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## PHYTOCHEMICAL INVESTIGATION AND WOUND HEALING ACTIVITY OF *JASMINUM GRANDIFLORUM*

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### Keywords:

*Jasminum grandiflorum*, Wound healing, Phytochemical investigation

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**ABSTRACT:** The influence of roots and leaf extracts of *Jasminum grandiflorum* was studied for its wound healing activity using the excision wound model. The roots and leaves of *Jasminum grandiflorum* were extracted with alcohol 90%, were subjected to phytochemical investigation. The root and leaf extracts were screened for wound healing activity. The animals were divided into four groups in excision wound model; controls were treated with normal saline, standard were treated with betadine and the experimental groups were treated with root and leaf extracts of *Jasminum grandiflorum* till complete epithelisation. The leaf extract treated wounds were found to epithelise faster as compared to the control group. Leaf extract treated rats exhibited 61.346% reduction in the wound area when compared to the control of 55.72%. The demonstration of an increased rate of wound contraction findings suggests the use of *Jasminum grandiflorum* leaf extract in the management of wound healing.

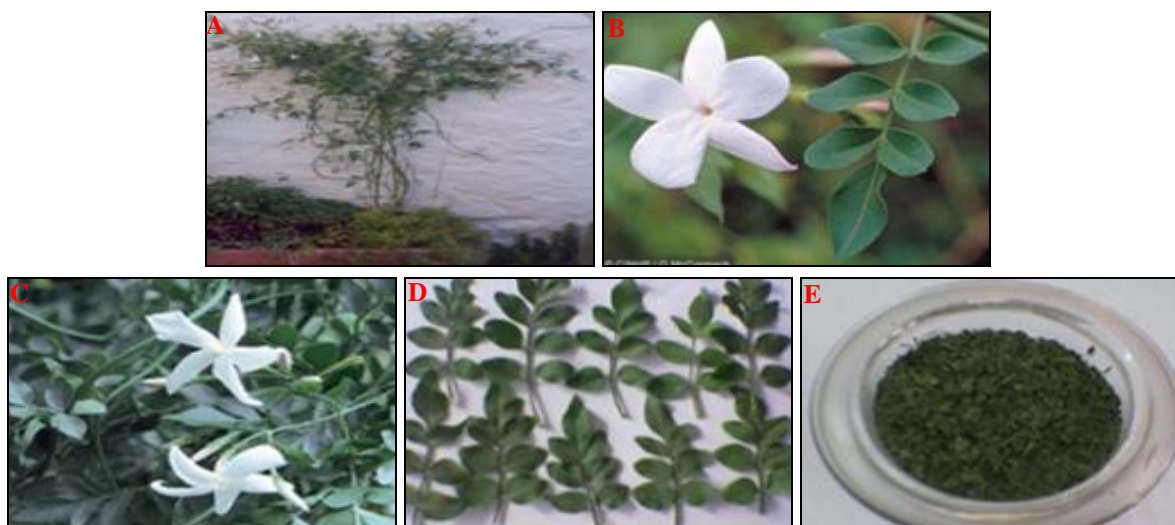
**INTRODUCTION:** A search for medicinal plants during the last several centuries has given an innumerable number of plants which are of great use in the treatment of diseases, promoting health<sup>1</sup>. Every disease has a drug in the plant growing in nature. About 80% of individuals from developed countries use traditional medicines. Jati is one of the plant origin drugs which had been mentioned for its various benefits in the literature of Ayurveda<sup>2</sup>. It has been claimed that leaf, flower, and roots of *Jasminum grandiflorum* are being used in many diseases. In the present study, *Jasminum grandiflorum* was subjected for different studies to know its chemical constituents in the different parts of the plant and an attempt has been made to find out the wound healing efficacy<sup>3</sup>.

**MATERIALS AND METHODS:** The roots and leaves of *Jasminum grandiflorum* are collected locally from the wild source at Bijapur and identified<sup>4</sup>. 250 gm of air-dried roots and leaves of *Jasminum graniflorum* are powdered and extracted with ethanol 90% separately. The individual extracts were subjected to preliminary phytochemical investigation. Healthy adult albino rats of 200-250 gm are used. Each group consists of six Albino rats divided between sexes<sup>5</sup>.

**Wound Healing Activity:** The animals were starved for 12 h before the Wounding. A circular wound of about 2 cm diameter was made on depilated dorsal thoracic region of rats<sup>6</sup>.

Animals were divided into 4 groups, control treated with normal saline, test groups treated with 250 mg leaf and root extracts once in a day to the full area of the wound and the standard group treated with the same dose of betadine ointment<sup>7</sup>. The parameters studied were wound closure, epithelisation, size and shape of scar area<sup>8</sup>.





**FIG. 1: PHOTO PLATE SHOWING NATURAL HABITAT OF JATI.** (A) The natural habitat of Jati; (*Jasminum grandiflorum* Linn.); (B and C) Showing inflorescences of jati; (D) Dried leaf of Jati; (E) Coarse powder of Jati Patra.



**FIG. 2: WOUND HEALING TREATMENT GROUPS (I, II, III)**

**RESULTS AND DISCUSSION:** TS of *Jasminum grandiflorum* leaf shows single layered epidermal cells, vascular bundles at midrib and covering trichomes<sup>9</sup>.

**Preliminary Phytochemical Investigation:**

**TABLE 1: SHOWING PRELIMINARY PHYTO-CHEMICAL TEST**

Tests:	Leaf extract	Root extract
Test for sterols		
Salkowski's test	+ ve	+ ve
Lieberman-Burchardt's test	- ve	+ ve
Sulphur test	+ ve	+ ve
Test for proteins		
Biuret test	+ ve	- ve
Million's Test	+ ve	- ve
Xanthoprotein Test	+ ve	- ve
Test for Triterpenoids		
Liebermann's Test	-ve	- ve
Tschugajew Test	+ ve	- ve
Test for Alkaloids		
Mayer's Test	+ ve	+ ve
Wagner's Test	+ ve	+ ve
Hager's Test	+ ve	+ ve
Dragendorff's Test	+ ve	+ ve
Test for carbohydrates		
Molish's Test	+ ve	+ ve
Barfoed's Test	- ve	+ ve
Benedict's Test	+ ve	+ ve
Test for Saponin's		
Foam Test	+ ve	- ve
Hemolytic Test	+ ve	- ve
Test for Tannin's		
Ferric chloride test	+ ve	+ ve
Lead acetate test	+ ve	+ ve
Bromine water test	- ve	+ ve
Test for Flavonoid's		
Shinoda Test	+ ve	+ ve
Lead acetate	+ ve	+ ve
Alkaline reagent test	+ ve	+ ve
Ferric chloride test	+ ve	+ ve
Bromine water test	- ve	- ve
Zinc HCl reduction test	+ ve	+ ve

**TABLE 2: WOUND HEALING ACTIVITY OF JASMINUM GRANDIFLORUM LEAF AND ROOT EXTRACTS IN THE EXCISION WOUND MODEL**

Wound Area%	Control	Leaf Extract	Root Extract	Standard
Day 4	10.50 ±0.63	16.75 ±1.33	14.58 ±1.70	21.84 ±1.75
Day 8	23.06 ±1.02	28.83 ±1.27	26.25 ±1.27	41.84 ±2.22
Day 12	64.50 ±0.69	72.66 ±2.3	67.91 ±1.42	75.66 ±2.45
Day 16	79.68 ±0.18	89.58 ±1.33	86.66 ±3.30	94.91 ±1.78
Day 18	91.43 ±0.70	100 ±0.21	93.58 ±0.76	100 ±0.47
Epithelisation in Days	21 ±0.365	15.66 ±0.21	17.83 ±0.30	15.16 ±0.47

**TABLE 3: SHOWING % CLOSURE OF ORIGINAL WOUND AREA ON 4<sup>th</sup> DAY**

S. no.	Group I	Group II	Group III	Group IV
1	11.84	19	13	22
2	12.02	13.5	16	27
3	8.48	18	9.5	19
4	10.0	21	17.5	26
5	11.67	16.5	20.5	21.5
6	9.0	12.5	11	15.5
Mean	10.50	16.75	14.58	21.84
SD	1.55	3.26	4.16	4.29
SEM	0.6339	1.33	1.70	1.75
T-value	-	4.231	2.250	6.075
P-value	-	0.0017***	0.0482*	0.0001***

\*-→Insignificant \*\*→Significant \*\*\*→More significant

**TABLE 4: SHOWING % CLOSURE OF ORIGINAL WOUND AREA ON 8<sup>th</sup> DAY**

S. no.	Group I	Group II	Group III	Group IV
1	26.50	27.5	23	34.5
2	23.00	24	27	39.5
3	21.00	28.5	19.5	44.5
4	19.55	29.5	24	50
5	24.72	33.5	34.5	44
6	23.64	30	29.5	38.5
Mean	23.06	28.83	26.25	41.84
SD	2.51	3.12	5.29	5.45
SEM	1.025	1.27	2.13	2.22
T-value	-	3.523	1.329	7.654
P-value	-	0.0055***	0.2133**	0.0001***

\*-→Insignificant \*\*→Significant \*\*\*→More significant

**TABLE 5: SHOWING % CLOSURE OF ORIGINAL WOUND AREA ON 12<sup>th</sup> DAY**

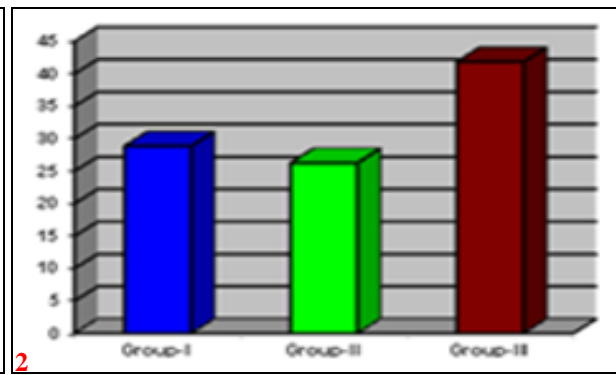
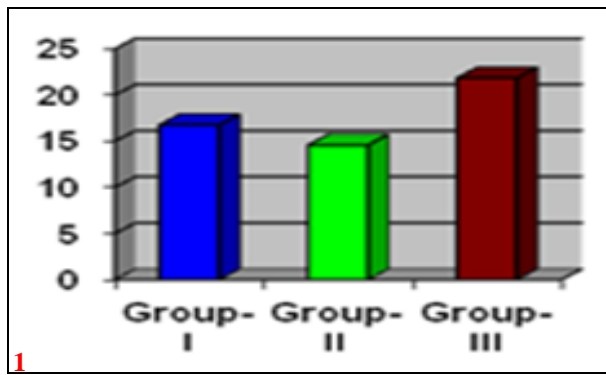
S. no.	Group I	Group II	Group III	Group IV
1	63.15	78.5	64	77.5
2	64.80	74.5	68.5	79.5
3	62.19	79	59.5	83.5
4	65.71	69.5	74	71.5
5	66.87	70	73.5	75.5
6	64.50	64.5	68	66.5
Mean	64.53	72.66	67.91	75.66
SD	1.69	5.68	5.56	6.01
SEM	0.69	2.3	2.27	2.45
T-value	-	3.36	1.42	4.364
P-value	-	0.0072***	0.1849*	0.0014***

\*-→Insignificant \*\*→Significant \*\*\*→More significant

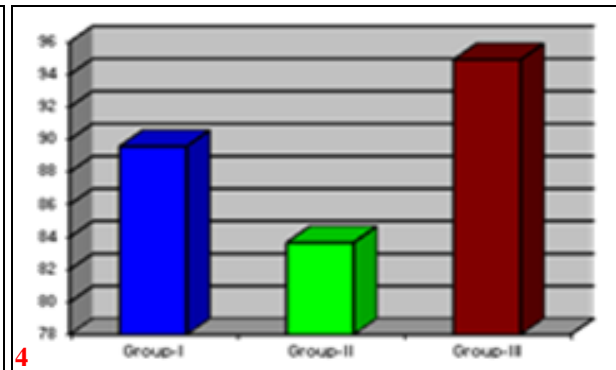
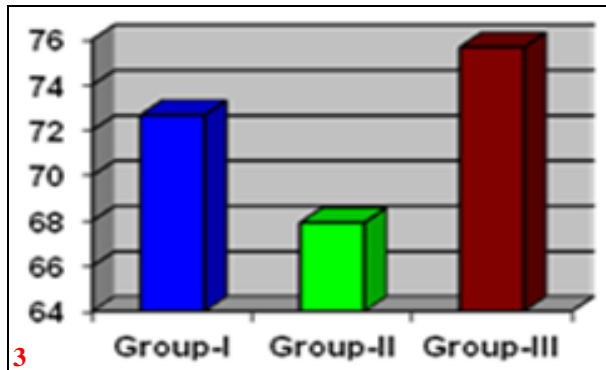
**TABLE 6: SHOWING % CLOSURE OF ORIGINAL WOUND AREA ON 16<sup>th</sup> DAY**

S. no.	Group I	Group II	Group III	Group IV
1	78.94	89.5	84.5	91.5
2	79.47	94.5	83.5	90
3	80.10	88.5	79.5	90.5
4	80.07	88.5	84.5	93.5
5	80.00	92	86.5	99.5
6	79.50	85	83.5	99.5
Mean	79.68	89.58	86.66	94.91
SD	0.4593	3.26	8.08	4.36
SEM	0.1875	1.33	3.30	1.78
T-value	-	7.41	0.1976	8.04
P-value	-	0.0001***	0.8473*	0.0001***

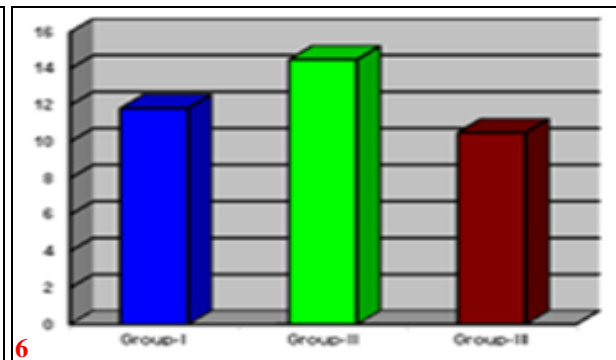
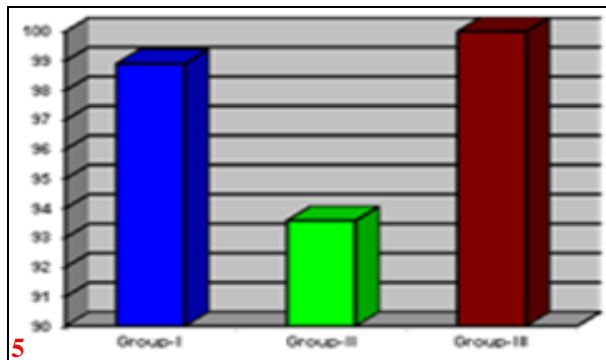
\*-→Insignificant \*\*→Significant \*\*\*→More significant



GRAPH 1-2: SHOWING MEAN PERCENTAGE CLOSURE OF ORIGINAL EXCISION WOUND AREA ON 4<sup>th</sup> AND 8<sup>th</sup> POST WOUNDING DAY RESPECTIVELY



GRAPH 3-4: SHOWING MEAN PERCENTAGE CLOSURE OF ORIGINAL EXCISION WOUND AREA ON 12<sup>th</sup> AND 16<sup>th</sup> POST-WOUNDING DAY RESPECTIVELY



GRAPH 5-6: SHOWING MEAN PERCENTAGE CLOSURE OF ORIGINAL EXCISION WOUND AREA ON 21<sup>th</sup> POST WOUNDING DAY AND EPITHELIZATION IN NUMBER OF DAYS

TABLE 7: SHOWING % CLOSURE OF ORIGINAL WOUND AREA ON 18<sup>th</sup> DAY

S. no.	Group I	Group II	Group III	Group IV
1	90.78	-	94.5	-
2	91.20	-	94.5	-
3	90.70	-	90	-
4	91.42	-	95	-
5	92.50	-	93.5	-
6	92.00	-	94.5	-
Mean	91.43	-	93.58	-
SD	0.70	-	1.86	-
SEM	0.2847	-	0.7601	-
T-value	-	-	2.74	-
P-value	-	-	0.0205*	-

\*-→Insignificant \*\*-→Significant \*\*\*-→More significant

TABLE 8: SHOWING PERIOD OF EPITHELISATION (IN NO OF DAYS)

S. no.	Group I	Group II	Group III	Group IV
1	21	16	18	16
2	22	15	17	17
3	21	16	19	15
4	20	16	18	14
5	20	15	17	14
6	22	16	18	15
Mean	21	15.66	17.83	15.16
SD	0.8944	0.5164	0.7528	1.16
SEM	0.365	0.210	0.3073	0.4773
T-value	-	12.64	6.63	9.70
P-value	-	0.0001***	0.001**	0.0001***

\*-→Insignificant \*\*-→Significant \*\*\*-→More significant

**TABLE 9: SIZE OF SCAR AREA (sq. mm %)**

S. no.	Group I	Group II	Group III	Group IV
1	16.91	10.49	15.22	9.61
2	15.26	12.63	14.56	9.69
3	17.36	11.23	12.21	8.94
4	17.21	12.51	14.35	9.32
5	14.92	11.97	13.78	8.83
6	15.25	11.61	12.52	8.76
Mean	16.15	11.74	13.77	9.19
SD	1.12	0.8096	1.188	0.450
SEM	0.4575	0.3305	0.4851	0.1654
T-value	-	7.81	3.56	14.30
P-value	-	0.0001***	0.0051*	0.0001***

\*.->Insignificant \*\*->Significant \*\*\*->More significant

**Leaf Constant Values:** Stomatal number: 12 - 18 mm<sup>2</sup>; stomatal index 16.5 m; vein islet no. 20 mm<sup>2</sup>; vein termination no.: 12 mm<sup>2</sup>.

**CONCLUSION:** The leaf extract had exhibited more significant wound healing promotion activity. The healing activity of leaves may be due to anti-septic property of essential oils or protein precipitating property of tannins. Further, study needs an investigation to pinpoint the mechanism of activity.

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**CONFLICT OF INTEREST:** Nil

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