



Analgesic Activity of Hebbal Plants - A Review

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Received: 6 May 2024 / Accepted: 10 Jun 2024 / Published online: 01 Jul 2024

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ABSTRACT

India has a wealth of unexplored nutraceuticals or herbal medicines with a rich heritage of ancient medicinal knowledge. Though many thousands of plants have been already studied under Ayurveda, Unani and Homeopathy medicines agreed that a great number of medicinal plants are not yet studied. There is a need to understand the medicinal properties of plant and discovery of newer plants with their pharmacological activity. In the present review the total data of plants studied under analgesic activity are described for further study in this topic.

KEY WORDS:

Analgesic activity, Herbal drugs.

INTRODUCTION:

There are many medicinal plants which have the potency to treat ailments.¹ In this era medicinal plants have huge contribution and importance in the healthcare system which provide major source of medicine to worldwide population as they have both nutritive and medicinal values.² these medicinal plants consider as a rich resources of ingredients which can be used in drug development and synthesis.³ Several scientific investigations are done to isolate the active ingredient and they have highlighted the importance and the contribution of many plant families such as Asteraceae, Liliaceae, Apocynaceae, Solnaceae, Caesalpinaceae, Ritaceae, Piperaceae, Sapolaceae used as medicinal plants.⁴ Analgesics are the drugs that relieves pain.⁵ Pain is an uncomfortable sensory and spiritual practise that is related with real or possible tissue destruction.⁶ Pain is divided into 2 classes acute and chronic pain.⁷ Pain is the major expression of injuries and disease.⁸

Table 1:- showing summary of analgesic activity

S. no	Plant name and Family	Part	Extraction	Standard drug and Dose	Models	Animal	Parameter	Mechanism	Stats analysis	P-Value	Author	Year
1.	<i>Cissus Quadrangularis</i>	Whole Plant	Alcoholic Extraction	Indomethacin 100,200, 400 Mg /Kg	Tail Flick Test, Hot Plate Induced Pain	Swiss Albino Mice	Time latency of Jumping, paw licking,	Pain and swelling	-	P<0.05	Singh et al. ⁹	1964
2	<i>Tinospora Cordifolia</i>	Stem	Aqueous Extract	Morphine 100 and 120 mg/kg	Hot Plate Induce Pain	Swiss Albino Mice	Time latency of Jumping, paw licking.	Pain and swelling	one way ANOVA	P<0.05	Pendse et al ¹⁰	1977
3.	<i>Randia Dumetorum</i>	Seeds	Alcoholic Extract	Aspirin 50,100and 200mg/Kg	writhing Method, Hot Plate Induced Pain.	Wister Albino Rats	Abdominal constriction , extension of hind limb, Time latency of Jumping , paw licking	Pain and swelling	-	P<0.05	Ghosh et al. ¹¹	1983
4.	<i>Desmodium Gangiticum</i>	Roots	Hexane Extract	Phenylbutazone	Writhing Response	Swiss Albino Mice	Abdominal constriction,	Pain and swelling	-	P<0.01	Ghosh et al. ¹²	1983

				50and 100 Mg/Kg bw			extension of hind limb					
5.	<i>Hedychium Spicatum</i>	Rhizo mes	Ethanol Extract	Phenylbutazo ne 25,50,100 Mg/Kg bw I.P.	Hot Plate Method, Writhing Response	Swiss Albino Mice	Time latency of Jumping, paw licking, Abdominal constriction, extension of hind limb.	Pain and swelling	(ANOV A), by Dunnett' s “t” test	P<0.0 1	Shrimal et al ¹³ .	1984
6	<i>Vicoa Indica</i>	Aerial Parts	Chlorofo r m Extract	Aspirin 100mg /Kg	Writhing Method, Tail Flick, Tail Chip Test, Tail Immersion Method.	Wister Albino Rats	Abdominal constriction , extension of hind limb , Time latency of tail flicking or body coiling	Pain and inflammation	Student' s t-test	P<0.0 01	M. Khrishnav eni et al. ¹⁴	1997
7.	<i>Morind Alucida</i>	leaves	Methanol ic extract	Aspirin and pentazocin 25,50,100 and 200mg/kg	writhing, tail immersion method	Swiss albino mice	Abdominal constriction, hind limb extension.	Pain and swelling	One way ANOV A	P<0.0 05	S.O Awe et al ¹⁵	1997



8.	<i>Vitex Negundo</i>	Leaves	Methanolic Extract	Sodium salicylates 500mg/kg p.o and Pethidine 5 mg/kg s.c	Tail Immersion Test, Writhing test.	Adult Albino Rats	Abdominal constriction and hind limb extension	Pain	one-way ANOVA	P<0.05	R.S Telang et al. ¹⁶	1999
9.	<i>Anacardium occidentale</i>	leaves	Methanolic extract.	Pentazocine	Tail flick	-			-	P<0.05	S.P. Pawar et.al ¹⁷	1999
10.	<i>Madhuca Longifolia</i>	Flowers	Aqueous Extract	Nalozone 10,15,20&30 mg/Kg	Writhing , Tail Immersion Test	Wister Albino Rats	Abdominal constriction, hind limb extension.	Pain and swelling	-	P<0.05	Dhanish Chandra et al. ¹⁸	2001
11.	<i>Myristica Fragrance</i>	seeds	Hexane extract	Ibuprofen and pentazocin	writhing and hot plate method		-	Pain and swelling	-	P<0.05	Sonavane et al ¹⁹	2001
12.	<i>Dalbergia Sissoo</i>	Leaves	Alcoholic Extract	Aspirin 300mg /kg and pethidine 5mg/kg	Peripheral Activity- Writhing Response, Central Analgesic Activity- Hot Plate, Tail Chip Method	Swiss Albino Mice	Abdominal constriction , hind limb extension , Time latency of jumping , paw licking	Pain and swelling	students ' t-test	P<0.01	S.W Hajare et al ²⁰	2002



13.	<i>Spilanthes Acmella</i>	Aerial Parts	Aqueous Extract	Aspirin 50,100&150 mg/Kg and pethidine 5mg/kg	Writhing Method ,Tail Flick Method	Swiss Albino Mice	Abdominal constriction ,hind limb extension ,Time latency of tail flicking or body coiling	Pain and swelling	ANOV A followed by Dunnet' s test	P<0.0 5	A. Chakrabor ty et al ²¹	2004
14.	<i>Centella Assiatica</i>	Whole Plant	Aqueous Extract	Morphine 10,30,100,30 0 Mg/Kg bw I.P	Writhing Response, Hot Plate Method	Mice	Abdominal constriction , hind limb extension, Time latency of jumping and paw licking	Pain and swelling	ANOV A followed by Bonferr oni multiple compari son test.	P<0.0 5	Somchit MN et al. ²²	2004
15.	<i>Vitex Doniana</i> (Verbenaceae)	Leaves	Methanol ic Extract	Aspirin 50.100,150m g/Kg	Writhing Method	Adult Albino Rat	Abdominal constriction , hind limb extension	Pain and swelling	ANOV A, Fischer LSD post hoc test	P<0.0 5	Iwueke et al. ²³	2006

16.	<i>Sida Corifolia</i>	Roots	Methanolic Extract	Phenylbutazone 100,200,300 Mg/Kg	Writhing Method, tail flick method.	Wister Albino Rats	Abdominal constriction, hind limb extension, Time latency of jumping , paw licking	Pain and swelling	(ANOVA) followed by Dunnett's test	P<0.05	Sutradhar et al. ²⁴	2006
17.	<i>Kigelia Africana</i>	Stem	Ethanollic Extract	Aspirin 100,200&500 mg/Kg	Writhing Method, Hot Plate Method	Swiss Mice	Abdominal constriction , hind limb extension , Time latency of jumping and paw licking	Pain and swelling	student's t-test	P<0.001	Owolabi and Omogbai et al. ²⁵	2007
18.	<i>Carissa Edulis</i>	Root, Bark, Stem, Leaves , Fruits & Seeds	Aqueous Extract	Aspirin 50,100 And 150mg/Kg Bw	Tail Chip method, Writhing Method.	Swiss Albino Mice	Abdominal constriction , hind limb extension	Pain and swelling	student t-test	P<0.05	Ibrahim et al. ²⁶	2007
19.	<i>Securinega Virosa</i>	Roots & Bark	Methanolic Extract	Piroxicam 6.25,12.5&25 mg/Kg	Writhing Method, Hot Plate	Albino Rats	Abdominal constriction , hind limb	Pain and swelling	ANOVA followed	P<0.01	Magaji et al. ²⁷	2008

					Induced Pain , Formalin Test		extension, Time latency of jumping, paw licking		by Dunnett t-test.			
20.	Thymus satureioides, T. maroccanus and T. leptobotrys (Labiatae)	Stem And Bark	Aqueous , Ethanollic Extract	Aspirin 50,100,200& 300 mg/Kg	Formalin Test	Wistar Albino Rats	-	Pain and swelling	(ANOV A), followed by Student- Neuman -Keuls.	P<0.0 5	Elhabazi et al. ²⁸	2008
21.	<i>Crossopteryx Febrifuga</i> (Family Rubiaceae)	Fresh Stem Bark	Methanol ic Extract	Aspirin 25,50,100mg/ Kg Bw I.P	Writhing Response	Swiss Albino Mice.	-	Pain and swelling	student' s t-test.	P<0.0 5	Salawu et al. ²⁹	2008
22.	<i>Solanum Trilobatum</i> Linn	roots	Methanol ic	Pentazocine (5 mg/kg s.c.), indomethacin (10 mg/kg)	Hot plate and writhing	Wister rats 180- 200 g and albino mice (20-25 g).	-	Pain and swelling	(ANOV A) followed by Dunnett' s t -test	P- values less than 0.05	Annamalai Pandurang an et al ³⁰	2008



23.	<i>Datura Metel</i> Linn (Solanaceae)	Seeds	Aqueous Extract	pentazocin-	Writhing Method, Radiant Heat Tail Flick Model.	Albino Rats(Wister Strain)	Time latency of tail flicking	Pain and swelling	-	P>0.0 5	Wannang et al. ³¹	2009
24.	<i>Hippob Romus</i>	leaves	Aqueous extract	Indomethacin	Tail immersion and formaline induced pain.	Wister rat	-	-	Student t- test	P<0.0 5	Pendota et al ³²	2009
25.	<i>Lippia Multiflora</i>	Leaves	Methanol Extract	Aspirin 200&400mg/ Kg	Writhing Method.	Wister Albino Rats	Abdominal constriction	Pain and swelling	one way ANOV A and Duncan' s post HOC test	P<0.0 5	Jigam et al. ³³	2009
26.	<i>Oscillatoria Willei</i>	Cyano bacteri um	Ethanollic Extract	Morphine 50,100and 200mg/Kg	Writhing Method, Hot Plate Method.	Swiss Albino Mice	Abdominal constriction, hind limb extension ,Time latency of	Pain and swelling	-	P<0.0 5	Rajavel et al. ³⁴	2009

							jumping , paw licking					
27.	<i>Aphanamixis Polystachya</i>	Leaves	Methanol Extract	Diclofenac 250 And 500mg/Kg	Hot Plate Method, Tail Immersion Test, Writhing Method,	Swiss Albino Mice	Time latency of jumping, paw licking, Abdominal constriction, hind limb extension.	Pain and swelling	-	P<0.05	Hossain Et Al. ³⁵	2009
28.	<i>Bauhinia Purpurea Linn</i>	Stem	Ethanol Extract	Aspirin 50,100mg/Kg Bw	Writhing Response, hot plate method.	Swiss Albino Mice.	Abdominal constriction, hind limb extension.	Pain and swelling	-	P<0.01	Shreedhar a et al. ³⁶	2009
29.	<i>Cassia Sieberiana</i>	Roots	Aqueous Extract	Aspirin 30,100,300mg/Kg	Writhing Response	Swiss Albino Mice	Abdominal constriction, hind limb extension.	Pain and swelling	an analysis of variance	P<0.05	Yoro et al. ³⁷	2009
30.	<i>Stereospermum kunthianum</i>	Stam bark	Aqueous extract	Indomethacin 10mg/kg	writhing, the hot plate test, tail flick test, and formalin pain test	Mice			-	(p <0.05)	Ching et.al ³⁸	2009

31.	<i>Aralia Cordata</i>	roots	Methanolic extract	Aspirin	writhing	Wister albino rats	Abdominal constriction, hind limb extension.	Pain and swelling	-	P<0.05	Tae doo kim et al. ³⁹	2010
32.	<i>Rosa Damascena</i>	Leaves	hydroalcoholic extract	Diclofenac sodium	writhing					P<0.05	Hajhashe mi et al. ⁴⁰	2010
33.	<i>Cucurbitacins</i>	-	-	Diclofenac	Hot Plate Induced Pain	Wister Albino rats	Time latency of jumping, paw licking	Pain and swelling	-	P<0.05	Saba et al. ⁴¹	2010
34.	<i>Ipomoea Asarifolia</i>	Stem	Aqueous Extract	Phenylbutazone 35/Kg,75 And 150 Mg	Writhing Method	Wister Albino Rats	Abdominal constriction	Pain and swelling	-	P<0.05	Lawal Et Al. ⁴²	2010
35.	<i>Malwa Parviflora</i>	Stem	Methanol Extract	Endomethacin 100,200 Mg/Kg	Writhing Method, Formalin Test In Rats.	Wister Albino Rats	Hind limb extension.	Pain and swelling	student's t-test.	P<0.05	Afolayan et al.. ⁴³	2010
36.	<i>Oxyanthus Unilocularis</i>	Leaf Stem And Barks	Methanol Extract	Aspirin and morphine 150 Mg/Kg	Writhing Method, Tail Flick Test , Pressure	Swiss Albino Mice	Abdominal constriction. Time latency of tail flicking	Pain and swelling	ANOVA followed by	P<0.01	Nkeh-Chungag et al.. ⁴⁴	2010



					Test, Formalin Test.				Dunnett' s test.			
37.	<i>Radix Bupleuri</i>	Leaves	Hexane extract	Aspirin 6.25,12.5,25 and 50mg/kg	writhing, tail flick method	Swiss albino mice	Abdominal constriction, Time latency of tail flicking	Pain and swelling	One way anova	P<0.0 5	Idris usman et al ⁴⁵	2010
38.	<i>Solanum Aculeastrum .</i>	Fresh Berrie s	Aqueous Extract	Indomethacin 1&10mg/Kg	Tail Immersion Test, Formalin Test .	Rattus Norveg icus Rats	-	Pain and swelling	(ANOV A). Means were separate d by the Duncan multiple range test using SAS and comple mented with student' s t-test.	P<0.0 5	Aboyade et al. ⁴⁶	2010

39.	<i>Terminalia Bellerica</i>	Fruits	Alcoholic Extract	Diclofenac 50-100 mg/Kg	Writhing Method	Wister Albino Rats	Abdominal constriction, hind limb extension.	Pain and swelling	the student's t-test	P<0.0.1	Khan And Gilani et al. ⁴⁷	2010
40.	<i>Aloe Ferox</i>	Fresh Leaves	Aqueous Extract	Indomethacin 50,100,200and 400mg/Kg Body Weight I.P.	Formalin Test, Tail Flick Method, writhing model.	Wiser Rats	Time latency of tail flicking , coiling	Pain and swelling	GLM (General Linear Model) procedures of the statistical analyses system (SAS, 2004) followed by the Dunnett's t-test	P>0.05	Mwale And Masika et al. ⁴⁸	2010
41.	<i>Microtrichia perotitii</i>	leaves	Methanolic extract	10 mg of Proxicam per kg body weight i.p	writhing	Male and female swiss albino mice			students t-test	P < 05	Nuhu et al ⁴⁹	2010



						(18 - 25 g)						
42.	<i>Abutilon Indicum</i>	-	Ethanollic extract	Pentazocin4 mg/kg	Eddy's hot plate	-	-	-	students "t" test	P<0.001	R.Saraswathi et al ⁵⁰	2011
43.	<i>Indigofera Pulchra</i>	Whole Plant	Methanol Extract	Morphine 2.5,5and10 Mg/Kg	Hot Plate Induced Pain	Swiss Albino Mice	Time latency of jumping, paw licking	Pain and swelling	ANOVA followed by Dunnett post hoc test	P<0.05	Musa et al ⁵¹	2011
44.	<i>Murraya Paniculata.</i>	Bark	Methanol Extract	Morphine 200&400mg/ Kg	Writhing Method.	Swiss Albino Mice	Hind limb extension.	Pain and swelling	-	P<0.01	Podder et al ⁵² .	2011
45.	<i>Stylochiton Lancifolius.</i>	Rhizomes	Methanol ic Extract	Piroxicam 50,100, 200mg/Kg	Writhing Method, Formalin Test.	Swiss Albino Mice	Abdominal constriction	Pain and swelling	-	P<0.01	Pateh et al. ⁵³	2011
46.	<i>Bridelia Ferruginea</i>	Stem Bark	Aqueous Extract	Aspirin and morphine 25,50&100m g/Kg	Writhing Method, Tail Immersion Test In Mice	Swiss Albino Mice	Abdominal constriction,	Pain and swelling	(ANOVA), followed by student t-test.	P<0.05	Akuodor et al ⁵⁴ .	2011

47.	<i>Ficus Religiosa</i>	Leaves	Methanol Extract	Ibuprofen 20&40mg/Kg bw p.o	Tail Flick Test, 31Writhing Method	Wister Rat	Time latency of tail flick, Abdominal constriction, hind limb extension.	Pain and swelling	(ANOV A) with Dunnett's	P<0.05	Gulecha et al. ⁵⁵	2011
48.	<i>Aspartame</i>			Diclofenac 2,4,8 mg/kg bw i.p	writhing method	Wister rats	Abdominal constriction	Pain and swelling	One way ANOV A	P<0.001	Pradhan et al. ⁵⁶	2011
49.	<i>Drymaria Cordata</i>	Leaves	Hydroethnolic extract	Endomethacin and morphine 50,100,200 Mg/Kg	Writhing Response, Hot Plate Method, Tail Flick Model. formalin induced model	Wister Albino Mice	Abdominal constriction , full extension of hind limb , Time latency of jumping,	Pain and swelling	one-way analysis of variance	P<0.01	Barua et al. ⁵⁷	2011
50.	<i>Ageratum Conyzoides</i>	Fresh Whole Plants	Ethanol Extract	Diclofenac and morphine 1,1.5&2mg/Kg bw Orally	Writhing Method, Formalin Test.	Old Swiss Albino Mice	Abdominal constriction, hind limb extension.	Pain and swelling	(ANOV A)followed by Tukey's post hoc	P<0.05	Rahman et al. ⁵⁸	2012

51.	<i>Emilia Sonchifolia</i>	Fresh Whole Plants	Ethanol Extract	Diclofenac and morphine	Writhing Test, Formalin Test.	Old Swiss Albino Mice	Abdominal constriction, hind limb extension.	Pain and swelling	test (ANOVA) followed by Tukey's post hoc test	P<0.05	Rahman et al. ⁵⁹	2012
52.	<i>Trochus Tentoriun</i>	Leaves	Column Chromatography	Diclofenac and pentazocin 25&50 Mg/Kg	Writhing Response, Hot Plate Method.	Swiss Albino Mice	Time latency of jumping	Pain and swelling	Dunnet's t test	P<0.01	Chellaram et al. ⁶⁰ .	2012
53.	<i>Chenopodium Album Linn</i>	Seeds And Leaves	Ethanol Extract	Diclofenac 300,500mg/Kg Bw	Tail Flick Test	Swiss Albino Mice	Time latency of tail licking	Pain and swelling	Student t-test.	P<0.05	Ahmad Et Al. ⁶¹	2012
54.	<i>Croton Argyratus</i>	Leaves ,Stem And Roots	Ethanol Extract	Morphine sulphate 50,100and 200 Mg/Kg	Hot Plate Method, Tail Flick Method , Formalin Test.	Swiss Albino Mice	Time latency of jumping , paw licking	Pain and swelling	(ANOVA) followed by Tukey's test and	P<0.05	Ali et al. ⁶²	2012

									Dunnet's Tests			
55.	<i>Inula Recemosa</i>	Roots	Aqueous extract	Aspirin 100, 200, 400 mg/kg bw	writhing, tail immersion method	Albino rats	Abdominal constriction, hind limb extension.	Pain and swelling	-	P<0.05	Arunugum et al. ⁶³	2012
56.	<i>Matricaria Chamomilla</i>	Flowers	Hydroalcoholic Extract	Morphine 25,50&100mg/Kg	Vincristine Induced Peripheral Neuropathy	Wister Albino Rats	-	Pain and swelling	ANOVA, along student's t- test.	P<0.05	Nouri et al. ⁶⁴	2012
57.	<i>Mondia Whitei</i>	Roots	Ethanollic Extract	Aspirin 25,50,100,200&400mg/Kg	Writhing Method	Swiss Albino Mice	Abdominal constriction , hind limb extension.	Pain and swelling	ANOVA, the student's t - test (paired And one tailed) was used. Scheffe' post hoc test	P<0.05	Githinji et al. ⁶⁵	2012



58.	<i>Musanga cecropioides</i>	Leaves	Petroleum extract	Morphine 15,20,40mg/kg bw	writhing	Wister albino rats	Abdominal constriction , hind limb extension	Pain and swelling	One way ANOVA	P<0.05	Senjobi et al ⁶⁶	2012
59.	<i>Nepheliu Longana</i>	Peels and seeds	Menthol extract	Indomethacin 250and 500mg/kg bw	writhing	Young long evans rats	Abdominal constriction, hind limb extension	Pain and swelling	One way ANOVA	P<0.01	Ripa et al ⁶⁷	2012
60.	<i>Oscillatoria annae</i>	Cyano bacterium	Ethanollic Extract	Indomethacin 50,100and 200mg/Kg	Writhing Method, Hot Plate Method.	Swiss Albino Mice	Abdominal constriction, hind limb extension, Time latency of jumping, paw licking	Pain and swelling	-	P<0.05	varalakshmi et al. ⁶⁸	2012
61.	<i>Pistacia Integerrima</i>	Bark	Methanol Extract	Diclofenac sodium 500,1000 And1500mg/Kg	Writhing Method	Balb-C Mice	Abdominal constriction , hind limb extension	Pain and swelling	-	P<0.05	Ismail et al., ⁶⁹	2012
62.	<i>Shorea Robusta</i>	Stem	Ethanollic Extract.	Morphine 30,100&300 mg/Kg	Tail Flick Test, Writhing Method, Hot Plate	Swiss Albino Mice	Time latency of jumping and paw licking	Pain and swelling	ANOVA with Bonferroni's multiple	P<0.001	Wani et al, ⁷⁰	2012



					Induced Pain.				compari son tests and two-way ANOV A with Bonferroni's multiple compari son test.			
63.	<i>Tecoma Stans</i>	Flowers	Methanolic Extract	Aspirin 100,200&300 mg/Kg	Writhing Method.	Wister Albino Rats	Abdominal constriction, hind limb extension.	Pain and swelling	-	P<0.05	Kameshwararam et al. ⁷¹	2012
64.	<i>Skimmia laureola</i>	Whole plant	Ethanollic extract	Diclofenac sodium	writhing	Wister albino rats	Abdominal constriction	Pain and swelling	-	P<0.05	Barkatullah et al. ⁷²	2012
65	<i>Agave Sisalana</i>	Fresh Leaves	Aqueous Extract	Indomethacin 50,100,200&400mg/Kg Bw I.P	Formalin Test, Tail Flick Test, Writhing Method.	Wister Young Rat	Time latency of tail licking	Pain and swelling	Dunnett's t - test	P<0.05	Mwale et al. ⁷³	2012
66.	<i>Melanthera scandens</i>	Leaf	Ethanollic extract	100 mg/kg acetylsalicylic acid	acetic acid, formalin-induced	Swiss albino mice	-	pain	Students ' t-test and	P≤0.01 and 0.05.	Jude.E. Okokon et.al ⁷⁴	2012



					paw licking , thermal- induced pain models	(17–24 g), rats (120– 145 g)			ANOV A			
67.	<i>Pinus roxburghii</i>	Bark and leaves	Alcoholic extract	Indomethacin	Writhing, tail immersion tests	Swiss albino mice			(ANOV A) followed by Dunnett' s -test	-	Dhirender Kaushik et al ⁷⁵	2012
68.	<i>Allium cepa</i>	Bulb	Fresh onion juice	Morphine 5mg/kg	Hot plate and formaline induced pain method	Swiss albino mice			-	P≤0.0	Nasri et al ⁷⁶	2012
69.	Anogeissus Accuminata	leaves	Methanol ic extract	pentazocin 10mg/kg I.P	Tail immersion, and Formalin induced pain	Wistar albino mice 35 - 40gms			ANOV A Followe d by Dunnett' s test.	P<0.0 5	R. Shwetha et al ⁷⁷	2013



70.	<i>Piper Longum.</i>	Fruits	Ethanol extract	Diclofenac 250mg/kg	Tail immersion model	Male and female Sprague Dawley Rats	Time latency of tail withdrawal	pain	ANOVA along with Duncan's multiple range tests	P<0.01	Ashajyothi V et al ⁷⁸	2014
71.	<i>Azadirachta indica</i>	leaves	Ethanol extract	Celecoxib (100mg/kg BW)	Eddy's hot plate	Albino rats			-	p<0.001	<i>Buchinena et.al</i> ⁷⁹	2014
72.	<i>Ziziphus rugosa Lam</i>	leaves	Methanolic extract	Indomethacin (10mg/kg) body weight (p.o.)	writhing method	Long - Evan's rats weighing about 120 to 170 g			ANOVA and post-hoc Dunnett's test	p < 0.05 and p < 0.01	Bulbul et. Al ⁸⁰	2015

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