.68	2.83	
others			0.42		
total	82.38	85.91	75.32	84.95	

^a Percent calculated from MS data.; ^bIdentification method: MS, identified on the basis of computer matching of the mass spectra with those of the Wiley and Mass Finder libraries and comparison with literature data.

Table S2. Common components of EOs.

Common components of GAEOs and LAEOs	Common components of GAVEOs and LAVEOs	Common components of GAVEOs and LAVEOs
(-)-4-terpinenol	(+)- α -calacorene	neointermedeol
(-)-carvone	(+)- β -eudesmol	caryophyllene
(-)- β -bourbonene	(\pm)-phytone	caryophyllene oxide
(\pm)-filifolone	(\pm)- α -curcumene	2-borneol
(\pm)-phytone	2-borneol	caryophylladienol I
(\pm)-piperitone	aromandendrene	humulene
1-octen-3-ol	caryophylladienol I	β -selinene
2-borneol	caryophylladienol II	4(15),5,10(14)- Germacatrien-1-ol
(+)- δ -cadinene	caryophyllene	phytol
artemisia alcohol	caryophyllene oxide	(\pm)-phytone
bicyclogermacren	<i>cis</i> - β -farnesene	
carveol	epi- β -caryophyllene	
caryophylladienol I	4(15),5,10(14)- Germacatrien-1-ol	
caryophyllene	himbaccol	
caryophyllene oxide	humulene	
chamazulene	isodene	
<i>cis</i> -carveol	isopathulenol	
<i>cis</i> -piperitol	ledol	
<i>cis</i> -p-menth-2-en-1-ol	mustakone	
copaene	neointermedeol	
eremophylene	palustrol	
eucalyptol	phytol	
eugenol	α -gurjunene	
4(15),5,10(14)- Germacatrien-1-ol	α -neocallitropsene	
germacrene D	β -bisabolene	
humulene	β -calacorene	
junenol	β -costol	
methyleugenol	β -selinene	
neointermedeol	γ -cadinene	
perillaldehyde	τ -muurolol	
phytol		
selina-4,11-dien		
spainulenol		

trans-4-thujanol

yogomi alcohols

α -terpinene

α -terpineol

β -copaene

β -selinene

γ -pironene

γ -terpinene

τ -cadinol

Table S3. Numbering correspondence table for Figure 4.

NO.	compounds	NO.	compounds	NO.	targets	NO.	pathway
C1	γ -pironene	C15	β -calacorene	T1	NTRK3	P1	PI3K-Akt signaling pathway
C2	o-cymene	C16	pentamethylcyclopentadiene	T2	NOS2	P2	Pathways of neurodegeneration - multiple diseases
C3	neointermedeol	C17	m-anisalcohol	T3	NFKB1	P3	Pathways in cancer
C4	methyleugenol	C18	himbaccol	T4	CNR2	P4	Neuroactive ligand-receptor interaction
C5	junenol	C19	caryophyllene oxide	T5	CHRM4	P5	MicroRNAs in cancer
C6	eugenol	C20	alloaromadendrene oxide	T6	AR	P6	Metabolic pathways
C7	eucalyptol	C21	2-borneol	T7	APOBEC3A	P7	Chemical carcinogenesis-receptor activation
C8	cis-carveol	C22	1-ethenyl-1-methyl-2,4-bis(1-methylethenyl)-cyclohexane	T8	APEX1	P8	cAMP signaling pathway
C9	chamazulene	C23	α -himachalene	T9	ADRA2C	P9	Calcium signaling pathway
C10	1-octen-3-ol	C24	bornyl acetate	T10	ACHE	P10	Alzheimer disease
C11	β -elemene	C25	9-(1-methylethylidene)-1,5-cycloundecadiene	T11	HTR1E		
C12	trimethylenenorbornane	C26	(1S)-(-)-verbenone	T12	NR3C2		
C13	p-cymene			T13	KDM1A		
C14	β -selinene			T14	GPR55		

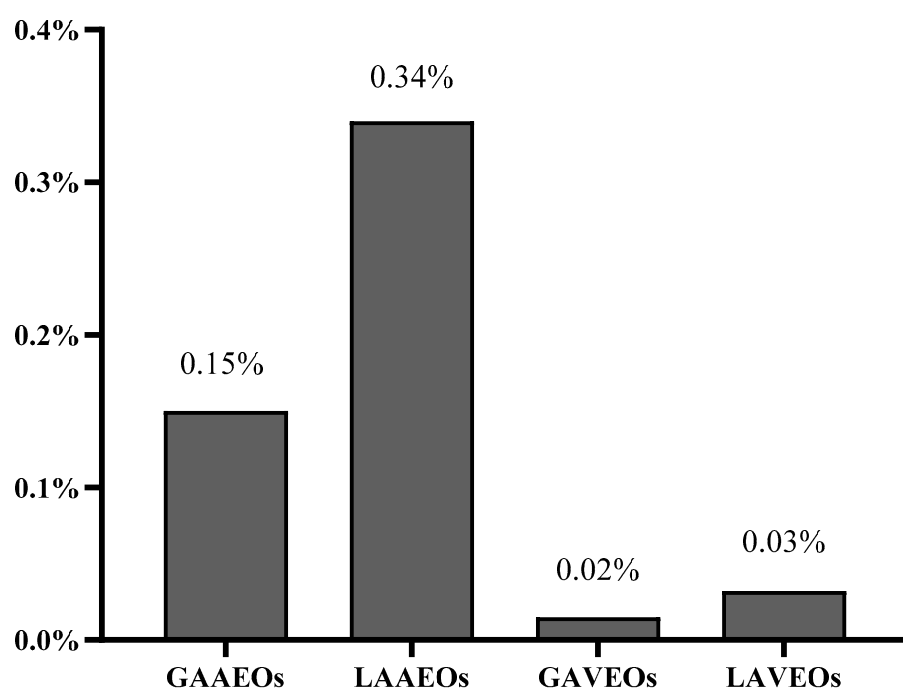


Figure S1. The Yields of EOs of *Artemisia*.

GAAEOs

[illegible]

LAAEOs

(-)-carvone	(±)-piperitone	eremophilene	pentadecahydronaphthalene	chrysanthemone	himachalene	(±)-linalone	RP50A1	PRKCE	MGAR	CTSD	STAT3	APH1A	PTD32	CASP9	CACNA1B	GRM4	GLI2	FDPS	CDK1	TDFT1	ATP4A	C12orf2	BAE1	APP							
cis-p-menth-2-en-1-ol	selinene	setra-4,11-dien	(-)-bairdione	caryophyllene	eucalyptol	-piperone	ECN1	CHRB2P	ALPL	HDAC7C	CHRM1	PIK3R1	LINA	HSF99A1	STPR4	NOTUM	BRD4	HSF99A1	LDH2	PSMB8	GHSK	AURKA2B	LTBR4	UGT2B7							
alloaromadendrene	isobornol	bicyclogermacrene	isogermacrene D	-costol	germacra-4(15),5E,10(14)-trien-1-ol	spinelulol	ALOX5	ACHE	CDK4	HTB18	HDAC8	PDE4B	CASA	HRH1	TUBA1A	HSD17B3	ELM1	NR12	IDH1	F7	GLAR1	CA3	CYP2D6	RARB							
oxide-(Ru et al.)	isovalerate						FAAH	TPH1	ANPEP	CQZ1	PTGFR	S1PR3	CA14	DPY7	SLC2A1	CD38	HTT7	PK3CB	TASN	SCD	FKBP1A	PFARA	EGFR	ADAM10							
							PSMB9	CYP17A1	ERAP2	HDAC2	CHRM1	SLC8A9	NFRB1	PSR1	CYP2C19	MAOB	PLAU	ITGB1	CAB	HTG2C	PDE3A	NG2B	CSNK2B	LY86							
-terpinene	p-cymene	eugenol	germacrene	trans-4-linalol	-elemene	-cadinol	DPP5	CDTR	KDM1A	HSD17B1	PROC	CTSK	AOC3	GRM5	HTB3A	HTB1F	GRBAP1	OPPL1	PRKCA	HTN4	PTGER3	PORY12	NR2F2	CHRNA4							
							KDQA	NOS1	CYP1A2	GRM2	EPHX1	RXR8	PTGES	PLA2G1B	CEB1	DRD2	APEX1	ALOX12	NGS3	PSMB2	TRIM24	CHRM1	ADORA2A	LPE							
							HDAC5	AURKB	ITGB3	KLF9	KCNAB2	SLC8A4	PRKCB	PREP	THRA	PNMT	YES1	MAPK1	TOP2A	S1PR2	HYR2	SDO1	DYRK1A	PDE4A							
							CHRM5	PRK3CA	RORR	CXCR6	ICMT	CAB2	HNR4	DUSP3	SIRT3	HSD11B1	RORP1	NTK3	CLKA	NME	CEB1	GLRA1	MAOA	MTOR							
							HRH5	TEC	ADORA1	HDAC1	SCN2A	TGMD2	ALOX5AP	HTB3A	CA12	CAB	CHRFAM7A	MAPK3	HDAC4	CHRM3	OPN4	TTR	ADORA1A	LDHA							
4,7-dimethyl-1-isopropyl-1,2,3,5,6,8-hexahydro-naphthalene	caryophyllene oxide	carveol	juncenol	1-octen-3-ol	neotermeneol	yogonol alcohol	CA1	ADRB1	TAAR1	TURA	PTK6	METAP2	TMPS5B	AKR1C3	CHRM4	APOBEC3A	HSD11B2	DHX29	TLR9	GRII2	RARA	NFE2L3	GPR150	PLAT							
							HSD17B10	MEF	PTGS1	CACNA1B	CHRNA1	MDHR1	ITK	PDGFR4	OPRK1	SLC3A1	MAP7	GLK1	PDGF4	PI3K1	DRD4	RPK3	LEK1	PLIN5							
(+)-2-bornanone	-cadinene	copaene	(-)-4-terpinenol	2-borneol	-terpinene	1-(1-butynyl)cyclopentanol	SIRT1	GPR35	MDM4	CDK5	AKR1C3	GRM1	HTB3A	NR1H5	NPRB1	GRIN2B	VDR	TNFR	ADORA3	MGLL	ESR1	HTHR	PROSP	BCL2A1							
							PTPN1	CDC25B	ABCG2	DNMT1	CALR3	RELA	GRN1	KIF11	FOR	SRD5A1	TP53	MC1	FOLH1	STK3	DCUN1D1	AHR	GSTH1	TLR9							
							SOMAR1	DDR1	HIF1A	NR3C2	RARG	CTSL	CHRNA7	CYP19A1	HNF4A	CCR2	FRRL2	CYP11B1	HICAR2	ENPP1	FZD2	PDZT4	THRB	CNR3							
trimethylenorbornane	caryophylladienol	methyl-eugenol	-terpinol	2,3-dehydro-1,8-dioneole	artemisia alcohol	chamazulene	ESR2	CHTR5	TD11	SLC6A2	PTK2B	PTN7	NO22	HDAC9	DRD1	SUAT1	PDE3B	RIPK2	NR3C1	ST5	PLK3CD	SRSF2	PCGT2	TSHR							
							ACACB	CA7	PDGFRB	CASR	CDC20A	LT4H	PTGER4	S1PR3	SLC5A5	RAC1	GUSB	MAP3K14	ACACA	ACE	CHRNA4	DUT	CAI	CNR1							
cis-carveol	bornyl acetate	cis-piperitol	-copaene	2-ethylidene-6-methyl-3,5-heptadienal			CCR1	TUBB2B	ACCB1	RET	PTPN2	RXRG	GSP31	CPT2	CTSD	KCNH2	TDG2	CTDSP1	TPR1	EPN1	NR	HSD17B2	PRKCD	SLC6A1							
							ADRA2C	SCN3A	CTSD3G	APOBEC3G	CYP19A1																				
Cellular senescence	Collecting duct acid secretion	EGFR tyrosine kinase inhibitor resistance	Fc gamma R-mediated phagocytosis	Glycine, serine and threonine metabolism	Human immunodeficiency virus 1 infection	Legionellosis	Antigen processing and presentation	Base excision repair	Central carbon metabolism in cancer	Colorectal cancer	beta-Alanine metabolism	cGMP-PKG signaling pathway	Complement and coagulation cascades	Endocrine resistance	Fluid shear stress and atherosclerosis	Glycosaminoglycan degradation	Human T-cell leukemia virus 1 infection	Leukocyte transendothelial migration	NOD-like receptor signaling pathway	Escherichia coli infection	Metabolism of xenobiotics by cytochrome P450	Prion disease	Regulation of lipolysis in adipocytes	Small cell lung cancer	Thiamine metabolism						
VEGF signaling pathway	Adrenergic signaling in cardiomyocytes	Apelin signaling pathway	Viral hepatitis B	African trypanosomiasis	Apoptosis	Bile secretion	Spring lipid signaling pathway	Thyroid cancer	Viral hepatitis B	Thyroid hormone signaling pathway	Viral carcinogenesis	Protein signaling pathway	PD-1 expression and PD-1 checkpoint pathway in cancer	Propanoate metabolism	Renin secretion	Staphylococcus aureus infection	Thyroid hormone synthesis	Viral life cycle-HIV-1	Alcornoque acid metabolism	Arachidonic acid metabolism	Biosynthesis of cofactors	Chemical carcinogenesis-DNA adducts	Cortisol synthesis and secretion	Endometrial cancer	Folate biosynthesis	GnRH signaling pathway	Hypertrophic cardiomyopathy	Lipid and atherosclerosis	Mineral absorption		
Notch signaling pathway	PD-1 expression and PD-1 checkpoint pathway in cancer	Propanoate metabolism	Renin secretion	Staphylococcus aureus infection	Thyroid hormone synthesis	Viral life cycle-HIV-1	Longevity regulating pathway	Mitochondrial	Nucleotide metabolism	Penicillin and glucuronate interconversions	Prostate cancer	Protein signaling pathway	PD-1 expression and PD-1 checkpoint pathway in cancer	Propanoate metabolism	Renin secretion	Staphylococcus aureus infection	Thyroid hormone synthesis	Viral life cycle-HIV-1	Alcornoque acid metabolism	Arachidonic acid metabolism	Biosynthesis of cofactors	Chemical carcinogenesis-DNA adducts	Cortisol synthesis and secretion	Endometrial cancer	Folate biosynthesis	GnRH signaling pathway	Hypertrophic cardiomyopathy	Lipid and atherosclerosis	Mineral absorption		
Hepatitis B	Inflammatory bowel disease	Longevity regulating pathway-multiple species	Morphine addiction	Oocyte meiosis	Peroxisome	Proteasome	ERBB signaling pathway	Gap junction	Hepatitis C	Mediator regulation of TRP channels	Long-term depression	mTOR signaling pathway	Cholesterol metabolism	Cytokine-cytokine receptor interaction	Estrogen signaling pathway	Gastric acid secretion	Hepatocellular carcinoma	Influenza A	Long-term potentiation	Natural killer cell mediated cytotoxicity	Inositol phosphate metabolism	Lysine degradation	Neuroptosis	Oxidative phosphorylation	Phenylethylamine metabolism	Proteoglycans in cancer	Riboflavin metabolism	Systemic lupus erythematosus	Transcriptional misregulation in cancer		
Aspirate and adenole metabolism	Caffeine metabolism	Choline metabolism in cancer	Cytosolic DNA-sensing pathway	Emetrol lipid metabolism	Gastric cancer	Herpes simplex virus 1 infection	Yersinia infection	alpha-Linolenic acid metabolism	Alcoholism	Thyroid disease	Calcium signaling pathway	Cholinergic synapse	Diabetic cardiomyopathy	Fanconi anemia	Glycine	HIF-1 signaling pathway	Insulin resistance	Lysosome	Neuroactive ligand-receptor interaction	Malaria	Hippocampal signaling pathway-multiple species	Insulin signaling pathway	MAPK signaling pathway	Histidine metabolism	Fatty acid metabolism	Drug metabolism-cytochrome P450	Cardiac muscle contraction	Citric acid cycle (TCA cycle)	Cell adhesion molecules	Cocaine addiction	Cell cycle
T cell receptor signaling pathway	Tuberculosis	2-Oxocarboxylic acid metabolism	Amoebiasis	Autophagy-related	ABC transporters	Angiotensin-converting enzyme inhibition	PI3K/AKT signaling pathway	Pyrimidine metabolism	Salivary secretion	Tyrosine metabolism	TOF-beta signaling pathway	Raz1 signaling pathway	Parathyroid hormone synthesis, secretion and action	Nicotine addiction	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action	Parathyroid hormone synthesis, secretion and action
NF-kappa B signaling pathway	Paraneoplastic secretion	Platelet activation	Pyruvate metabolism	Salmonella infection	TOF-beta signaling pathway	Raz1 signaling pathway	JAK-STAT signaling pathway	Measles	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection
Glycophospholipid metabolism	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	Human cytomegalovirus infection	

GAVEOs

aromadendrene	ledol	m-anisalcohol	caryophylladienol	germacra-4(15),5E,10(14)-trien-1-ol	HDAC8	CHRNA4	DHODH	ANPEP	HTR8	NOS2	PSMB1	SOX11	GPR39	ADRA2B	HSD11B1	HIF1A	MTNR1B	HLA23G1b	CA3	CEST1
trans--bergamotene	-muurolol	palustrol	isodlene	neonfermedol	FFR2	OPRL1	PRKCA	CA1	CD38	AHR	RORA	PTGS2	CXCR6	TNFR	PDE4B	STK3	CRHR1	CONE1	ATAD2	STAT3
epi--caryophyllene	-cadinene	mustakone	1-ethenyl-1-methyl-2,4-bis(1-methylethenyl)-cyclohexane	-calacorene	NOS1	ITK	CNR2	AP0BCE3A	ADRA2A	GRIN1	HTR7	NOS3	PSMB2	NR2F2	GSTP1	CDC28C	HSD11B2	PLIN1	MTOR	CA5B
(±)-curcumene	1,1,7,7a-tetramethyl-1a,2,6,7,7a,7b-hexahydro-1H-cyclopropa[a]-naphthalene	-selinene	caryophylladienol	pentamethylcyclopentadiene	UGT2B7	KCNA3	TEC	MAPK14	ESR2	HRH1	LDHA	KCNH2	NTRK3	RELA	HDAC4	TOP2A	OPRK1	TDO2	NR2E3	RAC1
alloaromadendrene oxide (Ru et al.)	-neocallitropsene	(+)-calacorene	8,9-dehydro-neoisolongifolene	caryophyllene oxide	ATP4A	NR1E2	GRIA2	ACACA	DRD5	PTPN2	CTSD	FCGR1	APEX1	LTAAH	KIF11	TLR9	SLC2A1	CA8	AR	RARA
(+)-eudesmol	-costol	isopathulenol	-muurolene	-gurjunene	PLIN5	DCUN1D1	RIPK3	DUT	BCL2A1	GRIN2B	E2F2	WDR3	HTR3A	CHRM1	P2RX7	CLK4	SLC6A3	CA13	PDE3A	AKR1G3
4-methylene-6-(1-propenylidene)-cycloctene	(-)-xanthorrhizol	caryophyllene	-muurolene	(-)-isocaryophyllene	CA12	GLS	TAA1	VDR	GPBAR1	KDM1A	BRD4	HTR1B	MAOA	PPARA	EGLN1	TLR4	SLC6A2	F7	CACNA1B	CYP19A1
2-borneol	valerena-4,7(11)-diene	chlorpyrifos	himbaccol		CSAR1	STS	RARB	METAP2	CA14	ALOX5AP	MDM4	NFE2L2	HSD17B10	NG2L	XDH	DPF4	AP0BCE3G	MAPK1	CA9	ADAM10
					FFAR4	PRK3CA	CYP3A4	CHRM2	PTPN1	KCNK9	PTGS1	GALR3	THRA	S1PR6	SAE1	KLF5	TTP1	GRM2	CDK5	ADRA2C
					FFR1	HTR1E	MAOB	PSMB9	DRP8	SLC6A3	CASP9	ESR1	ACHE	SCN5A	CDC25B	FAAH	SCN2A	PRK3CB	CLK2	OLSF3
					KCNA3	CHRM3	PRKCE	RORA	CHRM5	ABCB1	SCN3A	S1PR4	CNR1	AAK1	TUBB2B	PNMT	HCAAR2	MAP3K14	CA4	QRFP
					DHR4	CHRM4	CYP17A1	ALOX15	HTR2C	NR3C2	RARG	PSMB9	PRCP	HDAC11	SLC6A4	TRIM24	MARK3	CHRFAM7A	GPR35	PKA4
					PDE3B	TUBA1A	GRM4	BLM	GRM5	CACNA1H	KEAP1	PLAT	CSNK2B	RPS9KB1	CLK1	CDK4	PTX2B	CPT2	HSP90AA1	PKC3R1
					ALPL	CHRNA4	TMPS90	GLRA1	HTR5A	NFKB1	TDP1	SLC6A1	CES2	DRD1	CHRNA7	NR3C1	DYRK1A	PCP	HDAC2	MTNR1A
					PDGFRB	ADORA1	HDAC10	ALOX12	CXCR4	S1PR2	PDGFR4	HSD17B3	MIF	AURKB	ITGB3	CTSB	PDE7A	P2RY12	DPP9	MC4R
					FFR2	DRD2	PROC	HSP90A1	RIPK2	CA7										

Cholesterol metabolism	Fat digestion and absorption	Purine metabolism	Dilated cardiomyopathy	Porphyria metabolism	Autophagy - other	Spinothalamic tract	Viral life cycle	HIV-1	Retinol metabolism	NF-kappa B signaling pathway	Leukocyte transendothelial migration	PD-L1 expression and PD-1 checkpoint pathway in cancer	Sphingolipid signaling pathway	Calcium signaling pathway	Regulation of actin cytoskeleton	Endocrine resistance
Cellular senescence	Clinical muscle contraction	alpha-Linolenic acid metabolism	Oxytocin signaling pathway	African trypanosomiasis	Platinum drug resistance	Longevity regulating pathway - multiple species	Central carbon metabolism in cancer	Nucleotide metabolism	Tryptophan metabolism	RGC-like receptor signaling pathway	VEGF signaling pathway	Shigellosis	Rap1 signaling pathway	Neuroactive ligand-receptor interaction	Human immunodeficiency virus 1 infection	
Hepatocellular carcinoma	Measles	Synaptic vesicle cycle	Vascular smooth muscle contraction	Peroxisome	Phagosome	Systemic lupus erythematosus	Adipocytokine signaling pathway	Insulin resistance	Amphetamine addiction	Lincosic acid metabolism	Th1 and Th2 cell differentiation	Chagas disease	Fluid shear stress and atherosclerosis	Leptospirosis	Nitrogen metabolism	
MicroRNAs in cancer	Influenza A	Small cell lung cancer	Mineral absorption	Inositol phosphate metabolism	Inflammatory bowel disease	Protein processing in endoplasmic reticulum	Renin-angiotensin system	AMPK signaling pathway	HIF-1 signaling pathway	Gap junction	Chemical carcinogenesis - DNA adducts	Adrenergic signaling in cardiomyocytes	Yersinia infection	Proteoglycans in cancer	Nicotine addiction	
Metabolic pathways	Amniotic epithelial cell differentiation	Pancreatic cancer	Progesterone-mediated oocyte maturation	Homologous recombination	Carbohydrate digestion and absorption	B cell receptor signaling pathway	Aldosterone-regulated sodium reabsorption	Glutathione metabolism	mTOR signaling pathway	Ferroptosis	Alcoholism	Metabolism of xenobiotics by cytochrome P450	GnRH signaling pathway	C-type lectin receptor signaling pathway	Prior disease	
Chemical carcinogenesis - receptor activation	Cytotoxic DNA-sensing pathway	Axon guidance	T cell receptor signaling pathway	Hepatitis B	Fatty acid biosynthesis	Bacterial invasion of epithelial cells	Amoebiasis	Base excision repair	Longevity regulating pathway	Antifolate resistance	Long-term potentiation	Glyceraldehyde-3-phosphate metabolism	Epstein-Barr virus infection	Cocaine addiction	Tuberculosis	
Glycerolipid metabolism	Protein digestion and absorption	Type II diabetes mellitus	Fatty acid biosynthesis	Pathways of neurodegeneration - multiple diseases	AGE-RAGE signaling pathway in diabetic complications	Epithelial cell signaling in Helicobacter pylori infection	Human cytomegalovirus infection	Viral carcinogenesis	Proteasome	Hasidic metabolism	Pyruvate metabolism	D-Amino acid metabolism	Colorectal cancer	Steroid biosynthesis	Pyrimidine metabolism	
Toll-like receptor signaling pathway	Chemical carcinogenesis - reactive oxygen species	Thermogenesis	TNF signaling pathway	Retinoid signaling pathway	NOD-like receptor signaling pathway	Regulation of lipolysis in adipocytes	Salmonella infection	Alzheimer disease	p53 signaling pathway	Prostate cancer	Cell cycle	PKC-Akt signaling pathway	Tight junction	Oocyte matosis	Pathways in cancer	Thyroid cancer
Leishmaniasis	Relaxin signaling pathway	Neurocysticercosis	Endocannabinoid signaling	Long-term depression	Regulation of lipolysis in adipocytes	Salmonella infection	Alzheimer disease	p53 signaling pathway	Prostate cancer	Cell cycle	PKC-Akt signaling pathway	Tight junction	Oocyte matosis	Pathways in cancer	Thyroid cancer	Endocytosis
Lysosome	Signaling pathways regulating pluripotency of stem cells	Neurotrophin signaling pathway	Long-term depression	Regulation of lipolysis in adipocytes	Salmonella infection	Alzheimer disease	p53 signaling pathway	Prostate cancer	Cell cycle	PKC-Akt signaling pathway	Tight junction	Oocyte matosis	Pathways in cancer	Thyroid cancer	Endocytosis	Tyrosine metabolism
Natural killer cell mediated cytotoxicity	Biosynthesis of cofactors	Antigen processing and presentation	Toxoplasmosis	Protein signaling pathway	Fatty acid degradation	Insulin secretion	Cytokine-cytokine receptor interaction	Bleeder cancer	Fatty acid metabolism	Salivary secretion	Chemokine signaling pathway	Tight junction	Oocyte matosis	Pathways in cancer	Thyroid cancer	Endocytosis
GABAergic synapse	Herpes simplex virus infection	Phospholipase D signaling pathway	Cortisol synthesis and secretion	Autophagy - animal	Alcoholic liver disease	Dopaminergic synapse	Fc epsilon RI signaling pathway	Infammatory mediator regulation of TRP channels	PPAR signaling pathway	Gastric acid secretion	Drug metabolism - other enzymes	Melanoma	Fc gamma R signaling pathway	Ubiquitin mediated proteolysis	One carbon pool by folate	
Arginine and proline metabolism	Transcriptional misregulation in cancer	Proximal tubule cationic amino acid reclamation	Valine, leucine and isoleucine degradation	Choline metabolism in cancer	Lysine degradation	Bile secretion	Aschrochic acid metabolism	Mitochondrial - animal	Serotonergic synapse	Non-alcoholic fatty liver disease	Coronavirus disease - COVID-19	Morone addition	Cholinergic synapse	Focal adhesion		
Thyroid hormone synthesis	Alkaldosterone synthesis and secretion	Glycine / Glutathione metabolism	ECM-receptor interaction	Glycosaminoglycan degradation	Hypertrrophic cardiomyopathy	Antihypertensive drug metabolism	Ascorbate and aldarate metabolism	Folate biosynthesis	Huntington disease	Thyroid hormone signaling pathway	Caffeine metabolism	Atherosclerosis	Platelet activation	MAPK signaling pathway	cAMP-PKG signaling pathway	cAMP signaling pathway
Rheumatoid arthritis	Melanogenesis	Oxidative phosphorylation	Colicoiding duct acid secretion	Hypertrrophic cardiomyopathy	Antihypertensive drug metabolism	Ascorbate and aldarate metabolism	Folate biosynthesis	Huntington disease	Thyroid hormone signaling pathway	Caffeine metabolism	Atherosclerosis	Platelet activation	MAPK signaling pathway	cAMP-PKG signaling pathway	cAMP signaling pathway	
Gastric cancer	Hippo signaling pathway	Malaria	Colicoiding duct acid secretion	Hypertrrophic cardiomyopathy	Antihypertensive drug metabolism	Ascorbate and aldarate metabolism	Folate biosynthesis	Huntington disease	Thyroid hormone signaling pathway	Caffeine metabolism	Atherosclerosis	Platelet activation	MAPK signaling pathway	cAMP-PKG signaling pathway	cAMP signaling pathway	
Non-small cell lung cancer	Hepatitis C	Hippo signaling pathway - multiple species	Ethanol metabolism	Nicotinate and nicotinamide metabolism	Antihypertensive drug metabolism	Ascorbate and aldarate metabolism	Folate biosynthesis	Huntington disease	Thyroid hormone signaling pathway	Caffeine metabolism	Atherosclerosis	Platelet activation	MAPK signaling pathway	cAMP-PKG signaling pathway	cAMP signaling pathway	
ROS signaling pathway	Breast cancer	Hippo signaling pathway - multiple species	Ethanol metabolism	Nicotinate and nicotinamide metabolism	Antihypertensive drug metabolism	Ascorbate and aldarate metabolism	Folate biosynthesis	Huntington disease	Thyroid hormone signaling pathway	Caffeine metabolism	Atherosclerosis	Platelet activation	MAPK signaling pathway	cAMP-PKG signaling pathway	cAMP signaling pathway	

LAVEOs

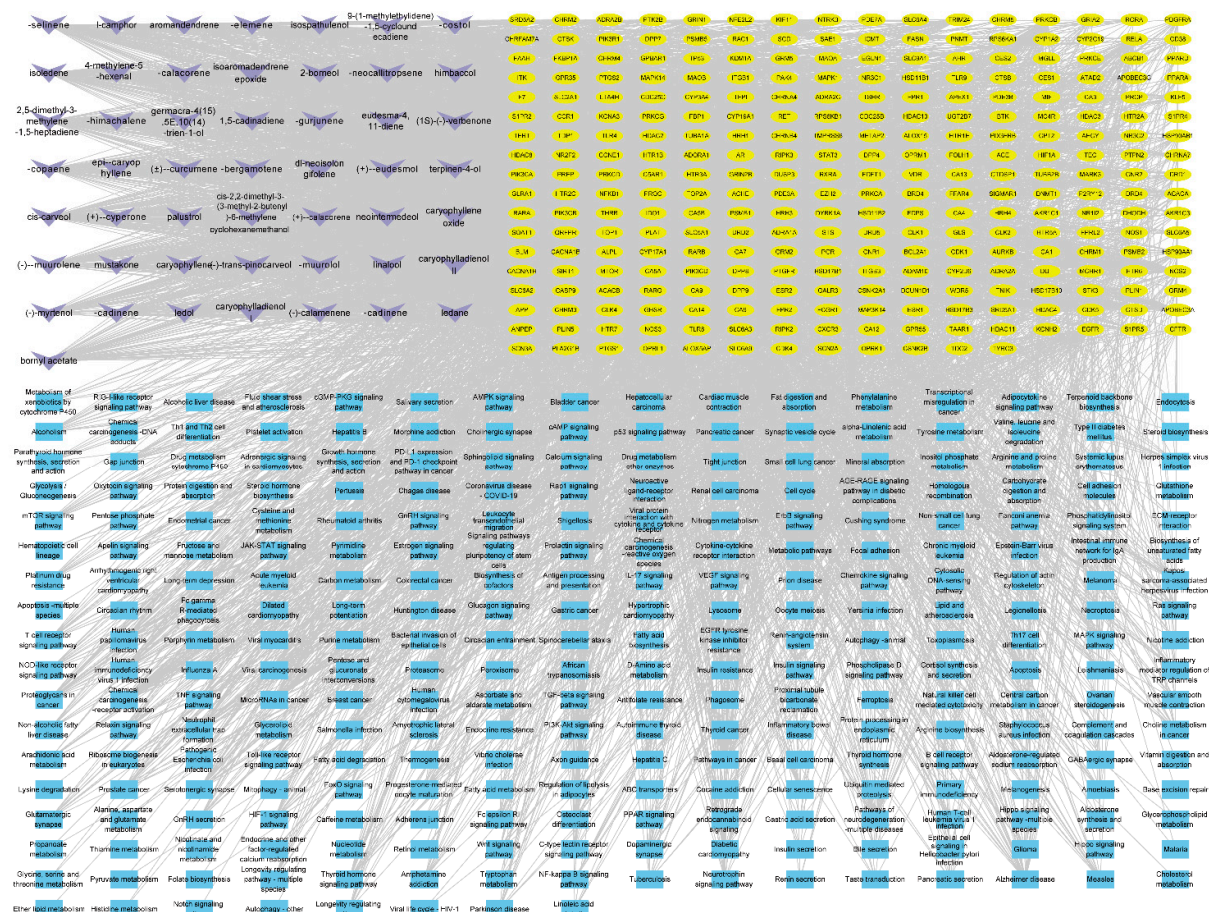


Figure S2. Ingredient-Target-pathway network of EOs. The ingredient represented by the purple V. The targets were represented by the yellow ellipse. The pathways were represented by the blue rectangle. The active ingredients were represented by the node, and the edge links the targets and the active ingredients.

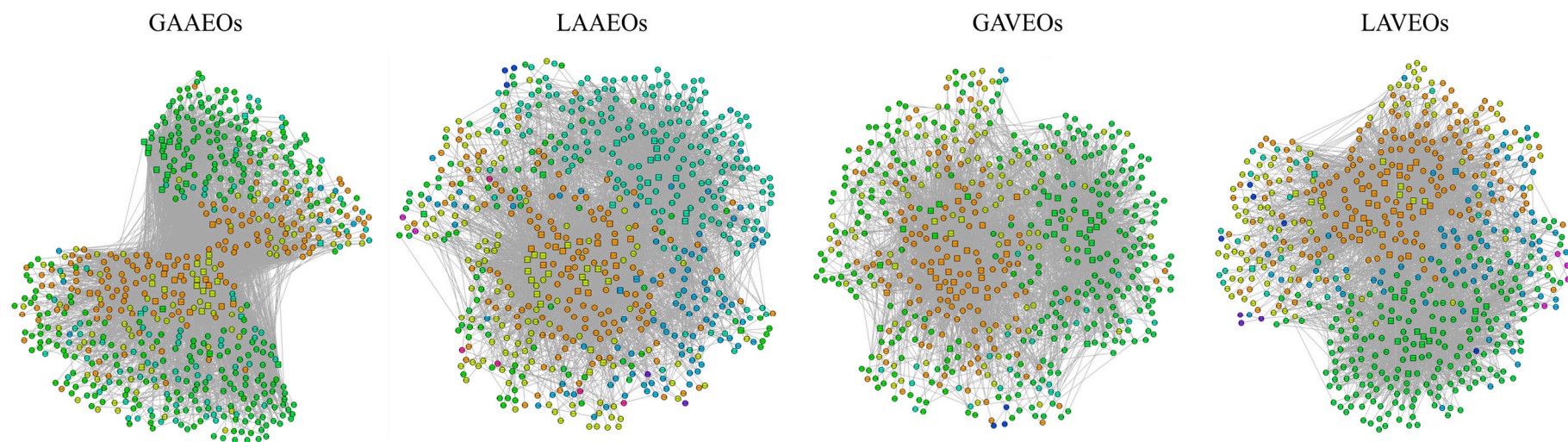
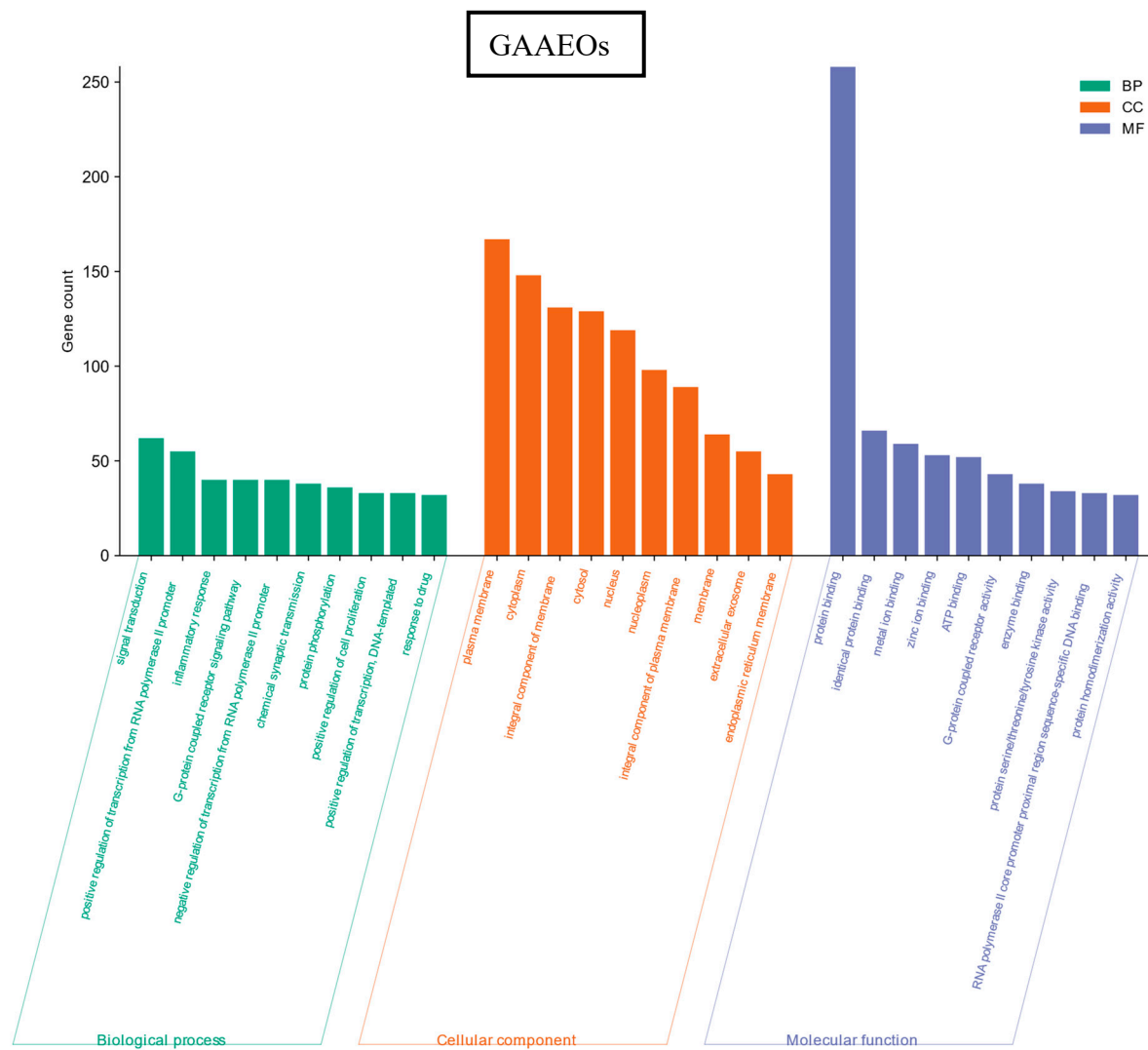
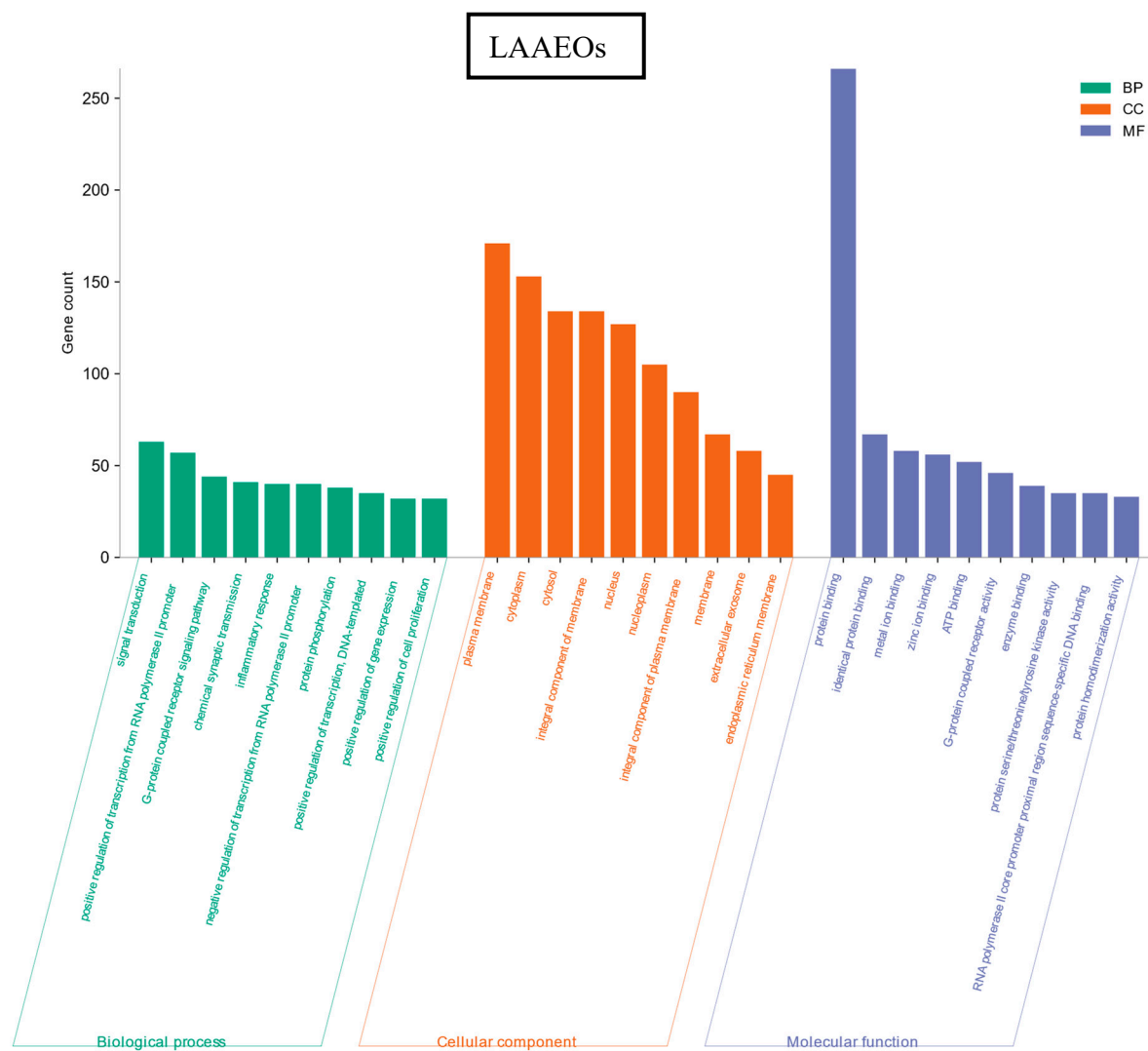
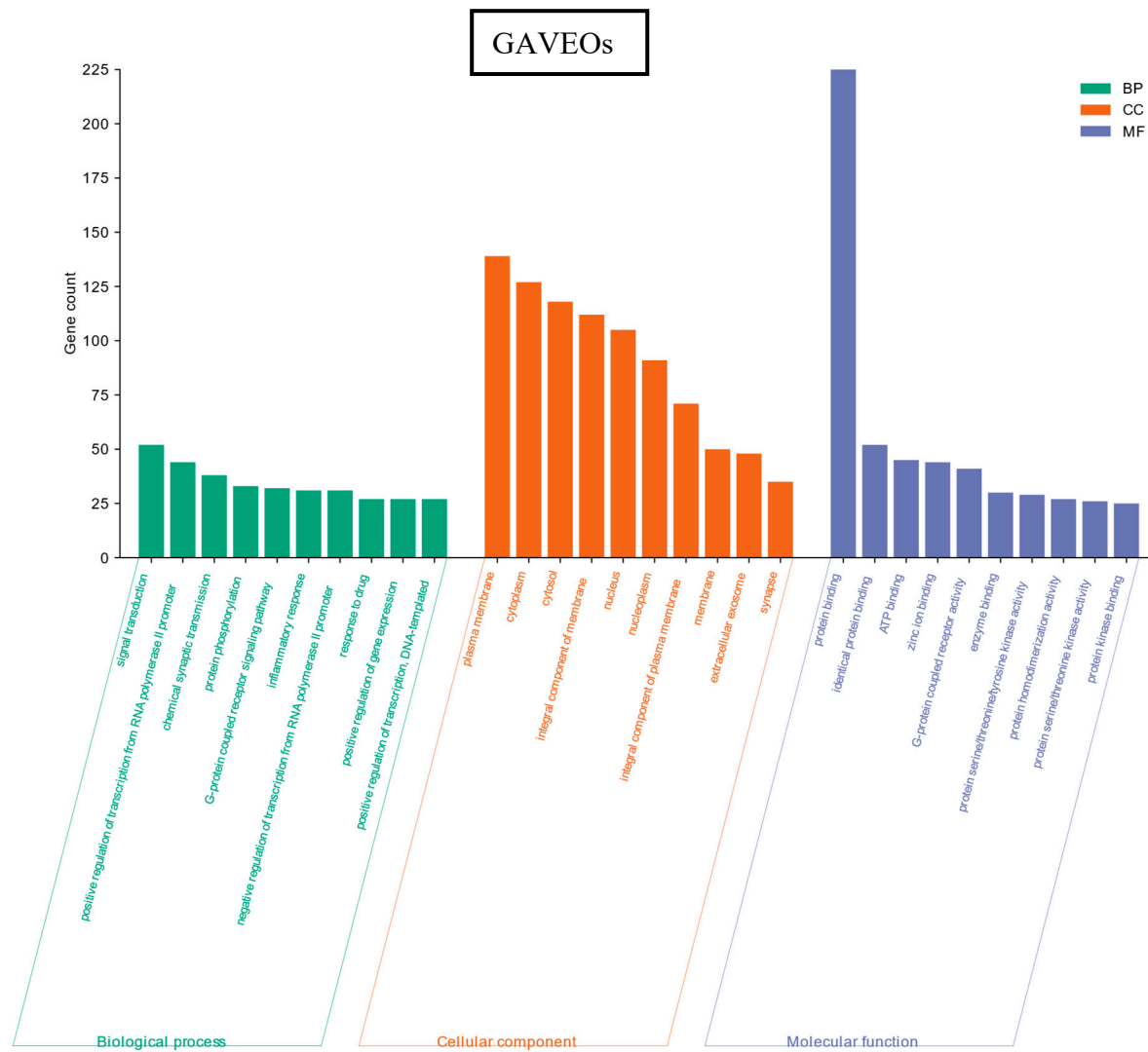


Figure S3. R cluster analysis. The related ingredients, targets and pathways information resulted in a data set which was converted to an igraph graph with “igraph” software package. Different communities were marked in different colors by a R_rainbow, and nodes with similar colors have higher associativity.







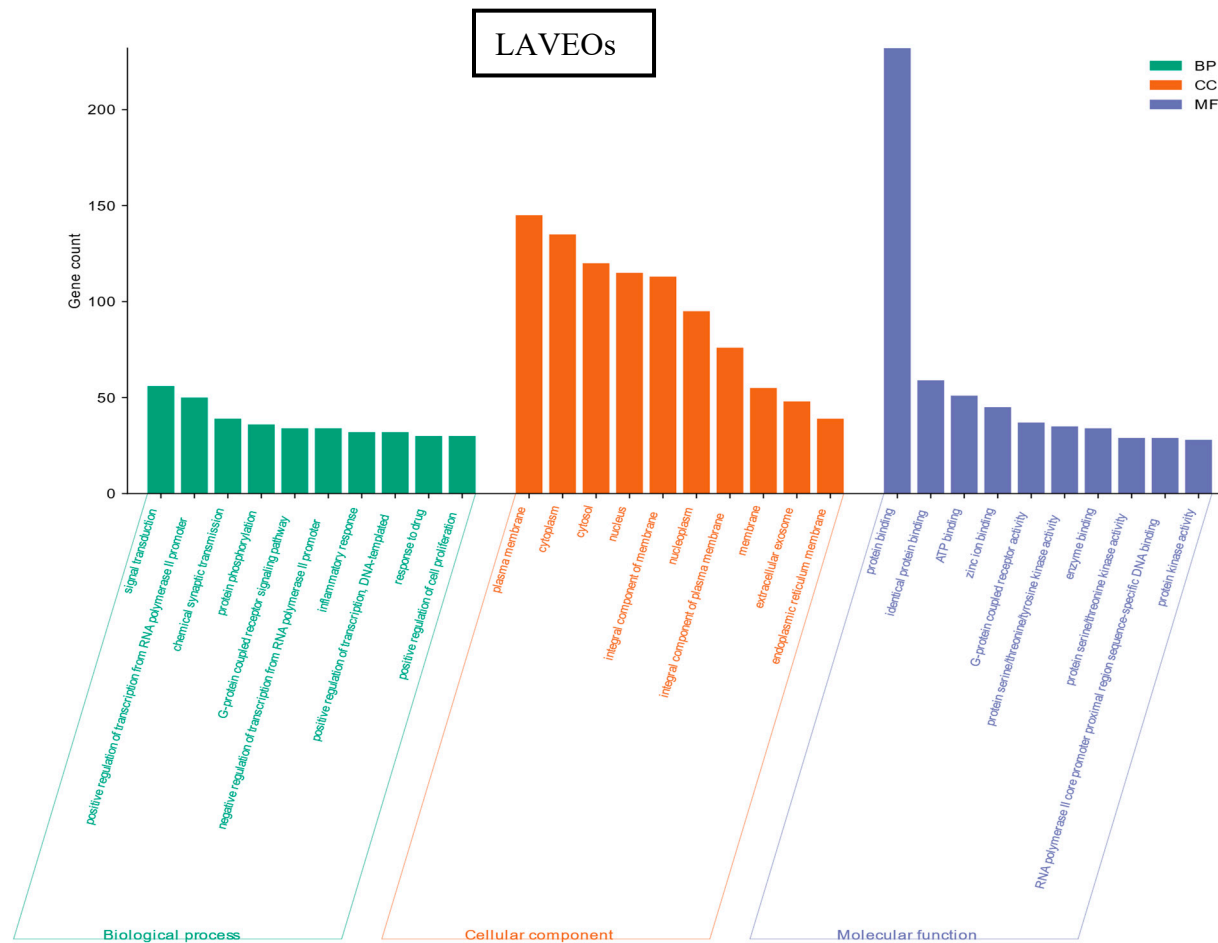


Figure S4. Gene Ontology (GO) analysis. Main Gene Ontology terms enriched by major hubs from cluster Profiler. The top 10 terms of BP, MM, and CC measured by adjusted value were selected to demonstrate.

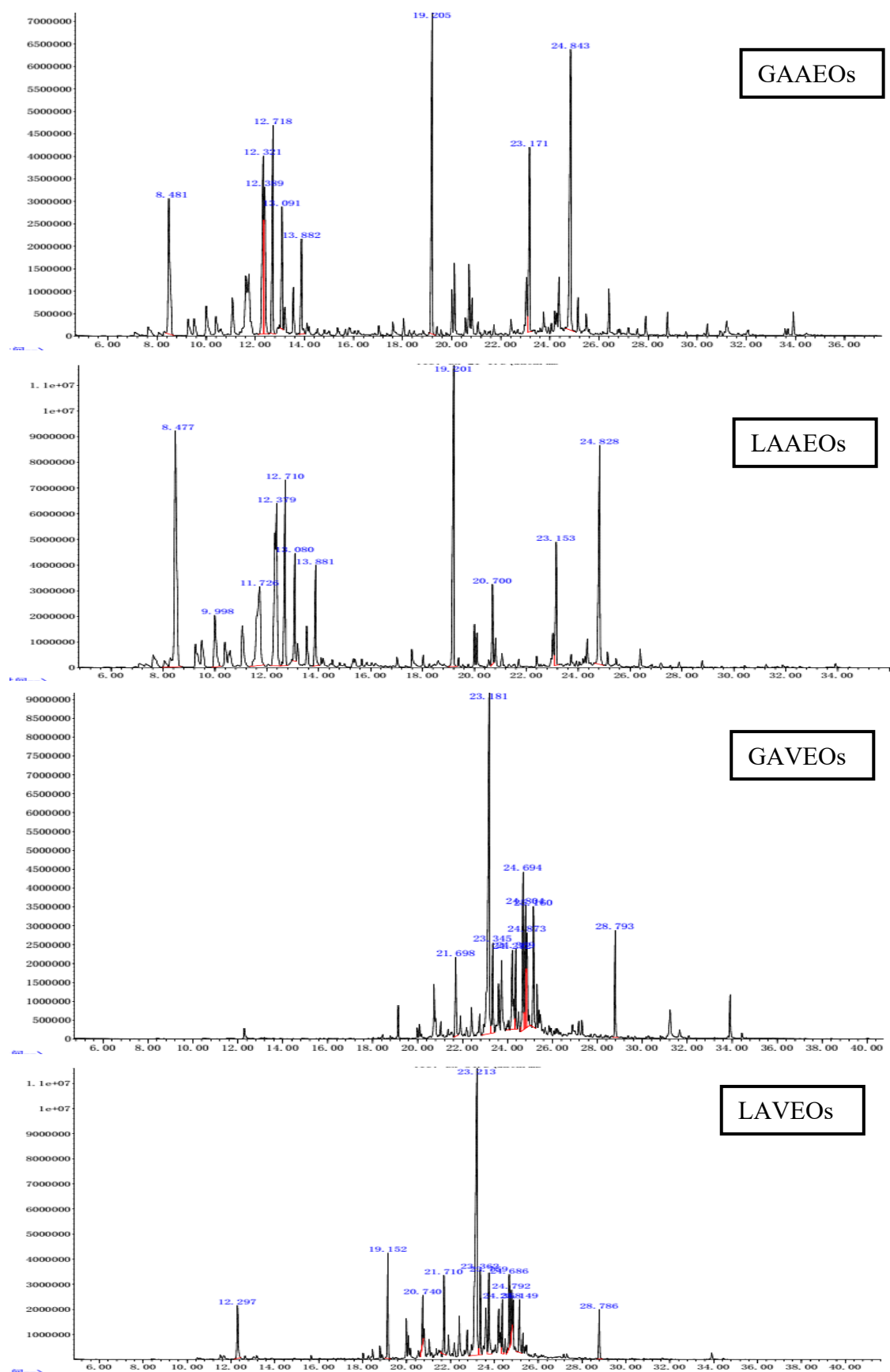


Figure S5 Total Ions Chromatograms (TIC) of EOs from *Artemisia*.