

Table 1 - Quantitative Microscopy of *C. retusa*

S. No.	Parameters Analysed	Observations /sq. mm	
		Range	Mean \pm SD
1	Stomatal Number – Adaxial epidermis	210 – 240	23.5 \pm 17.32
2	Stomatal Index – Adaxial epidermis	13.38 – 16.33	15.11 \pm 1.35
3	Vein islet number	4 – 8.4	6.88 \pm 1.73
4	Veinlet termination number	9.2 – 14.8	11.92 \pm 2.11
5	Palisade ratio	39 – 63	50.8 \pm 9.23

Table 2 - Physico-chemical parameters of *C. retusa*

S. No.	Parameters Analysed	Results in Mean % w/w (n = 3) ± SD		
		Root	Stem	Leaves
1	Foreign matter	Nil	Nil	Nil
2	Loss on drying at 105°C	8.23 ± 0.107	8.47 ± 0.076	10.19 ± 0.125
3	Ash	2.64 ± 0.227	2.63 ± 0.189	12.73 ± 0.155
4	Water soluble ash	1.76 ± 0.097	1.40 ± 0.121	7.48 ± 0.353
5	Acid insoluble ash	0.76 ± 0.130	0.079 ± 0.012	1.13 ± 0.098
6	Alcohol soluble extractives	3.69 ± 0.162	2.35 ± 0.272	2.35 ± 0.201
7	Water soluble extractives	8.37 ± 0.197	6.17 ± 0.101	16.69 ± 0.295

Table 3 – Analysis of microbial load of *C. retusa*

Name of Bacteria	CFU/g			Permissible Limits for Internal Use (WHO Limits)
	Root	Stem	Leaves	
Total bacterial count	1.5 x 10 ³	3 × 10 ²	0.5 × 10 ²	10 ⁵ CFU/g
Total fungal count	1 x 10 ²	Nil	Nil	10 ³ CFU/g
<i>Enterobacteriaceae spp.</i>	Nil	Nil	Nil	10 ¹ CFU/g
<i>Salmonella spp.</i>	Nil	Nil	Nil	Nil
<i>Staphylococcus aureus</i>	Nil	Nil	Nil	Nil
<i>Escherichia coli</i>	Nil	Nil	Nil	Nil
<i>Pseudomonas Spp.</i>	Nil	Nil	Nil	Nil

CFU : Colony Forming Unit

Table 4 – Analysis of Heavy Metals of *C. retusa*

S. No.	Name of the elements	Results			Permissible Limits (The Ayurvedic Pharmacopoeia India, 2008) (ppm)
		Root	Stem	Leaves	
1	Lead	0.1521ppm	0.0751ppm	0.2513ppm	10 ppm (WHO)
2	Cadmium	ND	ND	ND	0.3 ppm (WHO)
3	Mercury	ND	ND	ND	3 ppm (API)
4	Arsenic	ND	ND	ND	1 ppm (API)

ppm : parts per million

Table 5 – Analysis of Aflatoxin for *C. retusa*

S. No.	Name of the elements	Results			Detection Limits
		Root	Stem	Leaves	
1	Aflatoxin B ₁	BDL	BDL	BDL	BDL (DL: 1.0 ppb)
2	Aflatoxin B ₂	BDL	BDL	BDL	BDL (DL 0.5 ppb)
3	Aflatoxin G ₁	BDL	BDL	BDL	BDL (DL 1.0 ppb)
4	Aflatoxin G ₂	BDL	BDL	BDL	BDL (DL 0.5 ppb)

BDL: Below Detectable Limit DL -Detectable Limit ppb: Parts per billion

Table 6 - Analysis of Pesticidal residues of *C. retusa*

HCH (all isomers)	- Not detected
DDD (all isomers)	- Not detected
DDE (all isomers)	- Not detected
Aldrin	- Not detected
Dieldrin	- Not detected
Chlordane (cis & tans)	- Not detected
Alachlor	- Not detected
Azinphos-methyl	- Not detected
Chlorfenvinphos	- Not detected
Endosulphan (all isomers)	- Not detected
Endrin	- Not detected
Chlorpyrifos	- Not detected
Chlorpyrifos-methyl	- Not detected
Cypermethrin	- Not detected
DDT (all isomers)	- Not detected
Deltamethrin	- Not detected
Diazinon	- Not detected
Dichlorvos	- Not detected
Ethion	- Not detected
Fenitrothion	- Not detected
Fenvalerate (sum of isomers)	- Not detected
Heptachlor	- Not detected
Hexachlorobenzene	- Not detected
Lindane (gamma-HCH)	- Not detected
Malathion	- Not detected
Parathion methyl	- Not detected
Permethrin	- Not detected
Phosalone	- Not detected
Pirimiphos methyl	- Not detected
Limit of Quantification (LOQ) – 0.01mg/kg	
ND – Not detected	

Table 7 - Preliminary phytoconstituents of *C. retusa* (alcohol extract)

S.No	Test	Root	Stem	Leaves
1.	Flavanoid	+	+	+
2.	Phenol	+	+	+
3.	Alkaloid	+	+	+
4.	Triterpenoid	+	+	+
5.	Steroid	+	+	+
6.	Amino acid	+	+	+
7.	Coumarin	+	+	+
8.	Glycoside/Sugar	+	+	+
9.	Tannin	+	+	+
10.	Quinone	+	+	+
11.	Carboxylic acids	-	-	-
12.	Furanoid	-	-	-
13.	Saponins	-	-	+
	+ = Presence		- = Absence	

Table 8 – R_f Values of Petroleum ether extract of root, stem and leaves at 254nm

Solvent system	R_f Values		
	Root	Stem	Leaves
Toluene : Ethyl acetate (9 : 1)	0.77 Green	0.61 Green	0.56 Green
	0.55 Green	0.56 Green	0.40 Green
	0.48 Green		0.17 Green
	0.41 Green		0.11 Green
	0.33 Green		
	0.22 Green		
	0.14 Green		
	0.12 Green		

Table 9 – R_f Values of Petroleum ether extracts of root, stem and leaves at 366nm

Solvent system	R_f Values		
	Root	Stem	Leaves
Toluene : Ethyl acetate (9 : 1)	0.91 Violet	0.57 Green	0.90 Red
	0.78 Violet	0.51 Fluorescent blue	0.58 Red
	0.55 Dark violet	0.40 Red	0.52 Red
	0.49 Fluorescent blue	0.18 Red	0.49 Fluorescent blue
	0.39 Blue		0.40 Red
	0.35 Blue		0.36 Red
	0.19 Blue		0.31 Red
	0.09 Violet		0.26 Red
			0.21 Red
			0.18 Red

Table 10 – R_f Values of Petroleum ether extracts of root, stem and leaves after derivatization with Vanillin –Sulphuric acid

Solvent system	R_f Values		
	Root	Stem	Leaves
Toluene : Ethyl acetate (9 : 1)	0.82 Grey	0.81 Grey	0.83 Grey
	0.56 Green	0.52 Violet	0.76 Violet
	0.51 Violet	0.36 Violet	0.64 Violet
	0.47 Grey	0.25 Violet	0.57 Green
	0.36 Violet	0.12 Violet	0.51 Violet
	0.29 Violet		0.41 Grey
	0.16 Grey		0.36 Violet
			0.26 Violet
			0.18 Grey
			0.12 Violet

Table 11 - R_f Values of Chloroform extract of root, stem and leaves at 254nm

Solvent system	R_f Values		
	Root	Stem	Leaves
Toluene : Ethyl acetate (9 : 1)	0.91 Green	0.93 Green	0.92 Green
	0.75 Green	0.75 Green	0.72 Green
	0.54 Green	0.54 Green	0.57 Green
		0.32 Green	0.32 Green

Table 12 - R_f Values of Chloroform extract of root, stem and leaves at 366nm

Solvent system	R_f Values		
	Root	Stem	Leaves
Toluene : Ethyl acetate (9 : 1)	0.78 Violet	0.89 Blue	0.57 Red
		0.78 Violet	0.51 Red
		0.57 Red	0.49 Red
		0.51 Red	0.41 Red
		0.49 Blue	0.35 Red
		0.41 Red	0.32 Red
		0.32 Red	0.28 Red
		0.17 Red	0.17 Red

Table 13 - R_f Values of Chloroform extract of root, stem and leaves after derivatization with Vanillin –Sulphuric acid

Solvent system	R_f Values		
	Root	Stem	Leaves
Toluene : Ethyl acetate (9 : 1)	0.76 Light green	0.76 Violet	0.76 Violet
	0.53 Violet	0.55 Green	0.57 Light green
		0.50 Grey	0.50 Grey
		0.35 Grey	0.45 Grey
		0.26 Grey	0.35 Grey
		0.16 Grey	0.23 Grey
			0.17 Grey

Table 14 - R_f Values of Alcohol extracts of root, stem and leaves at 254nm

Solvent system	R_f Values		
	Root	Stem	Leaves
Chloroform : Methanol (8 : 2)	0.80 Green	0.68 Green	0.69 Green
	0.69 Green	0.47 Green	0.61 Green
	0.58 Green	0.13 Green	0.13 Green
	0.50 Green		
	0.44 Green		
	0.36 Green		
	0.13 Green		

Table 15 - R_f Values of Alcohol extracts of root, stem and leaves at 366nm

Solvent system	R_f Values		
	Root	Stem	Leaves
Chloroform : Methanol (8 : 2)	0.57 Light blue	0.57 Light blue	0.57 Light blue
	0.49 Fluorescent blue	0.49 Fluorescent blue	0.49 Light blue
	0.44 Fluorescent blue	0.41 Fluorescent blue	0.13 Blue
	0.27 Fluorescent blue	0.19 Blue	
	0.21 Blue	0.10 Fluorescent blue	
	0.10 Fluorescent blue		

Table 16 - R_f Values of Alcohol extract of root, stem and leaves after derivatization with Vanillin –Sulphuric acid

Solvent system	R_f Values		
	Root	Stem	Leaves
Chloroform : Methanol (8 : 2)	0.77 Grey	0.77 Grey	0.77 Grey
	0.71 Grey	0.71 Grey	0.71 Grey
	0.57 Grey	0.48 Grey	0.49 Grey
	0.49 Dark green	0.43 Grey	0.37 Grey
	0.45 Dark green	0.37 Grey	0.11 Light grey
	0.37 Grey	0.11 Dark grey	
	0.13 Dark grey		

Table 17 - Effect of alcohol extract of *Carmona retusa* on thermal stimulus (Hot plate - Analgesic activity)
ANOVA for significant difference among groups.

S. No.	Groups	Treatment	Initial response time (sec)	Mean response time in seconds (Mean \pm SEM)					Percentage increase in reaction time				
				30 min	60 min	90 min	120 min	180 min	30 min	60 min	90 min	120 min	180 min
1	Group I	Control	4.257 ^{ab} (0.073)	4.310 ^a (0.312)	4.557 ^a (0.156)	4.698 ^a (0.202)	4.432 ^a (0.443)	4.350 ^a (0.194)	-	-	-	-	-
2	Group II	Standard	4.380 ^{ab} (0.367)	10.457 ^c (1.167)	11.353 ^d (0.950)	10.260 ^c (0.068)	9.723 ^f (1.052)	8.942 ^e (0.136)	138.81	159.13	134.25	121.92	104.11
3	Group III	AERCR 50mg/kg	4.940 ^{ab} (0.941)	7.433 ^b (0.628)	7.862 ^{bc} (0.538)	7.338 ^{bcd} (0.536)	6.868 ^{cde} (0.149)	6.412 ^{cd} (0.838)	50.40	59.11	48.58	39.01	29.76
4	Group IV	AERCR 100mg/kg	5.112 ^b (0.150)	8.612 ^{bc} (0.848)	9.042 ^c (0.986)	8.520 ^{cde} (1.126)	7.285 ^{de} (0.279)	6.800 ^d (0.459)	68.49	76.91	66.73	42.66	33.07
5	Group V	AERCR 200mg/kg	5.250 ^b (0.561)	9.338 ^{bc} (0.922)	9.233 ^c (0.778)	9.010 ^{de} (0.983)	8.243 ^e (0.068)	7.442 ^d (0.483)	77.90	75.81	71.62	56.95	41.71
6	Group VI	AESCR 50 mg/kg	4.862 ^{ab} (0.460)	7.400 ^b (0.116)	6.933 ^b (0.153)	6.132 ^{ab} (.517)	5.572 ^{abc} (0.503)	5.093 ^{ab} (0.603)	52.26	42.59	26.13	14.61	4.73
7	Group VII	AESCR 100 mg/kg	3.510 ^a (0.019)	7.873 ^b (0.759)	7.222 ^b (0.052)	4.862 ^a (0.460)	7.400 ^{de} (0.116)	6.933 ^d (0.153)	58.35	45.27	32.39	25.15	10.87
8	Group VIII	AESCR 200 mg/kg	5.035 ^{ab} (0.615)	8.350 ^b (0.458)	7.513 ^{bc} (0.678)	6.945 ^{bc} (0.409)	6.380 ^{bcd} (0.549)	6.262 ^{abc} (0.071)	66.33	49.60	38.45	27.09	24.70
9	Group IX	AELCR 50 mg/kg	4.230 ^{ab} (0.247)	7.273 ^b (0.070)	7.008 ^b (0.450)	6.180 ^{ab} (0.652)	5.220 ^{ab} (0.056)	4.862 ^a (0.460)	71.87	65.72	46.10	23.40	5.91
10	Group X	AELCR 100 mg/kg	4.612 ^{ab} (0.598)	7.540 ^b (0.946)	7.132 ^b (0.426)	6.260 ^{ab} (0.595)	5.373 ^{abc} (0.454)	4.893 ^a (0.229)	63.56	54.60	35.79	16.49	6.07
11	Group XI	AELCR 200 mg/kg	4.272 ^{ab} (0.079)	8.153 ^b (0.043)	7.248 ^b (0.059)	6.520 ^{ab} (0.510)	5.933 ^{abcd} (0.789)	5.303 ^{abc} (0.066)	90.87	69.56	52.69	33.33	24.12
	F Value		1.230	4.992	8.774	7.543	9.121	11.148					
	P Value		0.293 NS	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**					

- Note: 1. n=6 animals in each group.
2. The value within bracket refers to SEM.
3. ** denotes significant at 1% level.
4. Different alphabet among Groups denotes significant at 5% level using Duncan Multiple Range Test (DMRT).

Table 18 - Effect of alcohol extract of *Carmona retusa* on acute inflammation
ANOVA for significant difference among groups.

S. No.	Groups	Treatment	Increase in paw volume (ml) (Mean + SEM)					Inhibition of oedema (%)
			1 st hr	2 nd hr	3 rd hr	4 th hr	6 th hr	
1	Group I	Control	0.510 ^c (0.060)	0.884 ^d (0.065)	0.847 ^c (0.054)	0.786 ^c (0.071)	0.716 ^c (0.071)	
2	Group II	Standard	0.215 ^a (0.019)	0.307 ^a (0.032)	0.285 ^a (0.027)	0.266 ^a (0.025)	0.232 ^a (0.031)	67.60
3	Group III	AERCR 100mg/kg	0.411 ^{bc} (0.041)	0.674 ^c (0.026)	0.573 ^b (0.018)	0.496 ^b (0.033)	0.368 ^b (0.027)	48.60
4	Group IV	AERCR 200 mg/kg	0.366 ^b (0.023)	0.498 ^b (0.039)	0.522 ^b (0.038)	0.397 ^b (0.026)	0.325 ^{ab} (0.025)	54.61
5	Group V	AESCR 100 mg/kg	0.425 ^{bc} (0.025)	0.587 ^{bc} (0.021)	0.588 ^b (0.025)	0.433 ^b (0.012)	0.415 ^b (0.011)	42.04
6	Group VI	AESCR 200 mg/kg	0.396 ^{bc} (0.013)	0.594 ^{bc} (0.021)	0.463 ^b (0.015)	0.456 ^b (0.015)	0.357 ^b (0.013)	50.14
7	Group VII	AELCR 100 mg/kg	0.444 ^{bc} (0.046)	0.654 ^c (0.071)	0.585 ^b (0.062)	0.497 ^b (0.052)	0.427 ^b (0.037)	40.36
8	Group VIII	AELCR 200 mg/kg	0.495 ^c (0.043)	0.675 ^c (0.043)	0.517 ^b (0.064)	0.469 ^b (0.064)	0.389 ^b (0.043)	45.67
	F Value		6.119	14.307	13.678	11.710	14.516	
	P Value		<0.001**	<0.001**	<0.001**	<0.001**	<0.001**	

- Note: 1. n=6 animals in each group.
2. The value within bracket refers to SEM.
3. ** denotes significant at 1% level.
4. Different alphabet among Groups denotes significant at 5% level using Duncan Multiple Range Test (DMRT).

Table 19 - Effect of alcohol extract of *Carmona retusa* on excision wound model
ANOVA for significant difference among groups.

S. No.	Group	Treatment	Wound size (mm)					
			3 rd Day	5 th Day	7 th Day	9 th day	11 th Day	13 th Day
1	Group I	Control	3.920 ^d (0.017)	3.570 ^d (0.031)	3.108 ^f (0.010)	2.740 ^c (0.070)	1.922 ^g (0.016)	1.288 ^f (0.012)
2	Group II	Standard 0.2% w/w	2.537 ^a (0.207)	1.895 ^a (0.022)	1.173 ^a (0.060)	0.503 ^a (0.012)	0.045 ^a (0.007)	. (.)
3	Group III	AERCR 5% w/w	3.138 ^b (0.013)	2.317 ^{bc} (0.103)	1.700 ^{bc} (0.019)	1.218 ^b (0.075)	0.713 ^d (0.013)	0.236 ^b (0.033)
4	Group IV	AERCR 10% w/w	3.095 ^b (0.012)	2.237 ^b (0.185)	1.562 ^b (0.033)	0.532 ^a (0.040)	0.122 ^b (0.009)	0.033 ^a (0.006)
5	Group V	AESCR 5% w/w	3.308 ^{bc} (0.095)	2.625 ^c (0.123)	2.040 ^{de} (0.108)	1.440 ^c (0.129)	0.643 ^d (0.067)	0.490 ^c (0.040)
6	Group VI	AESCR 10% w/w	3.232 ^b (0.019)	2.678 ^c (0.192)	1.835 ^{de} (0.153)	1.215 ^b (0.014)	0.310 ^c (0.018)	0.275 ^b (0.019)
7	Group VII	AELCR 5% w/w	3.510 ^c (0.019)	2.660 ^c (0.077)	2.132 ^e (0.020)	1.688 ^d (0.012)	1.063 ^f (0.009)	0.882 ^e (0.026)
8	Group VIII	AELCR 10% w/w	3.323 ^{bc} (0.021)	2.597 ^c (0.071)	1.898 ^{cd} (0.019)	1.302 ^{bc} (0.015)	0.862 ^e (0.009)	0.730 ^d (0.017)
	F Value		22.855	17.319	61.869	135.419	522.437	313.567
	P Value		<0.001**	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**

- Note: 1. n=6 animals in each group.
2. The value within bracket refers to SEM.
3. ** denotes significant at 1% level.
4. Different alphabet among Groups denotes significant at 5% level using Duncan Multiple Range Test (DMRT).

Table 20 - Effect of alcohol extract of *Carmona retusa* ointments on excision wound (% Wound closure)

S. No.	Groups	Wound Healing Area in Percentage						
			3 rd Day	5 th Day	7 th Day	9 th Day	11 th Day	13 th Day
1	Control	(Petroleum jelly)	21.60	28.60	37.83	45.20	61.57	74.23
2	Nitrofurazone	0.2% w/w	49.30	62.10	76.53	89.93	99.10	-
3	Root	5% w/w	37.23	53.67	66.00	75.63	85.74	95.29
		10% w/w	38.10	55.27	68.77	89.37	97.55	99.30
4	Stem	5% w/w	33.83	47.50	59.20	70.87	87.13	90.20
		10% w/w	35.37	54.93	63.30	77.50	93.80	94.50
5	Leaf	5% w/w	29.80	46.80	57.37	66.23	78.73	82.37
		10% w/w	33.87	48.07	62.03	73.97	82.77	85.40

Table 21 – Antimicrobial activity of alcohol extract of *Carmona retusa*

S. No.	Organism	Root extract							Stem extract							Leaf extract						
		Standard	100mg	50mg	25mg	12.5mg	6.25mg	3.125mg	Standard	100mg	50mg	25mg	12.5mg	6.25mg	3.125mg	Standard	100mg	50mg	25mg	12.5mg	6.25mg	3.125mg
1	<i>Proteus vulgaris</i> NCIM 2857	14	14	12	12	10	10	-	-	-	-	-	-	-	-	15	15	14	14	12	12	-
2	<i>Enterobacter aerogens</i> NCIM 5139	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	12	11	10	10	-
3	<i>Escherichia coli</i> NCIM 2931	20	22	20	18	14	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	<i>Pseudomonas aeruginosa</i> NCIM 2945	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	<i>Klebsiela pneumonia</i> NCIM 2957	8	16	14	12	10	10	-	-	13	12	11	10	13	-	-	14	14	14	14	14	-
6	<i>Salmonella typhimurium</i> NCIM 2501	20	15	15	14	13	12	-	8	10	10	12	12	12	-	20	12	12	12	12	12	-
7	<i>Staphylococcus aureus</i> NCIM 5021	30	20	18	14	12	10	-	25	20	16	14	10	8	-	25	-	-	-	-	-	-
8	<i>Bacillus subtilis</i> NCIM 2197	25	25	18	16	15	14	-	24	22	20	15	14	12	-	22	14	12	11	10	9	-
9	<i>Bacillus cereus</i> NCIM 2458	25	22	20	14	12	10	-	20	18	16	14	10	8	-	45	8	8	-	-	-	-
10	<i>Candida albicans</i> NCIM 3471	30	20	18	16	14	12	-	30	20	18	15	14	14	-	32	-	-	-	-	-	-

Table 22 - Minimum Inhibitory Concentrations (MIC)

S. No.	Organism	Concentrations of the extracts					
		100mg/ml	50mg/ml	25mg/ml	12.5mg/ml	6.25mg/ml	3.125mg/ml
	Root extracts	+	+	+	+	+	-
1	<i>Proteus vulgaris</i> NCIM 2857	+	+	+	+	+	-
2	<i>Escherichia coli</i> NCIM 2931	+	+	+	+	+	-
3	<i>Klebsiela pneumonia</i> NCIM 2957	+	+	+	+	+	-
4	<i>Salmonella typhimurium</i> NCIM 2501	+	+	+	+	+	-
5	<i>Staphylococcus aureus</i> NCIM 5021	+	+	+	+	+	-
6	<i>Bacillus subtilis</i> NCIM 2197	+	+	+	+	+	-
7	<i>Bacillus cereus</i> NCIM 2458	+	+	+	+	+	-
8	<i>Candida albicans</i> NCIM 3471	+	+	+	+	+	-
	Stem extracts						
1	<i>Klebsiela pneumonia</i> NCIM 2957	+	+	+	+	+	-
2	<i>Salmonella typhimurium</i> NCIM 2501	+	+	+	+	+	-
3	<i>Staphylococcus aureus</i> NCIM 5021	+	+	+	+	+	-
4	<i>Bacillus subtilis</i> NCIM 2197	+	+	+	+	+	-
5	<i>Bacillus cereus</i> NCIM 2458	+	+	+	+	+	-
6	<i>Candida albicans</i> NCIM 3471	+	+	+	+	+	-
	Stem extracts						
1	<i>Proteus vulgaris</i> NCIM 2857	+	+	+	+	+	-
2	<i>Enterobacter aerogens</i> NCIM 5139	+	+	+	+	+	-
3	<i>Klebsiela pneumonia</i> NCIM 2957	+	+	+	+	+	-
4	<i>Salmonella typhimurium</i> NCIM 2501	+	+	+	+	+	-
5	<i>Bacillus subtilis</i> NCIM 2197	+	+	+	+	+	-
6	<i>Bacillus cereus</i> NCIM 2458	+	+	+	-	-	-

(+) – Presence of growth, (-) - Absence of growth
The results are the average of the triplicates