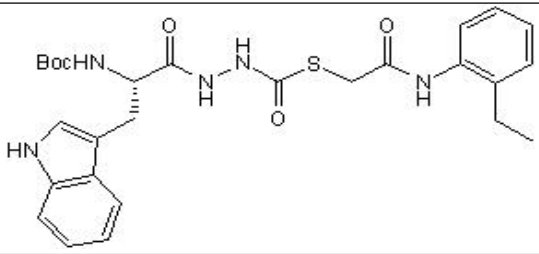
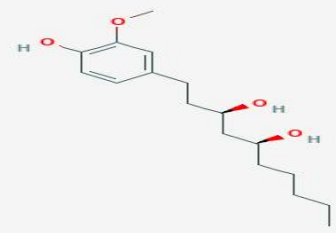
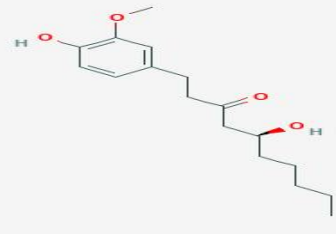
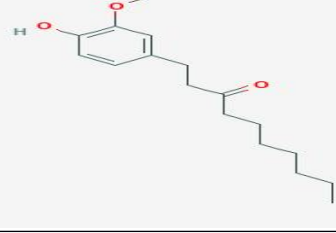
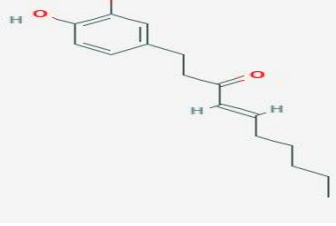
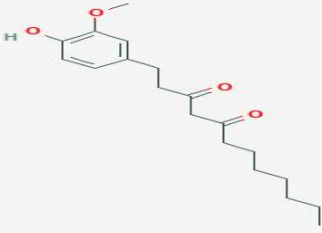
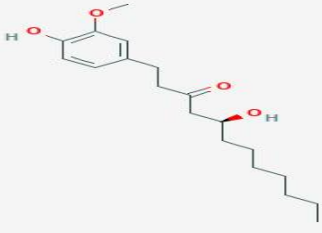
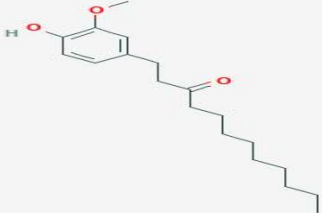
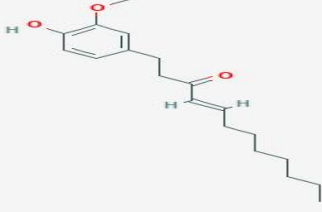
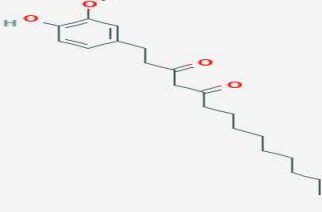
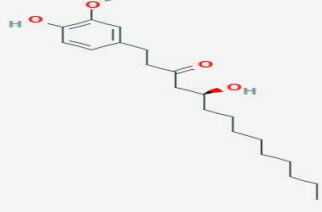
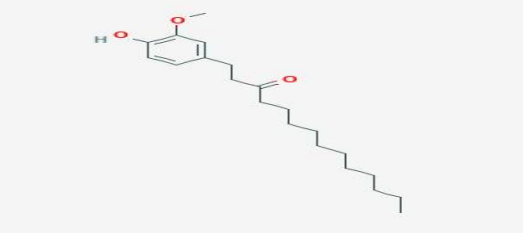
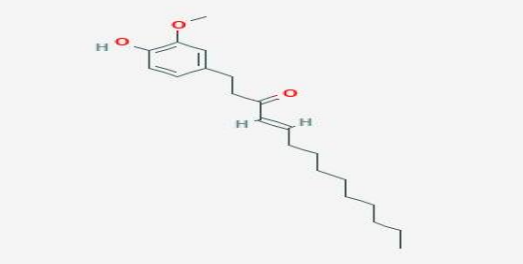
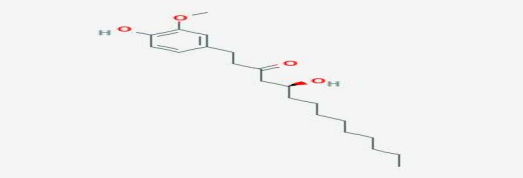
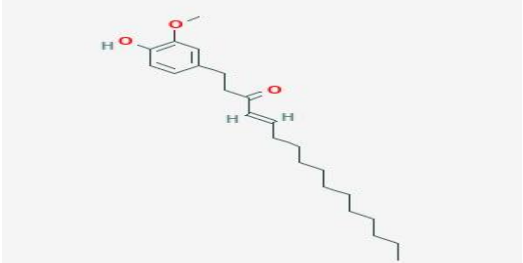
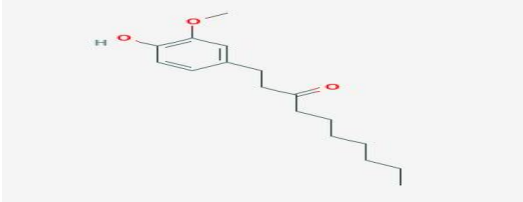
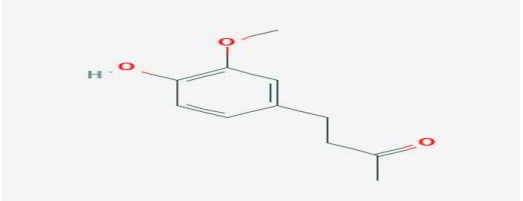


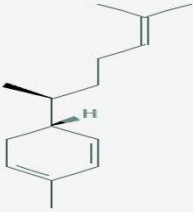

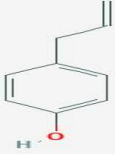
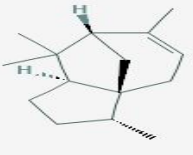
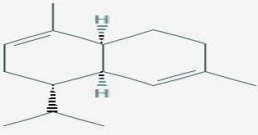

Supplementary Tables

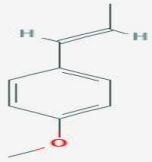
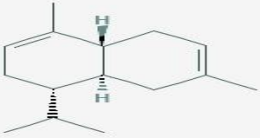
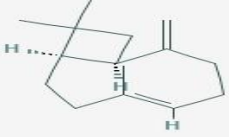
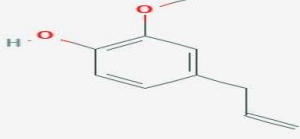
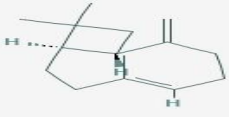


Supplementary Table 1. Binding energy of bioactive constituents of long pepper, ginger, clove and black pepper


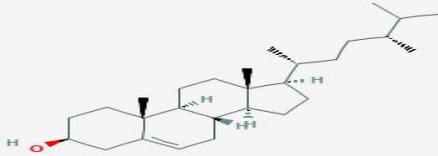
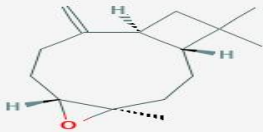

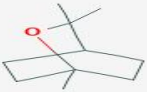
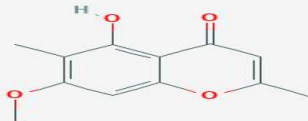
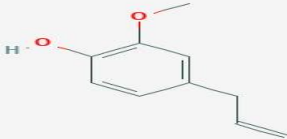
Chemical name	Chemical structure	Binding energy
<i>N</i> -[(1,1-Dimethylethoxy)carbonyl]-L-tryptophan-2-[[[2-[(2-ethylphenyl)amino]-2-oxoethyl]thio]carbonyl]hydrazide (CID 16725315)		-9.2
Ginger		
6 gingerdiol (CID 11369949)		-7.1
6 gingerol (CID 442793)		-7.0
(6 paradol CID 94378)		-5.3
6 shagaol (CID 5281794)		-6.2

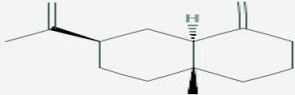



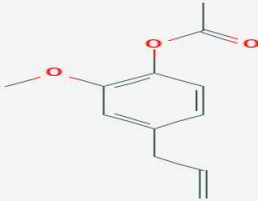
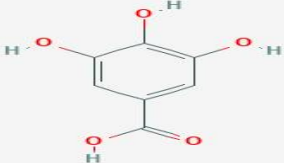

8 gingerdione (CID 14440537)		-6.3
8 gingerol (CID 168114)		-4.7
8 paradol (CID 213821)		-6.0
8 shogaol (CID 6442560)		-6.3
10 Gingerdione(CID 14440539)		-6.4
10 Gingerol (CID 168115)		-5.7

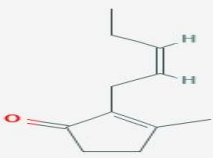
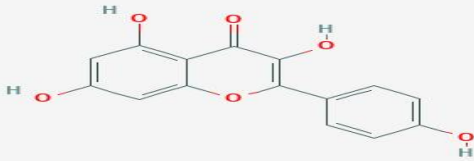
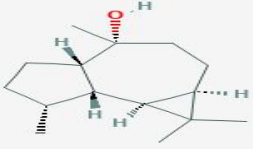
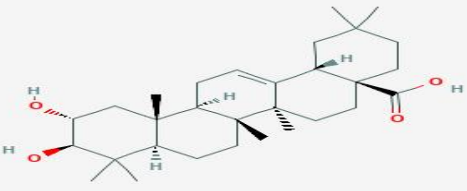
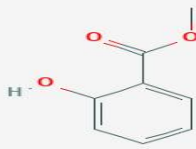
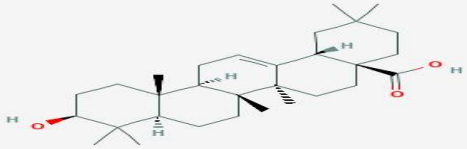
10 paradol (CID 51352076)		-5.7
10 shagaol (CID 6442612)		-5.4
12 gingerol (CID 168115)		-5.9
12 shagaol (CID 9975813)		-6.0
6 PARADOL (94378)		-5.6
Zingerone (CID 31211)		-5.7

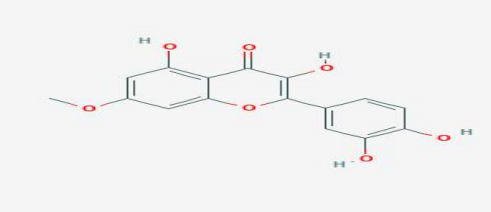
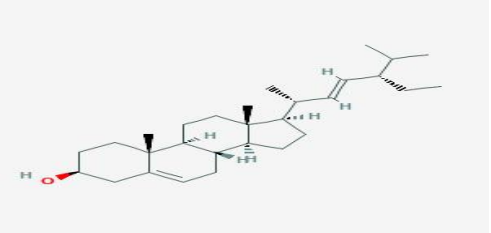
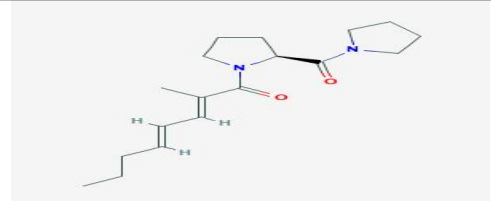
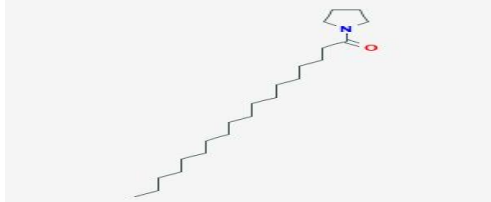

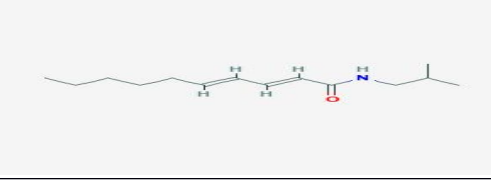

Zingiberene (CID 92776)		-7.2
Clove		
4-Allylanisole (CID 8815)		-4.9
4-Allylphenol (CID 68148)		-5.5
Alpha Cedrene (CID 6431015)		-8.0
Alpha Muurolene (CID 12306047)		-7.6
Alpha Pinene (CID 10657)		-5.1

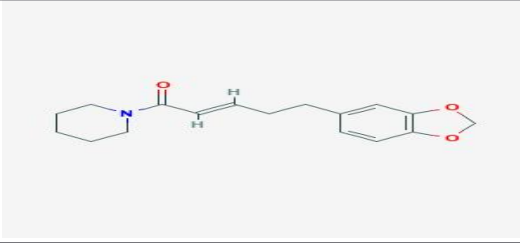
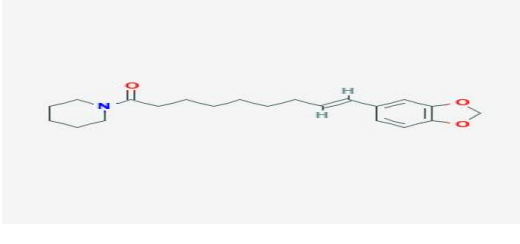
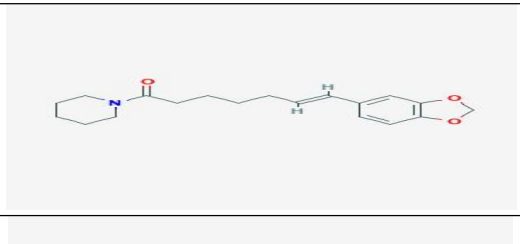
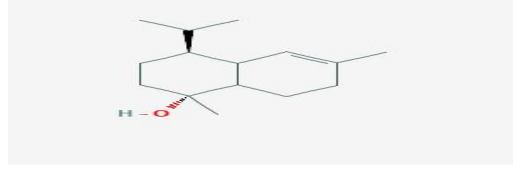
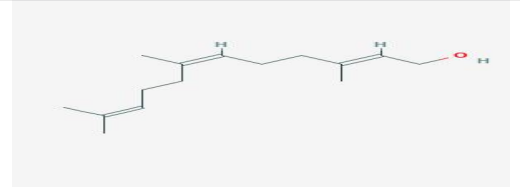
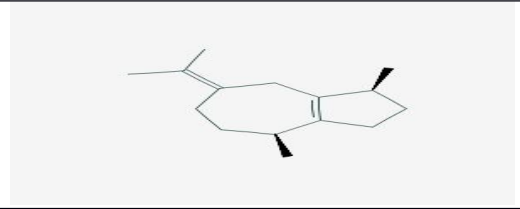
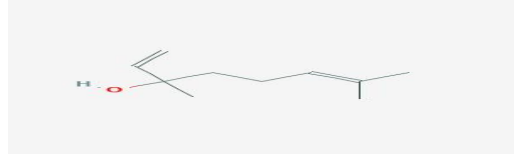

Anethol (CID 637563)		-4.8
B Cadinene (CID 10657)		-8.0
Beta_Caryophyllene (CID 5281515)		-5.2
Beta Caryophyllene (CID 3314)		-5.7
Beta Caryophyllene (CID 5281515)		-6.2
Beta Copaene (CID 87529)		-6.8
Beta Pinene (CID 14896)		-5.2

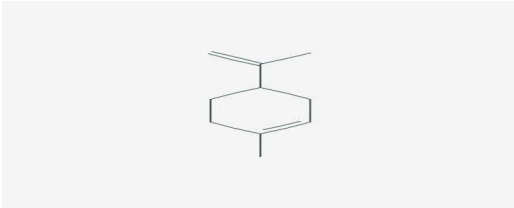

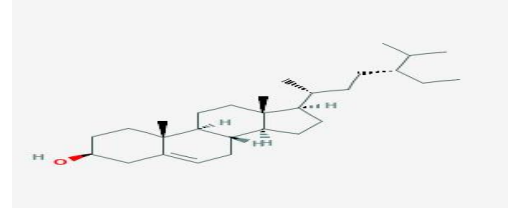
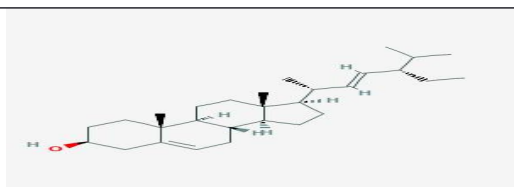
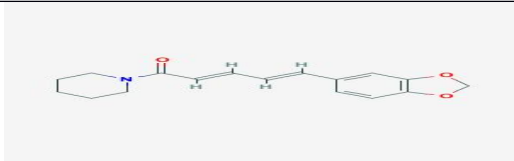
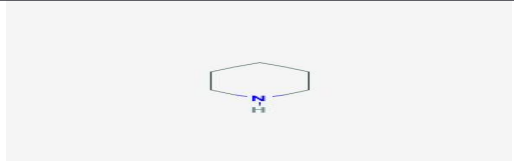
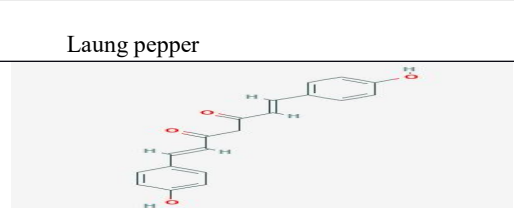
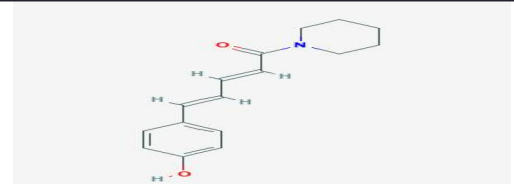
beta Silinene (CID 10856614)		-6.8
Campesterol (CID 173183)		-8.1
Cryophylleneoxide (CID 1742210)		-6.5
Copaene (CID 19725)		-6.9
Eucalyptol (CID 2758)		-6.1
Eugenitin (CID 3083581)		-7.5
Eugenol (CID 3314)		-5.3

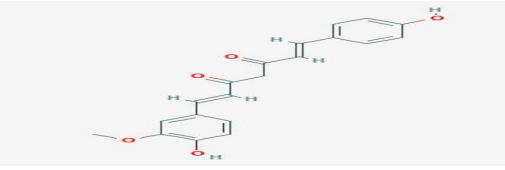
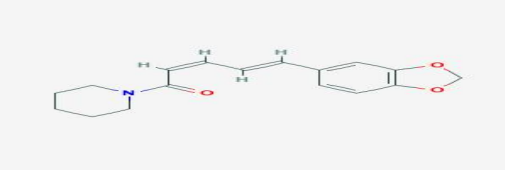
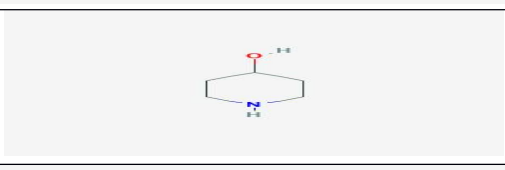
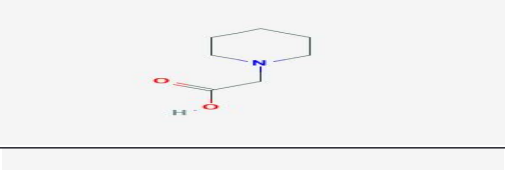
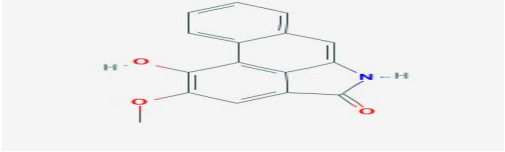
BETA SELININE (CID 442393)		-6.9
Cryophylleneoxide (CID 1742210)		-6.5
Copaene (CID 19725)		-6.9
Eucalyptol (CID 2758)		-6.1
Eugenylacetate (CID 7136)		-6.0
Gallic acid (CID 370)		-6.5
Globulol (CID 12304985)		-6.7

Jasmone (CID 1549018)		-6.0
Kaempferol (CID 5280863)		-9.3
Ledol (CID 92812)		-6.4
Maslinic acid (73659)		-8.3
Methyl Salicylate (CID 4133)		-5.0
Oleonolic acid (CID 10494)		-8.0

Rhamnetin (CID 5281691)		-8.9
Stigmasterol (CID 5280794)		-7.9
Black pepper		
(2E,4E)-2-Methyl-1-[(S)-2-(pyrrolidine-1-carbonyl)-pyrrolidin-1-yl]-octa-2,4-dien-1-one (CID 44292388)		-6.7
(2E)-octadecanoyl] pyrrolidine (CID 574659)		-3.8
Hexadecanoylpyrrolidine (CID 247220)		-6.4
Pellitorine (CID 5318516)		-5.1
Piperettine (CID 341140014)		-6.6

Piperanine (CID 5320618)		-7.9
Piperolein B (CID 21580213)		-6.8
Piperolein A (CID 11141599)		-7.6
6-cadinol (CID 6428423)		-6.6
(E,Z)-Farnesol (CID 1549109)		-4.9
beta-Guaiene (CID 15560252)		-7.4
Linalool CID 6549)		-4.9
Limonene (CID 22311)		-6.1

Sabinene (CID 10887971)		-6.1
beta-Pinene (CID 14896_)		-5.8
b-sitostero (CID 222284)		-6.6
Stigmasterol (CID 5280794)		-7.9
Piperine (CID 638024)		-6.8
PIPRIDINE (CID 8082)		-3.9
Laung pepper		
Bisdemethoxycurcumin (CID 5315472)		-8.5
Coumaperine (CID 10131321)		-7.8

demethoxycurcumin (CID 5469424)		-6.4
Isopiperine (CID 1548913)		-8.0
Piperidin-4-ol (CID 79341)		-4.2
Piperidine, 1-(5-(1,3-benzodioxol-5-yl)-1-oxo-2,4-pentadienyl) (CID 4840)		-6.5
Piperolactam A (CID 3081016)		-9.4

Supplementary Table 2. “Lipinski’s rule of five” for the bioactive constituents of ginger, clove, long pepper and black pepper targeting human cathepsin L protease

S.no.	Compound	Molecular weight	HBD	HBA	TPSA	Water solubility	Lipophilicity	Druglikeness
Ginger								
1.	6 gingerdiol (CID 11369949)	296.40g/mol	3	4	69.92Å	soluble	3.13	0.55
2	6 gingerol (CID 442793)	294.39g/mol	2	4	66.76 Å	Moderate soluble	3.13	0.55
3	8gingerdione (CID 14440537)	320.42g/mol	1	4	63.60 Å	Moderate soluble	3.81	0.55
4	10 gingerdione (CID 14440539)	348.48g/mol	1	4	63.60 Å	Poor soluble	4.58	0.55
5	10 Paradol (CID 51352076)	334.49g/mol	1	3	46.53 Å	Poor soluble	5.39	0.55
6	10 shagaol (CID 6442612)	332.48/mol	1	3	46.53 Å	Poor soluble	5.24	0.55
7	6 Paradol (CID 94378)	278.39/mol	1	3	46.53 Å	Moderate soluble	3.96	0.55
8	Zingiberene (CID 92776)	204.35/mol	0	0	0 Å	soluble	4.47	0.55
Clove								
9	Alpha Cedrene (CID 6431015)	204.35/mol	0	0	0 Å	soluble	4.36	0.55
10	Alpha muurolene (CID 12306047)	204.35g/mol	0	0	0 Å	soluble	4.08	0.55

11	Beta cadinene(CID 10657)	204.35g/mol	0	0	0 Å	soluble	4.06	0.55
12	Eugenitin (CID 3083581)	220.22g/mol	1	4	59.67 Å	soluble	2.12	0.55
13	Eugenol (CID 3314)	164.20g/mol	1	2	29.46 Å	soluble	2.25	0.55
14	Jasmone (CID 1549018)	164.24g/mol	0	1	17.07 Å	soluble	2.74	0.55
15	Kaempferol (CID 5280863)	286.24g/mol	4	6	111.13 Å	soluble	1.58	0.55
16	Rhamnetin (CID 5281691)	316.26g/mol	4	7	120.36 Å	soluble	1.63	0.55
Long pepper								
17	Bisdemethoxycurcumin (CID 5315472)	308.3g/mol	2	4	74.60 Å	soluble	2.83	0.55
18	Caumaperine (CID 10131321)	257.33g/mol	1	2	40.54 Å	soluble	2.74	0.55
19	PiperolactanA (CID: 30810116)	265.26g/mol	2	3	62.32Å	soluble	2.85	0.55
Black pepper								
21	Piperolein B (CID 21580213)	343.46 g/mol	0	3	38.77Å	Moderate soluble	4.47	0.55
22	Sabinene (CID 10887971)	136.23 g/mol	0	0	0.00 Å	Soluble	3.25	0.55
20	(2E,4E)-2-Methyl-1-[(S)-2-(pyrrolidine-1-carbonyl)-pyrrolidin-1-yl]-octa-2,4-dien-1-one (CID 44292388)	304.43g/mol	0	2	40.62Å	Soluble	2.79	0.55

Supplementary Table 3. Toxicity evaluation of bioactive constituents of ginger, clove, long pepper and black pepper

Compounds	Mutagenic	Tumorigenic	Irritant	Reproductive Effect
Ginger				
6 gingerdiol (CID 11369949)	None	None	None	None
6 gingerol (CID 442793)	None	None	None	None
8gingerdione (CID 14440537)	None	None	None	None
10gingerdione(CID14440539)	None	None	None	None
10 Paradol (CID 51352076)	None	None	None	None
10 shagaol(CID 6442612)	None	None	None	None
6 Paradol (CID 94378)	None	None	None	None
Zingiberene (CID 92776)	None	None	None	None
Clove				
AlphaCedrene (CID 6431015)	None	None	None	None
Alpha muurolene (CID 12306047)	None	None	None	None
Beta cadinene (CID 10657)	None	None	None	None
Eugenitin (CID 3083581)	None	None	None	None
Eugenol (CID 3314)	None	None	None	None
Jasmone (CID 1549018)	None	None	None	None

Kaempferol (CID 5280863)	None	None	None	None
Rhamnetin (CID 5281691)	None	None	None	None
Long pepper				
Bisdemethoxycurcumin (CID 5315472)	None	None	None	None
Caumaperine (CID 10131321)	None	None	None	None
PiperolactanA(CID30810116)	None	None	None	None
Black pepper				
Piperolein B (CID 21580213)	None	None	None	None
Sabinene (CID 10887971)	None	None	None	None
(2E,4E)-2-Methyl-1-[(S)-2-(pyrrolidine-1-carbonyl)-pyrrolidin-1-yl]-octa-2,4-dien-1-one (CID 44292388)	None	None	None	None