

Wound Healing Plants of Jalgaon District of Maharashtra State, India

¹M.Z. Chopda and ²R.T. Mahajan

¹Post Graduate Department of Zoology

²Post Graduate Department of Biotechnology
Moolji Jaitha College, Jalgaon – 425001

Issued 04 January 2009

Abstract

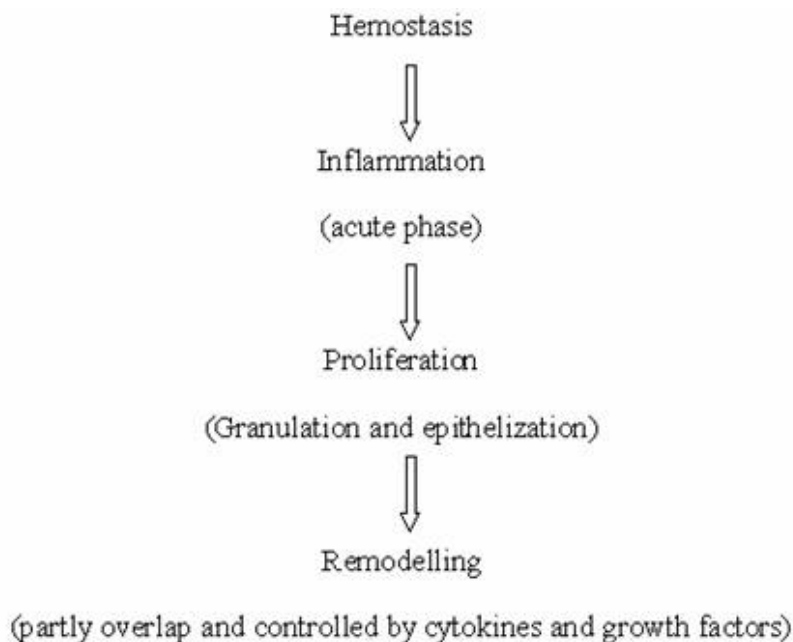
Jalgaon District of Maharashtra state (India) has a great heritage and rich in various green and semi evergreen species. Record of 3347 species from 201 families appeared in earlier literature from Jalgaon District. A list of 283 wound healing plants of Indian origin is compiled; out of these 224 plants are native of Maharashtra, a 131 plants among them occurred in Jalgaon District, which are in practice by local herbalist, Vaidyas and non-registered medical practitioners and Mukhiya (Head) of tribal community. Taxonomical distribution showed 93.63% dicot and 6.37% monocot and a single aquatic plant. The investigation revealed that wound healing natural products usually localized in root (27%) > leaves (20%) > stem > seed > whole plant > fruit > flower > rhizome > tuber > shoot > stamen > grain > gall > filament and plant product like latex (46%), oil (40%) , gum and resin (7%) as evident from this survey. Most of the remedies consisted of either single plant part or combination. Methods of preparation varies and they are species specific viz: plant parts applied as a paste, juice extracted from the fresh plant parts, powder made from fresh or dried plant parts, some fresh plant parts, and decoction. In this study the most dominant family was Leguminosae and roots were most frequently used for wound healing. Here an attempt has also been made to work out on plants belonging to Jalgaon District in order to exploit them for preparation of ointment that can be used both in human and domestic animals.

Keywords: Wound healing, Traditional Medicinal plants, Jalgaon District

Introduction

The Indian traditional system of medicine is based on pragmatic facts of the observations and the experience over millennia. More than 1200 diseases are mentioned in different classical texts. Traditional medicine, being a significant element in the cultural patrimony, still remains the main choice for a large majority of people for treating various diseases and ailments. Management in various forms of diseases like Diabetes, Cardiovascular disorders, hepato-protective, antibacterial, antifungal and wound healing etc. are made with more than 1000 medicinal plants (89.93%); 58 minerals, metals, or ores (5.24%); and 54 animal and marine products (4.86%)¹. Figure 1 depicts the process of wound healing phenomenon.

Figure 1. The process of wound healing pathogenesis.



As per modern medicine certain essential polypeptides of the low concentration present in animal serum, called Growth Factors⁶, which control cell proliferation. However, a recent study reveals that some of these growth factors may have serious untoward effects such as carcinogenesis⁷. Classical management of wounds follows various therapeutic steps, starting with an aseptic dressing and ending with the rehabilitation of the normal structure and function⁸. These therapeutic measures were aimed not only to accelerate the healing process but also to maintain the quality and aesthetics of the healing. As described in different literature, 70% of the wound healing drugs are of plant origin, 20% of mineral origin, and the remaining 10% consisting of animal products⁹. These drugs are stated to be effective in different conditions such as wounds, ulcers, sinuses, abscess, syphilitic ulcers, and maggots in wounds, septic wounds, and inflammatory changes of wounds, cellulitis, purulative ulcer, diabetic carbuncle, and fistula-in-ano. The plants are used as first aids, washing of wounds, extraction of pus, as coagulants and for infected wounds. Scientific investigations have been carried out to assess the wound healing properties of the some drugs. This paper is a review of some of the plant medicines used by the tribal community and rural people, possesses unique untold information about plants. This knowledge is being eternally handed down from generation to generation. The objective of this study is to interact with local traditional healers and document their knowledge on medicinal plants and their widespread uses.

Background of study

Plants have been used for medicinal purposes for as long as history has been recorded. China, India, and Egypt appear to have been the places which cradled the use of herbs, but herbalism was common in India. A great variety of plants are used for medicinal treatments. Either the dried plant, or a specific part of it (root, leaves, fruit, flowers, seeds), these recipes are prepared using different ingredients of non-plant origin such as water, salt, honey, etc. in modern way it is formulated into suitable preparations viz. tablets, pills, extracts, tinctures,

lotions, ointments, creams, etc. The first generally accepted use of plants as healing agents was depicted in the cave paintings discovered in the Lascaux caves in France, which have been radiocarbon-dated 13,000 to 25,000 BC¹¹. The first authentic record of Khandesh plants is to be found in the flora of the Bombay presidency¹². Species found in Ayurvedic and Unani systems of Medicine, together with those used as popular village remedies have been mentioned in Gazetteer of Bombay state¹³. Surveys on flora of Khandesh region were restricted only with Botanical or Taxonomical point of view (singh 2001) (Table 2)²⁷ however our survey reports medicinal uses of the same flora.

Table 1. Flora of Maharashtra state: Statistics.

Group	Families	Genera	Species	Subspecies	Verities	Sub varieties
Monocotyledons	34	256	913	03	39	01
Dicotyledons	167	841	2221	25	137	00
Total	201	1097	3134	28	176	01

On utilizing them properly, they may be used to control the diseases like, Jaundice, Diabetes, Malaria, Arthritis, Diarrhea, Hypertension, and Wound healing. Laticiferous plant *Euphorbia nerifolia* Linn reported as wound healer by Rasik (1996). Bhattarai (1997) lists 42 plant species used in wound treatment in Nepal, and of these eight are listed as haemostats. Admirable activity of *Hemigraphis colorata* (Blume) H.G. leaf on wound healing and inflammation in mice was observed by Subramoniam (2001). A review on wound healing plants documented by Biswas (2003) quote 164 plants. Splendid action of *Tagetes erecta* Linn leaves was established by Ghosh (2004). Aqueous and methanolic extract of *Vernonia arborea* (HK) showed remarkable activity for wound healing (Manjunatha, 2005). Recently Muthu (2006) has been reported 16 remedies against wound used by Kancheepuram tribal community. Holy basil plant *Ocimum sanctum* Linn exhibits outstanding action as antioxidant and wound healing property (Shetty, 2007). Ethnomedicinal importance of flora of Dhule and Nandurbar Districts has been mentioned in literature¹⁴ gives number of plants for various diseases out of these 36 numbers of plants as wound healing. Parallel work with listing of wound healing plants of Indigenous origin has been carried out by us where we found 131 plants of them belonging to the Jalgaon District. This paper reports an ethnobiological study with the aim to identify medicinal plants used in the treatment of wounds. An attempt has been made to congregate scanty information available in literature. A perusal of reported literature on the Khandesh flora prompted us to exploit them as a national prosperity.

Materials and Methods

Geographic Location of Jalgaon District, Maharashtra, India

Maharashtra encompasses an area of 3,07,713 km² (9.4% of country) and is the third largest state¹⁵ in India. Maharashtra is bordered by the states of Madhya Pradesh to the north, Chhattisgarh to the east, Andhra Pradesh to the southeast, Karnataka to the south, and Goa to the southwest. The state of Gujarat lies to the

northwest, with the Union territory of Dadra and Nagar Haveli sandwiched in between. The Arabian Sea makes up Maharashtra's west coast and lies at Latitude : 20.00 N Longitude : 76.00 E The total forest cover of Maharashtra is 61939 km². This includes 28387 km² of dense forest and 18478 km² of open forest¹⁸. Of the total forest area of Maharashtra, 8196 km² are under protected area (Figure 2)^{16,17,22} which includes 35 sanctuaries¹⁹, 5 National Parks²⁰, and 26 Tiger reserve²¹. Jalgaon District in North Maharashtra with an Area 11757 km² and the forests in the district cover an area of 4,732.199 km² of which 4,413.423 km² and 318.776 km² are under Forest and Revenue departments respectively. Of the total area 3,937.435 km² constitute reserve forests and 794.764 km² private forests²³. Area under Irrigation 1, 21,000 hectares, Irrigation Projects Major-2 Medium-10 Minor-514 Imp. Projs.-2 - Upper Tapi and Hatnur. Languages/Dialects - Ahirani, Marathi. Folk-Arts Lavani, Tamasha, Gondhal. Weather Temperature- Max.-34.9 Deg. C. Min.-19.90 C. Rainfall-763.6 mm (Average), Main Crops Banana, cotton, sugarcane , oil seeds, pulses, Area under Horticulture 47424 hectares. The Jalgaon district is located 20⁰-21⁰N and 74⁰-76⁰ E. It is located in Northern part of Maharashtra State¹⁸. It is bounded on the north by Madhya Pradesh, on the east by Buldhana district, on the west by Nasik and Dhulia districts and on the south by Aurangabad district. It is a part of Deccan Uplands of the Maharashtra State; it is distinguished from the rest of the upland districts by its westward aspect.

Figure 2. Location of Study area (Jalgaon District, Maharashtra, India).

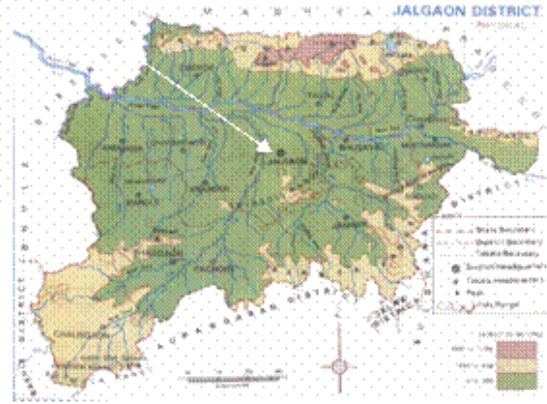
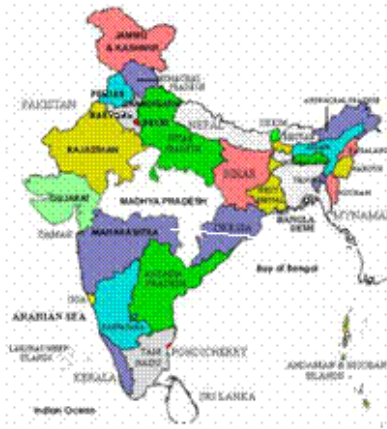


Plate 1. Panoramic view of Satpuda hill (at background) along with villagers and author.



Plate 2. Enquiry about Wound healing plants with aborigines of Yawal Tahsil of Jalgaon District.



Plate 3. Conversations with traditional practitioner about Wound healing plants.

While the rest of the upland region is drained by the major rivers to the east, the Tapi and its tributaries drain the Jalgaon region to the west towards Arabian Sea. The landscape is typically that of the Deccan lavas with residual hill ranges and broad valleys, with trap dykes introducing a sharp local contrast as small chains of hillocks. Thus Jalgaon includes varied topographical features and landscapes, consisting of wild hills and forests, rich gardens and groves, stretch of barren plain, low rolling rocky hills and tensely gullied (bad land) topography

near major river banks. Regionally, from east to west, parallel with the Tapi, are three well marked belts of country; in the centre the rich Tapi valley, in the north the high and wild Satpuda, and in the south and south-west bare ridges and rich well-watered valleys flanked by the Ajanta range. Jalgaon district is divided in to 15 Tahsils. Among the unsettled tribes of Khandesh, the largest in number are the Bhils, who are regarded as the aboriginals originally spread all over Rajputana, Malva, and Gujarat and Central India but now found mostly in Khandesh, parts of Gujarat, and the Vindhya hills. Jalgaon district is known for its advances in horticulture. Cultivation and production of banana and cotton, especially by resorting to drip irrigation, has created a role model for cultivators in other parts of India. Bananas grown in the district are exported outside the State and to other countries. Mehrun village is famous for its unique *bor* (jubjube)²⁴. In this study data were collected through general conversation with the local traditional vaidyas, tribal communities and rural peoples. Surveyed information includes medicinal plants with their local names and parts used. The plants were listed by following book “The flora of Presidency of Bombay”¹².

Result and discussion

The list is compiled on the basis of (i) Textual data (ii) References and Cross-references^{37, 38} (iii) Herbalist / non-medical practitioners (iv) Internet and web-sites. The plants used in the management of wounds as described in different literature are listed in Table 1 with local name, botanical name, family name, parts used.

Table 2. Medicinal plants of Wound Healing mentioned in different classical texts.

Sr. no.	Name of the plant	Habit	Family	Common name	Part used
1.	<i>Abies webbiana Lindl</i>	T	<i>Pinaceae</i>	Talisa	L
2.	<i>Abrus precatorius linn</i>	C	<i>Leguminosae</i>	Gunja,Kunch	SD
3.	<i>Acacia arebica Linn</i>	T	<i>Mimosaceae</i>	Babul	ST,L,FU,SD
4.	<i>Acacia catechu Willd</i>	T	<i>Mimosaceae</i>	Khadira	ST
5.	<i>Acacia chundra Roxb</i>	T	<i>Leguminosae</i>	Khadir	ST, WH
6.	<i>Acacia ferneiana Willd</i>	T	<i>Leguminosae</i>	Irimeda	ST
7.	<i>Acaylpha indica</i>	H	<i>Euphorbiaceae</i>	Khokali	Leaves,bark
8.	<i>Achyranthus aspera linn</i>	H	<i>Amaranthaceae</i>	Apamarga	WH
9.	<i>Achyranthus bdentata Blure</i>	H	<i>Amaranthaceae</i>	Raktapuspi	WH
10.	<i>Acorus calamus Linn</i>	H	<i>Araceae</i>	Bacha	RH
11.	<i>Adathoda vasica Nees</i>	S	<i>Acanthaceae</i>	Basak	L
12.	<i>Adiantum, lunulatum Burm</i>	H	<i>Polypodiaceae</i>	Hansapdi	L
13.	<i>Aegle mermelos Corr</i>	T	<i>Rutaceae</i>	Bilwa	L, ST

14.	<i>Agrimonia pilosa Ledeb</i>	S	<i>Rosaceae</i>	Belur,	WH
15.	<i>Albizzia lebbeck Benth</i>	T	<i>Leguminosae</i>	Shirisa	ST
16.	<i>Alstonia scholaris Roxb</i>	T	<i>Apocynaceae</i>	Saptapama	L, ST, ST
17.	<i>Amomum subulatum Roxb</i>	T	<i>Zingiberaceae</i>	Bhadraila	SD
18.	<i>Anacardium occidentale Linn</i>	H	<i>Anacardiaceae</i>	Batad	RT, ST, FU
19.	<i>Anaphalis triplinervis Sims</i>	H	<i>Asteraceae</i>	Anans	FL
20.	<i>Andropogon muricantus Retz</i>	H	<i>Graminae</i>	Virana	RT
21.	<i>Andropogon squarrosus Hook. f.</i>	H	<i>Graminae</i>	Bena	RT
22.	<i>Angelica glauca Edgw</i>	T	<i>Umbelliferae</i>	Chorak	RT
23.	<i>Annona squemosa Linn</i>	T	<i>Annonaceae</i>	sitaphal	RT, L,FU,SD
24.	<i>Anogeisus latifolia Wall</i>	S	<i>Comberetaceae</i>	Dhava	ST
25.	<i>Anthocephalus cadamba Miq</i>	T	<i>Rubiaceae</i>	Kadamba	ST
26.	<i>Aquilaria agalocha Roxbg</i>	T	<i>Thymelaeaceae</i>	Aguru	LX
27.	<i>Argemone maxicana Linn</i>	H	<i>Papaveraceae</i>	Katuparni	RT, LX
28.	<i>Argyreia speciosa Roxb</i>	C	<i>Convulvulaceae</i>	Samudrapalaka	L
29.	<i>Artemisia lciniata Willd</i>	S	<i>Asteraceae</i>	Khampa	L, FU, FL, ST
30.	<i>Artemisia vulgaris Linn</i>	S	<i>Asteraceae</i>	Damnak	WH
31.	<i>Artocarpus integrifolia Linn</i>	T	<i>Moraceae</i>	Panash	RT, ST, FU
32.	<i>Asclepias curasavica Linn</i>	H	<i>Asclepiadaceae</i>	Raktaphul	RT, L
33.	<i>Asparagus gonocladus Linn</i>	S	<i>Liliaceae</i>	Satmuli	RT
34.	<i>Asparagus racemosa Willd</i>	C	<i>Liliaceae</i>	Satavri	RT
35.	<i>Azadirachta indica A Juss</i>	T	<i>Meliaceae</i>	Nimba	L,OL
36.	<i>Balanites roxburghii Planch</i>	T	<i>Simaronbaceae</i>	Hingana	ST
37.	<i>Baliospermum monatanum Muell Arg.</i>	S	<i>Euphorbiceae</i>	Danti	L
38.	<i>Basia longlifolia Linn.</i>	T	<i>Sapotaceae</i>	Jalaja	SD
39.	<i>Bauhinia purpurea Linn</i>	T	<i>Leguminosae</i>	Lai-kovidar	SB, FL, FU
40.	<i>Berberis aristata D.C.</i>	H	<i>Berberidaceae</i>	Daruhald	RT,ST
41.	<i>Berberis asiatica Roxb</i>	H	<i>Berberidaceae</i>	Sumul	RT
42.	<i>Betula alnoides Buch.-Ham.</i>	T	<i>Betulaceae</i>	In Birch	ST
43.	<i>Biophytum sensitivum Linn</i>	H	<i>Gerandaceae</i>	Lajalu	SD

44.	<i>Boerhaavia diffusa</i> Linn.	H	<i>Nyctaginaceae</i>	Punarnava	WH
45.	<i>Bombusa arudinacea</i> Willd	T	<i>Graminae</i>	Vansha lochan	ST, SH
46.	<i>Boralia hispida</i> Linn	H	<i>Rubiaceae</i>	Madanghati	RT
47.	<i>Boschniakia himalaika</i> Hook.f.	S	<i>Scrophulariaceae</i>	Ganelu	WH
48.	<i>Boswellia serrata</i> Roxb	T	<i>Bursaraceae</i>	Salai	L
49.	<i>Bryophyllum calycinum</i> Salib	H	<i>Crassulaceae</i>	Pattharchur	L
50.	<i>Caesalpinia bonducella</i> F.	T	<i>Leguminosae</i>	Karanja	SD
51.	<i>Caesalpinia sappan</i> Linn.	S	<i>Leguminosae</i>	kuchandan	SD
52.	<i>Calendula officinalis</i> Linn.	H	<i>Asteraceae</i>	Marigold	FL
53.	<i>Callophylum inophyllum</i> Linn	T	<i>Guttiferae</i>	Sultanchampa	RT
54.	<i>Calotropis gigantean</i> Linn.	S	<i>Asclepiadiaceae</i>	Rajarka	LX
55.	<i>Calotropis procera</i> Ait.	S	<i>Asclepiadiaceae</i>	Akanda	RT, ST
56.	<i>Canabis sativa</i> Linn	H	<i>Cannabinaceae</i>	Bhang	L
57.	<i>Capparis aphylla</i> Roth	T	<i>Capparideaceae</i>	Karira	RT, ST
58.	<i>Capparis sepiaria</i> Linn.	T	<i>Capparideaceae</i>	Kalikara	RT, ST
59.	<i>Cardiospermum halicacabum</i> Linn	S	<i>Celastraceae</i>	Lataphatki	SD
60.	<i>Carica papaya</i>	T	<i>Caricaceae</i>	Papaya	Latex
61.	<i>Carthamus tinctorius</i> Linn	S	<i>Asteraceae</i>	Kusum	SD
62.	<i>Casia auriculata</i> Linn	S	<i>Caesalpinaceae</i>	Arbur	ST, F,L, SD
63.	<i>Cayratia camosa</i>	C	<i>Vitaceae</i>	Ambatvel	RT
64.	<i>Cedrela toona</i> Roxb.	H	<i>Leguminosae</i>	Tuni	SD
65.	<i>Cedrus deodara</i> Roxb. Loud.	T	<i>Annonaceae</i>	Devdaru	L
66.	<i>Celastrus panniculatus</i> Willd	C	<i>Celastraceae</i>	Jotismti	SD
67.	<i>Celsia coromandeliona</i> Vahl	H	<i>Scrophulariceae</i>	Bhutakeshi	WH
68.	<i>Centilla asiatica</i> Linn	H	<i>Umbeliferaceae</i>	Mandukparni	WH, SD
69.	<i>Chaslia chartacea</i> Craqib	S	<i>Rubiaceae</i>	Vellakuainji	RT
70.	<i>Chenopodium album</i> Linn.	H	<i>Chenopodiaceae</i>	Pigweed	L
71.	<i>Chloroxylon swietiana</i> DC	T	<i>Rutaceae</i>	Bhirra	L
72.	<i>Cinommomum tamala</i> N& E	T	<i>Lauraceae</i>	Patra	ST
73.	<i>Cirsium verutum</i> D.Don Spreng	S	<i>Asteraceae</i>	Kandara	RT
74.	<i>Cisampleos pareira</i> Linn.	T	<i>Menispermaceae</i>	Aknadi	RT

75.	<i>Citrullus colocynthis schard</i>	C	<i>Cucurbitaceae</i>	Indrabaruni	RT, FU
76.	<i>Citrus decummoona Linn.</i>	S	<i>Rutaceae</i>	Baranimbu	L, SD
77.	<i>Citrus medica Linn.</i>	S	<i>Rutaceae</i>	Matulunga	FU
78.	<i>Clerodendron serratum Spreng</i>	T	<i>Verbenaceae</i>	Bharangi	RT, L
79.	<i>Clitoria terentea Linn</i>	H	<i>Leguminosae</i>	Aparajita	RT, L, SD
80.	<i>Coccinia grandis Linn</i>	C	<i>Cucurbitaceae</i>	Kundari	WH
81.	<i>Codonopsis ovatabenth</i>	H	<i>Campanulaceae</i>	Bastard ginseng,	RT
82.	<i>Coleus vettiveroides Benth</i>	T	<i>Labiatae</i>	Valakam	WH
83.	<i>Coriandar sativum Linn</i>	H	<i>Umbeliferae</i>	Dhaniya	FU
84.	<i>Coscinum fenerstratum W</i>	C	<i>Menispermaceae</i>	Kuldi	RT
85.	<i>Crocus sativus Linn.</i>	S	<i>Iridaceae</i>	Kumkuma	FL
86.	<i>Cucumis trigonus</i>	C	<i>Cucurbitaceae</i>	Pongari	RT
87.	<i>Curcuma aromatica Salib</i>	H	<i>Zinziberaceae</i>	Jangali halad	RT
88.	<i>Curcuma longa Linn.</i>	H	<i>Zingiberaceae</i>	Haridra	RH
89.	<i>Curcuma zedoria Rosc.</i>	H	<i>Zingiberaceae</i>	Ekangi	TU
90.	<i>Cynodon dactylon Linn</i>	H	<i>Graminae</i>	Durva	WH ,RT
91.	<i>Cyprus rotundus Linn</i>	H	<i>Cyperaceae</i>	Motha/Mustak	RT
92.	<i>Datura fastuosa Linn.</i>	H	<i>Solanaceae</i>	Dhutura	L
93.	<i>Desmodium gangeticum D.C.</i>	H	<i>Leguminosae</i>	Shalaparni	WH
94.	<i>Desmotricum fimbriatum Lindl.</i>	H	<i>Orchidaceae</i>	Jivanti	RT
95.	<i>Dipterocanthus prostratus Ness</i>	H	<i>Acanthaceae</i>	-	RT
96.	<i>Dolichos biflorus Linn.</i>	H	<i>Leguminosae</i>	Kulattha	SD
97.	<i>Echinopus echinatus</i>	H	<i>Asteraceae</i>	Utakanta	RT
98.	<i>Eclipta alba Hassk</i>	H	<i>Asteraceae</i>	Bhringaraj	WH ,L, RT
99.	<i>Elephantopus scaber Linn</i>	H	<i>Asteraceae</i>	Gobhi, Punjaki	RT
100.	<i>Eletraia cardamomum Maton.</i>	C	<i>Zingiberaceae</i>	Elaich	SD
101.	<i>Embelia ribes Burm.f.</i>	C	<i>Myrsinaceae</i>	Bidanga	FU
102.	<i>Emlica officinalis Geartn</i>	T	<i>Euphorbiaceae</i>	Amlaki	FU, L
103.	<i>Ephedra vulgaris Hook.f.</i>	C	<i>Gnetaceae</i>	Somlata	ST
104.	<i>Erythrina indica Lam</i>	T	<i>Leguminosae</i>	Paribhadra	L, ST
105.	<i>Erythrina variegata Linn.</i>	T	<i>Leguminosae</i>	Badisa	L

106.	<i>Eucalyptus globus</i> Labill	T	<i>Myrtaceae</i>	Karpura	OL
107.	<i>Euphorbia hirta</i> Linn	H	<i>Euphorbiceae</i>	Dhudhi	RT
108.	<i>Euphorbia nerifolia</i> Linn.	H	<i>Euphorbiaceae</i>	Snuhi	LX
109.	<i>Euphorbia pilosa</i> Linn.	S	<i>Euphorbiaceae</i>	Chuplya	LX
110.	<i>Euphorbia thymifolia</i> R.Br.	H	<i>Euphorbiaceae</i>	Dugdhika	WH
111.	<i>Evolvulus alsinoides</i> Linn.	C	<i>Umbelliferae</i>	Shankhapuspi	FU
112.	<i>Feronia elephantum</i> Correa	T	<i>Rutaceae</i>	Kapirath	L
113.	<i>Ferula jaeschkeana</i> Vatke	S	<i>Umbellierae</i>	Hingu	GU
114.	<i>Ficus amottiana</i> Miq	T	<i>Moraceae</i>	Paraspipal	L, ST
115.	<i>Ficus bengalensis</i> Linn.	T	<i>Moraceae</i>	Vad	ST
116.	<i>Ficus glomerata</i> Roxb	T	<i>Moraceae</i>	Gular	WH , RT
117.	<i>Ficus hispida</i> Linn.f.	T	<i>Moraceae</i>	Kakodambara	ST
118.	<i>Ficus lacor</i> Buch. Ham.	T	<i>Moraceae</i>	Plaksha	ST
119.	<i>Ficus religiosa</i> Linn	T	<i>Moraceae</i>	Pipal	ST ,SH, L
120.	<i>Ficus retusa</i> Linn	T	<i>Moraceae</i>	Kuni	RT, L, ST
121.	<i>Gloriosa superba</i> Linn.	C	<i>Liliaceae</i>	Langloli	RT
122.	<i>Glycyrrhiza glabra</i> Linn.	S	<i>Leguminosae</i>	Jastimadhu,	RT, L
123.	<i>Gmellina arboria</i> Roxb	T	<i>Verbenaceae</i>	Shivam	RT, L
124.	<i>Gmellina eliptica</i> Sm	S	<i>Verbenaceae</i>	-	RT
125.	<i>Grawia hirsute</i> Vahl	S	<i>Tiliaceae</i>	-	RT
126.	<i>Grewia tenax</i> Forsk.	T	<i>Tiliaceae</i>	Gangu kanger	WH
127.	<i>Grewia tiliaefolia</i> Vahl.	T	<i>Tiliaceae</i>	Dhamina	ST
128.	<i>Gymnema sylvestre</i> R.Br.	C	<i>Asclepiadaceae</i>	Meshsringi	L
129.	<i>Hedychium spicatum</i> Ham ex Smith	H	<i>Zingiberaceae</i>	Sathi	RT
130.	<i>Heliotropium indicum</i> Linn	S	<i>Boraginaceae</i>	Hastisanda	L
131.	<i>Heliotropium eichwaldi</i> Stead	S	<i>Boraginaceae</i>	Nilkatte	L
132.	<i>Hemidesmus indicus</i> R.Br.	C	<i>Asclepiadaceae</i>	Anantamul	RT
133.	<i>Hollarrhena antidysentrica</i> Wall	T	<i>Apocynaceae</i>	Kutaj	RT, ST, SD
134.	<i>Hordeum vulgare</i> Linn.	H	<i>Graminae</i>	Yava	GR
135.	<i>Hydnocarpus laurifolias</i>	T	<i>Violaceae</i>	Kowl	SD, OL
136.	<i>Hydrolea zeylanica</i> Vhal.	S	<i>Hydrophyllaceae</i>	Ishalamgla	RT

137.	<i>Ichnocarpus frutescens</i> R.Br.	S	<i>Apocynaceae</i>	Shyama	RT
138.	<i>Indigophera aspalathoides</i> Vahl Ex D.C.	T	<i>Leguminosae</i>	Ingudi	SD
139.	<i>Ipomea paniculata</i> R.Br.	C	<i>Convolvulaceae</i>	Kushmanda	RT
140.	<i>Ipomea turpethum</i> R.Br.	H	<i>Convolvulaceae</i>	Trivirita	RT
141.	<i>Iris germanica</i> Linn.	S	<i>Irideae</i>	Padmakeshar	ST
142.	<i>Jasminum auriculatum</i> Vahl.	C	<i>Oleaceae</i>	Juthika	FL
143.	<i>Jasminum grandiflorum</i> Linn	C	<i>Oleaceae</i>	Chameli	WH
144.	<i>Jasminum officinalis</i> Linn.	C	<i>Oleaceae</i>	Jati	RT
145.	<i>Jasminum sambac</i> Ait.	C	<i>Oleaceae</i>	Mogra	ST, L, SD
146.	<i>Jatropha curcas</i> Linn	S	<i>Euphorbiaceae</i>	Mogali erand	L
147.	<i>Jatropha gossypifolia</i> Linn.	S	<i>Oleaceae</i>	Ratnajot	RT, ST, L, SD
148.	<i>Kaempheria rotunda</i>	S	<i>Zinziberaceae</i>	Bhuichampa	WH
149.	<i>Klenhovia hospital</i> Linn	S	<i>Streculiaceae</i>	Berora	L
150.	<i>Lagenaria vulgaris</i> Seringe.	C	<i>Cucurbitaceae</i>	Ikshaku	SD
151.	<i>Lantana camera</i> Linn	S	<i>Verbenaceae</i>	Kuri	WH
152.	<i>Leea aequata</i> Linn	S	<i>Vitaceae</i>	Leea	RT
153.	<i>Lilium gigantium</i> Wall	H	<i>Liliaceae</i>	Sunset plant	L
154.	<i>Linum usitatissimum</i> Linn	H	<i>Linaceae</i>	Alasi	SD, OL
155.	<i>Lippia nodiflora</i> Mich.	H	<i>Verbenaceae</i>	Jalapippai	FU
156.	<i>Litsea citrate</i> Lam	T	<i>Lauraceae</i>	Garbijaur	ST
157.	<i>Loranthus asper</i> Desr.	C	<i>Loranthaceae</i>	Bandaka	WH
158.	<i>Loranthus longiflorus</i> Desr	S	<i>Loranthaceae</i>	Vanda	L, FL
159.	<i>Luffa acutangula</i> Linn	C	<i>Cucurbitaceae</i>	Kritamul	SD
160.	<i>Luvunga scandens</i> Buch. Ham.	H	<i>Rutaceae</i>	Kakoli	RT
161.	<i>Lycopus europus</i> Linn	C	<i>Labiatae</i>	Jalnin	L
162.	<i>Lygodium flexuosum</i> Linn	H	<i>Schizaeaceae</i>	Rajhans	RT
163.	<i>Madhuca indica</i> J.F.Gmel	T	<i>Sapotaceae</i>	Moha	WH
164.	<i>Mallotus philippinensis</i> Muell. Arg.	T	<i>Euphorbiaceae</i>	Kampillaka	SD, FU
165.	<i>Melastoma malabathricum</i> Linn	S	<i>Melastomaceae</i>	Malabar melastome	RT
166.	<i>Melia azedarach</i> Linn	T	<i>Meliaceae</i>	Bakain	ST, ST

167.	<i>Meriandra strobilifera</i> <i>Benth</i>	T	<i>Labiatae</i>	Kafur	L
168.	<i>Mertynia diandra</i> <i>Glox.</i>	H	<i>Mertyneceae</i>	Baghnakhi	FU, FL
169.	<i>Mesua ferrea</i> <i>Linn.</i>	S	<i>Guttiferae</i>	Nagkesar	SM
170.	<i>Mimosa pudica</i> <i>Linn.</i>	R	<i>Mimosaceae</i>	Lajjalu	WH
171.	<i>Mimusops elengi</i> <i>Linn.</i>	T	<i>Sapotaceae</i>	Bakul	ST
172.	<i>Morinda citrifolia</i> <i>Linn</i>	T	<i>Rubiaceae</i>	Ach,Aal	L
173.	<i>Moringa oleifera</i> <i>Lamk</i>	T	<i>Moringaceae</i>	Sajina	RT
174.	<i>Mucuna pruriens</i> <i>Bak.</i>	C	<i>Leguminosae</i>	Kapikacchhu	RT
175.	<i>Murryaya koenginii</i> <i>spreng</i>	S	<i>Rutaceae</i>	Kadipatta	RT
176.	<i>Musa paradisiaca</i> <i>Linn.</i>	S	<i>Musaceae</i>	Kadali	ST
177.	<i>Myrica nagi</i> <i>Thumb.</i>	T	<i>Myricaceae</i>	Katphala	ST
178.	<i>Nardostachys jatamansi</i> <i>D.C.</i>	H	<i>Valerianaceae</i>	Jatamansi	RT
179.	<i>Nelsonia canescens</i>	H	<i>Acanthaceae</i>	blue pussy leaf	RT
180.	<i>Nelumbium speciosum</i> <i>Willd.</i>	C	<i>Nymphaeaceae</i>	Kamal	RT
181.	<i>Nelumbo nucifera</i> <i>Willd.</i>	C	<i>Nymphaeaceae</i>	Pundariya	ST
182.	<i>Nerium indicum</i> <i>Mill.</i>	S	<i>Apocynaceae</i>	Karabi	RT
183.	<i>Nymphoea stellata</i> <i>Willd.</i>	C	<i>Nymphaeaceae</i>	Nilotapala	RT
184.	<i>Nymphoea lotus stellata</i> <i>Willd.</i>	C	<i>Nymphaeaceae</i>	Shapla	RT
185.	<i>Ochradenus baccatus</i> <i>Del</i>	T	<i>Resedaceae</i>	Kalliram	L
186.	<i>Odina woodier</i> <i>Roxb.</i>	T	<i>Anacardiaceae</i>	Jingira	ST
187.	<i>Oledelandia biflora</i> <i>Linn.</i>	T	<i>Rubiaceae</i>	Khetpapra	WH
188.	<i>Oroxulum indicum</i> <i>vent</i>	T	<i>Bignonaceae</i>	Sonpatha	RT ,SD
189.	<i>Oryza sativa</i> <i>Linn.</i>	H	<i>Graminae</i>	Shetashalitand	SD
190.	<i>Oscimum sanctum</i> <i>Linn</i>	H	<i>Labiaceae</i>	Tulsi	L
191.	<i>Papaver somiferum</i> <i>Linn.</i>	H	<i>Papaveraceae</i>	Ahiphena	SD
192.	<i>Pavetta indicm</i>	T	<i>Rubiaceae</i>	Jarum-jarum	RT
193.	<i>Phaseolus trilobus</i> <i>Ait.</i>	H	<i>Leguminosae</i>	Mudga	RT, WH
194.	<i>Phragmites maxima</i> <i>Blatter & Mc Cann</i>	H	<i>Graminae</i>	Nalmula	RT
195.	<i>Picorrhiza kurroa</i> <i>Royle ex Benth.</i>	H	<i>Scrophulariaceae</i>	Katuki	RH
196.	<i>Pinus gradiyana</i> <i>Wall</i>	T	<i>Pinaceae</i>	Rhi	SD

197.	<i>Pinus longifolia Roxb</i>	T	<i>Pinaceae</i>	Cheer	OL
198.	<i>Piper auranticum Linn.</i>	C	<i>Piparaceae</i>	Renuka	FU
199.	<i>Piper chava Hunter.</i>	C	<i>Piparaceae</i>	Chavika	FU
200.	<i>Piper longum Linn.</i>	C	<i>Piparaceae</i>	Pipul	RT
201.	<i>Piper nigrum Linn.</i>	C	<i>Piparaceae</i>	Marich	FU
202.	<i>Pisum sativum Linn.</i>	C	<i>Verbenaceae</i>	Harenu	L
203.	<i>Plantago lanciolata Linn</i>	T	<i>Plantagenaceae</i>	Bal tanga	L
204.	<i>Pluchea lanceolata Oliver & Hiern</i>	H	<i>Asteraceae</i>	Rasna	L
205.	<i>Plumbago zeylanica Linn.</i>	C	<i>Plumbaginaceae</i>	Chita	RT
206.	<i>Pongamia glabra Vent.</i>	T	<i>Leguminosae</i>	Karanja	SD, L
207.	<i>Portulaca quadrifida Linn</i>	H	<i>Portulacaceae</i>	Lonia	L
208.	<i>Premna integrifolia Linn.</i>	S	<i>Verbenaceae</i>	Ganiari	RT
209.	<i>Prunus amygdalus Batsch</i>	T	<i>Rosaceae</i>	Almond	WH
210.	<i>Prunus cerasus Linn.</i>	T	<i>Rosaceae</i>	Elabaluka	SD
211.	<i>Prunus mahaleb Linn.</i>	S	<i>Rosaceae</i>	Priyangu	RT
212.	<i>Prunus puddum Roxb.</i>	T	<i>Rosaceae</i>	Padmakastha	ST
213.	<i>Psidium guajavaLinn</i>	H	<i>Myrtaceae</i>	Amrud	L
214.	<i>Psoralia corylifolia Linn.</i>	C	<i>Leguminosae</i>	Bakuchi	SD
215.	<i>Pteredium aquilinum Khun</i>	H	<i>Polypodiaceae</i>	Bracken	RT
216.	<i>Pterocarpus santalinus L.f.</i>	T	<i>Papilionaceae</i>	Raktachandan	ST
217.	<i>Pterocarpus marsupium Roxb</i>	S	<i>Leguminoceae</i>	Bijasar	L
218.	<i>Randia dumentorum Linn.</i>	S	<i>Rubiaceae</i>	Madan	ST
219.	<i>Rannunculus scleratus Linn.</i>	S	<i>Rannunculaceae</i>	Kandira	WH
220.	<i>Rauwolfia serpentina Bent</i>	S	<i>Apocynaceae</i>	Chota chandra	RT, L
221.	<i>Resantia indica</i>	H	<i>Celastraceae</i>	-	RT
222.	<i>Rhinacanthus nasutus K</i>	T	<i>Acanthaceae</i>	Palakjuhi	RT, L
223.	<i>Rhus succdeania Linn.</i>	H	<i>Anacardiaceae</i>	Karkatashringi	GL
224.	<i>Rosa chinensisJacq</i>	S	<i>Rosaceae</i>	Sada gulab	FU
225.	<i>Rosa multiflora Herm</i>	S	<i>Rosaceae</i>	Kujai	FU
226.	<i>Rubia cordifolia Linn.</i>	S	<i>Rubiaceae</i>	Manjistha	RT
227.	<i>Rumex crisper Linn.</i>	S	<i>Aristolochiaceae</i>	Betas	WH

228.	<i>Salix tetrasperma</i> Roxb.	S	<i>Salicaceae</i>	Jalabetas	ST, FL
229.	<i>Salmalia malabarica</i> Schott & Endl	S	<i>Bombacaceae</i>	Shimul	ST
230.	<i>Salvia moorcroftiana</i> Wall	S	<i>Labiatae</i>	Sage species	FL
231.	<i>Salvia officinalis</i> Linn	S	<i>Labiatae</i>	Sage	WH
232.	<i>Santalum albam</i> Linn.	T	<i>Santalanaceae</i>	Swetchandana	ST
233.	<i>Saraca indica</i> Linn.	T	<i>Leguminosae</i>	Asoka	ST
234.	<i>Saussurea lappa</i> C.B. Clarke	H	<i>Asteraceae</i>	Kur	RT
235.	<i>Semecarpus anacardium</i> Linn.	T	<i>Anacardaceae</i>	Bhallataka	RT
236.	<i>Sesasum indicum</i> Linn	H	<i>Pedaliaceae</i>	Til	L, SD, OL
237.	<i>Shorea robusta</i> Gareth	T	<i>Dipterocarpaceae</i>	Sal	ST, SD, RS
238.	<i>Sida acuta</i> Burn	S	<i>Malvaceae</i>	Boriora	RT
239.	<i>Sida cordifolia</i> Linn	H	<i>Malvaceae</i>	Bala	RT
240.	<i>Sida spinosa</i> Linn.	S	<i>Malvaceae</i>	Chakule	RT
241.	<i>Solena heterophylla</i> Lour.	S	<i>Cucurbitaceae</i>	Bankundri	L
242.	<i>Soymida febrifuga</i> A. Juss	T	<i>Meliaceae</i>	Rohera	ST
243.	<i>Spaeranthus indicus</i> Linn.	H	<i>Asteraceae</i>	Mundi	RT
244.	<i>Spirogyra elongata</i>	A	<i>Algae</i>	Shaibal	FI
245.	<i>Stfordia fruticosa</i> Kurz.	S	<i>Lytheraceae</i>	Dhataki	FL
246.	<i>Strebulus asper</i> Lour.	S	<i>Moraceae</i>	Shoera	RT
247.	<i>Strychnos nux vomica</i> Linn	T	<i>Loganiaceae</i>	Visha-mukti	L
248.	<i>Swertia chirata</i> Buch.Ham.	H	<i>Gentianaceae</i>	Chireta	ST, L
249.	<i>Symplocos racemosa</i> Ro	T	<i>Symplocaceae</i>	Luddi/Lodhraka	ST
250.	<i>Syzygium cumini</i> Skeels	T	<i>Myrtaceae</i>	Jambu, Jamun	ST, FU
251.	<i>Tagetes erecta</i> Linn	H	<i>Asteraceae</i>	Bhuidri	FL, L
252.	<i>Tamarix gallica</i> Linn	S	<i>Tamaraceae</i>	Jhau	WH
253.	<i>Tarenna asiatica</i> Linn. Alston	S	<i>Rubiaceae</i>	Kommichittu	L
254.	<i>Tecoma radicans</i> JuS	C	<i>Bignonaceae</i>	Trumpet Creeper	RT
255.	<i>Tephrosia purpurea</i> pers	H	<i>Leguminosae</i>	Sarapunkha	WH
256.	<i>Terminalia arjuna</i> Bedd	T	<i>Combretaceae</i>	Kahu	ST
257.	<i>Terminalia chebula</i> Retz.	T	<i>Combreraceae</i>	Haritki	FU
258.	<i>Terminaliraia belerica</i> Roxb.	T	<i>Combreraceae</i>	Bibhitaka	FU

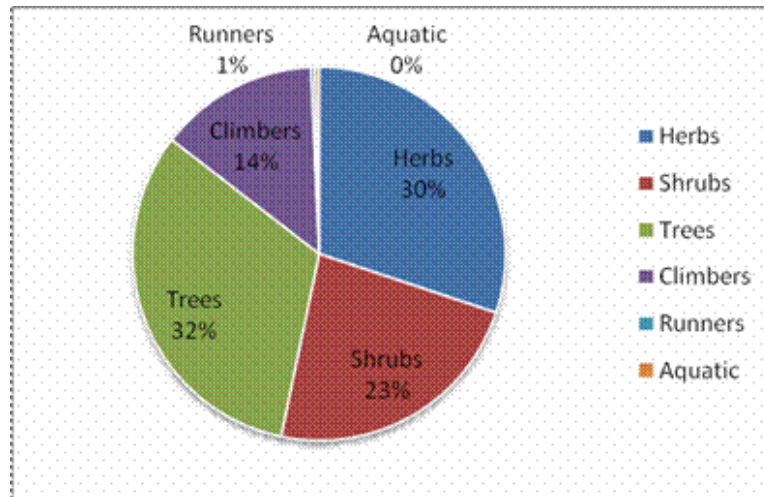
259.	<i>Thespesia populnea Soland ex correa</i>	T	<i>Malvaceae</i>	Palashpipul	FU, L, RT
260.	<i>Thuja orientalis Linn</i>	T	<i>Cuprasasae</i>	Vidya	ST
261.	<i>Tinospora tomentosa Colebr.</i>	T	<i>Menispermaceae</i>	Padmagulancha	ST
262.	<i>Trechyspermum ammiLinn.</i>	H	<i>Umbelliferae</i>	Ajwain,	SD
263.	<i>Tribulus terretris Linn.</i>	R	<i>Zygophyllaceae</i>	Gokshura	FU
264.	<i>Tricodesma indicum R.Br.</i>	C	<i>Cucurbitaceae</i>	Surasa	RT
265.	<i>Tricosanthes dioica Roxb.</i>	C	<i>Cucurbitaceae</i>	Palta	L, ST
266.	<i>Tridax Procumbens Linn.</i>	H	<i>Asteraceae</i>	Ekdandi	L
267.	<i>Tylophora fasciculata H</i>	H	<i>Asclepiadaceae</i>	Gundra	L
268.	<i>Typha elephantine Linn</i>	T	<i>Typhaceae</i>	Cat tails	FU
269.	<i>Vateria indica Linn.</i>	T	<i>Dipterocarpaceae</i>	Sarja	LX
270.	<i>Veronia anthelmintic Willd.</i>	S	<i>Asteraceae</i>	Somraj	SD
271.	<i>Veronia teris Wall</i>	H	<i>Asteraceae</i>	Banda	WH
272.	<i>Veronica beccalunga Linn</i>	H	<i>Scrophulariaceae</i>	Ashwakandika	WH
273.	<i>Vernonia arborea Hk</i>	T	<i>Asteraceae</i>	-	L
274.	<i>Viscum album Linn</i>	C	<i>Loranthaceae</i>	Pitabringi	WH
275.	<i>Vitex negundo Linn.</i>	S	<i>Verbeneceae</i>	Nishinda	L
276.	<i>Wedelia calendulacea Less</i>	H	<i>Asteraceae</i>	Bhringaraj	L
277.	<i>Widelia wallichii Los</i>	H	<i>Asteraceae</i>	-	WH
278.	<i>Witahnia somnifera Dunal.</i>	S	<i>Solanaceae</i>	Ashwagandha	TU, RT
279.	<i>Xanthium stumarium</i>	S	<i>Asteraceae</i>	Chote gokhru	RT
280.	<i>Zingiber officinale Rosc.</i>	H	<i>Zingiberaceae</i>	Sunthi	RH
281.	<i>Ziziphus jujube Linn</i>	T	<i>Rhamnaceae</i>	Bor	RT
282.	<i>Ziziphus mauritiana Linn</i>	T	<i>Rhamnaceae</i>	Bor	RT
283.	<i>Ziziphus vulgaris Linn</i>	T	<i>Rhamnaceae</i>	Bor	ST

H = Herbs, S = Shrubs, T = Tree, C = Climber, R = Runners, A = Aquatic, L = Leaves, SD = Seeds, ST = Stem, FU = Fruit, WH = Whole plant, RH = Rhizome, RT = Root, FL = Flower, LX = Latex, OL = Oil, TU = Tuber, GU = Gum, SH = Shoot, GR = Grain, SM = Stamen, GL = Gall, RS = Resin, FI = Filament,

The present investigation comprises geographical distribution of wound healing plants throughout India was 283 of which 79.15% was found in Maharashtra and 46.28% observed in Jalgaon District. 283 plant species of ethnomedicinal plants, distributed in 236 genera belonging to 97 families. For each species botanical name, family, local name, parts used, is provided. Traditional healers are using these plants to cure diseases related to

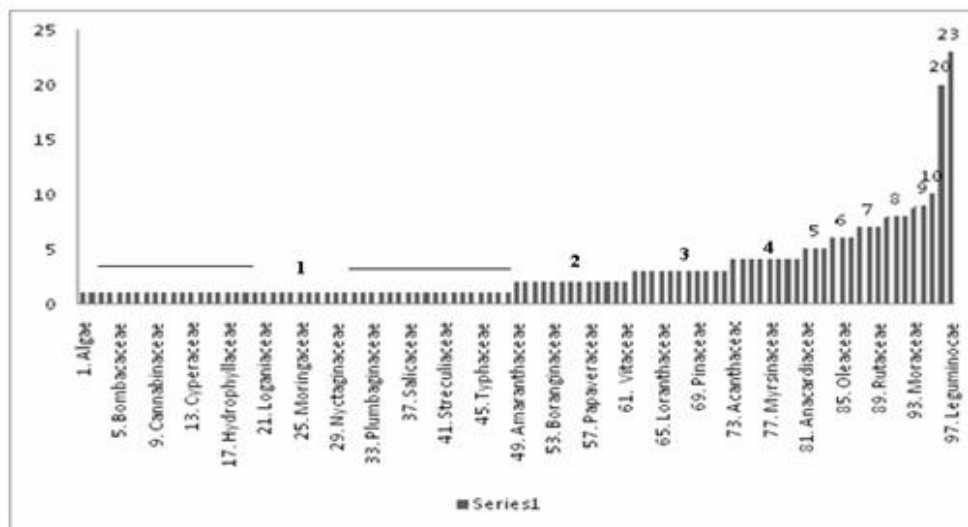
skin problems, cold, fever, cough, headache, diarrhea, fertility problems, toothache, stomach ache, diabetes, rheumatism, asthma, dysentery, small pox, bone fractures, earache, hair loss and poison (snake, scorpion and insect) bites especially wounds. Zingiberaceae was the dominant monocot family followed by Poaceae family. Trees (93 species) were found to be the most used plants (Figure 3) followed by Herbs (87 species), shrubs (67 species) and climbers (40 species) in descending order.

Figure 3. Distributions of wound healing plants habit wise.



Only one aquatic plant, 93.63% of dicotyledons and 6.34% of monocotyledons, plants are of wound healing in nature. The most dominant families in the study were Leguminosae (23 species) (Figure 4), Asteraceae (20 species), Euphorbiceae (10 species), Moraceae and *Rubiaceae* (09 species), Cucurbitaceae, *Verbenaceae*, Zingiberaceae (08 species), Poaceae, *Rosaceae* and *Rutaceae* (07 species), Asclepiadaceae, *Oleaceae* and *Umbelliferae* (06 species), Apocynaceae and Labiatae (05 species) Acanthaceae, Comberetaceae, *Liliaceae*, *Malvaceae*, *Myrsinaceae*, *Nymphaeaceae*, *Piparaceae* and *Scrophulariaceae* (04 species), Celastraceae, Convulvulaceae Dipterocarpaceae, *Loranthaceae*, Meliaceae, Menispermaceae, Mimosaceae, Pinaceae, *Rhamnaceae*, Sapotaceae, and *Tiliaceae* (03 species), Other families with less number are listed below: *Amaranthaceae*, *Annonaceae*, *Berberidaceae*, *Bignonaceae*, *Boranginaceae*, *Capparideceae*, *Guttiferae*, *Lauraceae*, *Papaveraceae*, *Pedaliaceae*, *Polypodiaceae*, *Solanaceae*, and *Vitaceae* (2 species), whereas 48 families have single species. Different parts of medicinal plants were used as medicine by the local traditional healers.

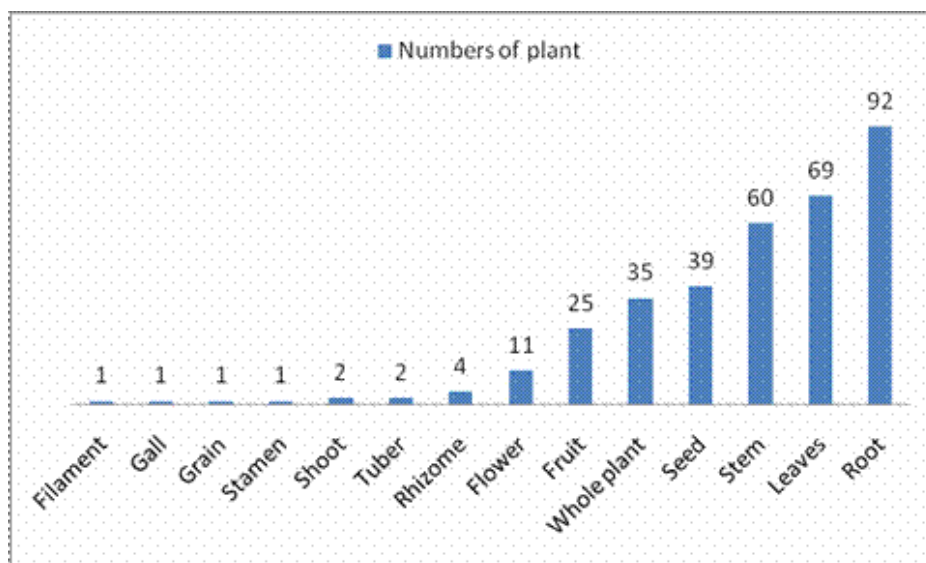
Figure 4. Familiwise distribution of wound healing plants.



Arabic number represents number of plant species

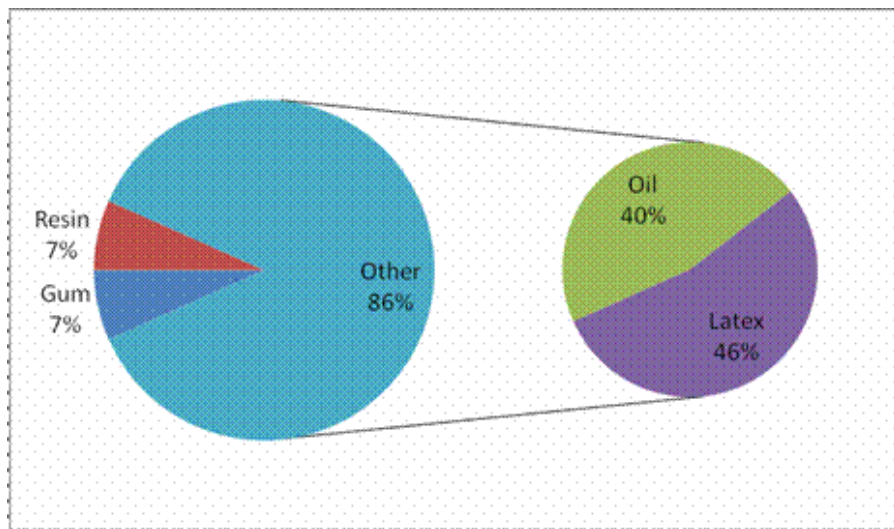
Mostly root was used for wound healing followed by leaves (Figure 5A). Part used are in following order stem > seed > whole plant > fruit > flower > rhizome > tuber > shoot > stamen > grain > gall > filament.

Figure 5A. Distribution of part used of wound healing plants.



In addition to plant parts, plant products used by *adivasi* neighborhood, as under latex > oil > resin and gum (Figure 5B).

Figure 5B. Distribution of plant product of wound healing plants.



The scientific approaches for the study of traditional plant-based remedies for wound healing will provide us an important platform for rigorous testing and evaluation of their clinical efficacy based on animal models.

Table 3 Wound healing plants belonging to North Maharashtra region.

Sr. no.	Name of the plant	Habit	Family	Common name	Part used
1.	<i>Abrus precatorius linn</i>	C	<i>Leguminosae</i>	Gunja,Kunch	SD
2.	<i>Acacia arebica (Linn)</i>	T	<i>Mimosaceae</i>	Babul	ST,L,FU,SD
3.	<i>Acacia ferneiana Willd</i>	T	<i>Leguminosae</i>	Irimeda	ST
4.	<i>Achyranthus aspera linn</i>	H	<i>Amaranthaceae</i>	Apamarga	WH
5.	<i>Achyranthus bdentata Blure</i>	H	<i>Amaranthaceae</i>	Raktapuspi	WH
6.	<i>Acorus calamus Linn</i>	H	<i>Araceae</i>	Bacha	RH
7.	<i>Adathoda vasica Nees</i>	S	<i>Acanthaceac</i>	Basak	L
8.	<i>Adiantum, subulatum Burm</i>	H	<i>Polypodiaceae</i>	Hansapdi	L
9.	<i>Aegle mermelos Corr</i>	T	<i>Rutaceae</i>	Bilwa	L, ST
10.	<i>Albizzia lebbeck Benth</i>	T	<i>Leguminosae</i>	Shirisa	ST
11.	<i>Alstonia schlolaris (Roxb)</i>	T	<i>Apocynaceae</i>	Saptapama	L, ST, ST
12.	<i>Anacardium occidentale (L)</i>	H	<i>Anacardiaceae</i>	Batad	RT, ST, FU
13.	<i>Annona squemosa (Linn)</i>	T	<i>Annonaceae</i>	sitaphal	RT, L,FU,SD
14.	<i>Anogeisus latifolia Wall</i>	S	<i>Comberetaceae</i>	Dhava	ST
15.	<i>Anthocephalus cadamba</i>	T	<i>Rubiaceae</i>	Kadamba	ST
16.	<i>Argemone maxicana (Linn)</i>	H	<i>Papaveraceae</i>	Katuparni	RT, LX
17.	<i>Asparagus racemosa Willd</i>	C	<i>Liliaceae</i>	Satavri	RT

18.	<i>Azadirachta indica (Linn)</i>	T	<i>Meliaceae</i>	Nimba	L,OL
19.	<i>Balanites roxburghii Planch</i>	T	<i>Simaronbaceae</i>	Hingana	ST
20.	<i>Baliospermum monatanum Muell</i>	S	<i>Euphorbiceae</i>	Danti	L
21.	<i>Bauhinia purpurea (Linn)</i>	T	<i>Leguminosae</i>	Lai-kovidar	SB, FL, FU
22.	<i>Biophytum sensitivum (Linn)</i>	H	<i>Gerandaceae</i>	Lajalu	SD
23.	<i>Boerhaavia diffusa Linn.</i>	H	<i>Nyctaginaceae</i>	Punarnava	WH
24.	<i>Bombusa arudinacea</i>	T	<i>Graminae</i>	Vansha lochan	ST, SH
25.	<i>Boswellia serrata</i>	T	<i>Bursaraceae</i>	Salai	L
26.	<i>Bryophyllum calliciniu (Linn)</i>	H	<i>Crassulaceae</i>	Pattharchur	L
27.	<i>Caesalpinia bonducella f.</i>	T	<i>Leguminosae</i>	Karanja	SD
28.	<i>Caesalpinia sappan Linn.</i>	S	<i>Leguminosae</i>	kuchandan	SD
29.	<i>Calendula officinalis Linn.</i>	H	<i>Asteraceae</i>	Marigold	FL
30.	<i>Callophylum inophyllum</i>	T	<i>Guttiferae</i>	Sultanchampa	RT
31.	<i>Calotropis gigantean Linn.</i>	S	<i>Asciepidiaceae</i>	Rajarka	LX
32.	<i>Canabis sativa (Linn)</i>	H	<i>Cannabinaceae</i>	Bhang	L
33.	<i>Carthamus tinctorius (Linn)</i>	S	<i>Asteraceae</i>	Kusum	SD
34.	<i>Celastrus panniculatus Willd</i>	C	<i>Celastraceae</i>	Jotismti	SD
35.	<i>Centilla asiatica (Linn)</i>	H	<i>Umbeliferaceae</i>	Mandukparni	WH, SD
36.	<i>Citrullus colocynthis schard</i>	C	<i>Cucurbitaceae</i>	Indrabaruni	RT, FU
37.	<i>Citrus medica Linn.</i>	S	<i>Rutaceae</i>	Matulunga	FU
38.	<i>Clerodendron serratum</i>	T	<i>Verbenaceae</i>	Bharangi	RT, L
39.	<i>Clitoria terentea (Linn)</i>	H	<i>Leguminosae</i>	Aparajita	RT, L, SD
40.	<i>Coccinia grand (Linn)</i>	C	<i>Cucurbitaceae</i>	Kundari	WH
41.	<i>Coriandar sativum (Linn)</i>	H	<i>Umbeliferae</i>	Dhaniya	FU
42.	<i>Curcuma aromatica (Salib)</i>	H	<i>Zinziberaceae</i>	Jangali halad	RT
43.	<i>Curcuma longa Linn.</i>	H	<i>Zingiberaceae</i>	Haridra	RH
44.	<i>Cynodon dactylon (Linn)</i>	H	<i>Graminae</i>	Durva	WH ,RT
45.	<i>Cyprus rotundus (Linn)</i>	H	<i>Cyperaceae</i>	Motha/Mustak	RT
46.	<i>Datura fastuosa Linn.</i>	H	<i>Solanaceae</i>	Dhutura	L
47.	<i>Desmodium gangeticum D.C.</i>	H	<i>Leguminosae</i>	Shalaparni	WH
48.	<i>Dolichos biflorus Linn.</i>	H	<i>Leguminosae</i>	Kulattha	SD
49.	<i>Echinopus echinatus</i>	H	<i>Asteraceae</i>	Utakanta	RT

50.	<i>Ehlipta alba</i> (Linn)	H	<i>Asteraceae</i>	Bhringaraj	WH ,L, RT
51.	<i>Elephantopus scaber</i>	H	<i>Asteraceae</i>	Gobhi, Punjaki	RT
52.	<i>Embelia ribes</i> Burm.f.	C	<i>Myrsinaceae</i>	Bidanga	FU
53.	<i>Emlica officinalis</i> Linn.	T	<i>Euphorbiaceae</i>	Amlaki	FU, L
54.	<i>Erythrina indica</i> (Lam)	T	<i>Leguminosae</i>	Paribhadra	L, ST
55.	<i>Erythrina variegata</i> Linn.	T	<i>Leguminosae</i>	Badisa	L
56.	<i>Eucaiyptus globus</i> (Labill)	T	<i>Myrtaceae</i>	Karpura	OL
57.	<i>Euphorbia hirta</i> (Linn)	H	<i>Euphorbiceae</i>	Dhudhi	RT
58.	<i>Euphorbia nerifolia</i> Linn.	H	<i>Euphorbiaceae</i>	Snuhi	LX
59.	<i>Euphorbia thymifolia</i> R.Br.	H	<i>Euphorbiaceae</i>	Dugdhika	WH
60.	<i>Evolvulus alsinoides</i> Linn.	C	<i>Umbelliferae</i>	Shankhapuspi	FU
61.	<i>Ferula jaeschkaena</i> (Vatkke)	S	<i>Umbellierae</i>	Hingu	GU
62.	<i>Ficus amottiana</i> (Miq)	T	<i>Moraceae</i>	Paraspipal	L, ST
63.	<i>Ficus bengalensis</i> Linn.	T	<i>Moraceae</i>	Vad	ST
64.	<i>Ficus glomeratus</i> (Linn)	T	<i>Moraceae</i>	Gular	WH , RT
65.	<i>Ficus hispida</i> Linn.f.	T	<i>Moraceae</i>	Kakodambara	ST
66.	<i>Ficus nlacor</i> Buch. Ham.	T	<i>Moraceae</i>	Plaksha	ST
67.	<i>Ficus religiosa</i> (Linn)	T	<i>Moraceae</i>	Pipal	ST ,SH, L
68.	<i>Gloriosa superba</i> Linn.	C	<i>Liliaceae</i>	Langloli	RT
69.	<i>Gmellina arboria</i> (Roxb)	T	<i>Verbenaceae</i>	Shivam	RT, L
70.	<i>Grewia tiliaefolia</i> Vahl.	T	<i>Tiliaceae</i>	Dhamina	ST
71.	<i>Gymnema sylvestre</i> R.Br.	C	<i>Asclepiadaceae</i>	Meshsringi	L
72.	<i>Hemidesmus indicus</i> R.Br.	C	<i>Asclepiadaceae</i>	Anantamul	RT
73.	<i>Hollarrhena antidysentrica</i>	T	<i>Apocynaceae</i>	Kutaj	RT, ST, SD
74.	<i>Hordeum vulgare</i> Linn.	H	<i>Graminae</i>	Yava	GR
75.	<i>Indigophera aspalathoides</i> Vahl.	T	<i>Leguminosae</i>	Ingudi	SD
76.	<i>Jasminum aticulatum</i> Vahl.	C	<i>Oleaceae</i>	Juthika	FL
77.	<i>Jasminum grandiflorum</i> (Linn)	C	<i>Oleaceae</i>	Chameli	WH
78.	<i>Jasminum officinalis</i> Linn.	C	<i>Oleaceae</i>	Jati	RT
79.	<i>Jasminum sambak</i> (Ait)	C	<i>Oleaceae</i>	Mogra	ST, L, SD
80.	<i>Jatropha curcus</i> (Linn)	S	<i>Euphorbiaceae</i>	Mogali erand	L
81.	<i>Jatropha gosypifolia</i> Linn.	S	<i>Oleaceae</i>	Ratnajot	RT, ST, L, SD

82.	<i>Kaempheria rotunda</i>	S	<i>Zinziberaceae</i>	Bhuichampa	WH
83.	<i>Lagenaria vulgaris Seringe.</i>	C	<i>Cucurbitaceae</i>	Ikshaku	SD
84.	<i>Lantana camera</i>	S	<i>Verbenaceae</i>	Kuri	WH
85.	<i>Loranthus asper Desr.</i>	C	<i>Loranthaceae</i>	Bandaka	WH
86.	<i>Madhuka indica</i>	T	<i>Sapotaceae</i>	Moha	WH
87.	<i>Melia azedarach (Linn)</i>	T	<i>Meliaceae</i>	Bakain	ST, ST
88.	<i>Mertynia diandra Glox.</i>	H	<i>Mertyneceae</i>	Baghnakhi	FU, FL
89.	<i>Mimosa pudica Linn.</i>	R	<i>Mimosaceae</i>	Lajjalu	WH
90.	<i>Mimusops elengi Linn.</i>	T	<i>Sapotaceae</i>	Bakul	ST
91.	<i>Morinda citrifolia (Linn)</i>	T	<i>Rubiaceae</i>	Ach,Aal	L
92.	<i>Moringa oliefera Linn.</i>	T	<i>Moringaceae</i>	Sajina	RT
93.	<i>Mucuna pruriens Bak.</i>	C	<i>Leguminosae</i>	Kapikacchhu	RT
94.	<i>Murryaya koenginii (Linn)</i>	S	<i>Rutaceae</i>	Kadipatta	RT
95.	<i>Musa paradisiaca Linn.</i>	S	<i>Musaceae</i>	Kadali	ST
96.	<i>Myrica nagi thumb.</i>	T	<i>Myricaceae</i>	Katphala	ST
97.	<i>Nardostachys jatamansi Dc.</i>	H	<i>Valerianaceae</i>	Jatamansi	RT
98.	<i>Nelumbium speciosum Willd.</i>	C	<i>Nymphaeaceae</i>	Kamal	RT
99.	<i>Nerium indicum Mill.</i>	S	<i>Apocynaceae</i>	Karabi	RT
100.	<i>Odina stier Roxb.</i>	T	<i>Anacardiaceae</i>	Jingira	ST
101.	<i>Papaver somiferum Linn.</i>	H	<i>Papaveraceae</i>	Ahiphena	SD
102.	<i>Phaseolus trilobus Ait.</i>	H	<i>Leguminosae</i>	Mudga	RT, WH
103.	<i>Plumbago zeylanica Linn.</i>	C	<i>Plumbaginaceae</i>	Chita	RT
104.	<i>Pongamia glabra Vent.</i>	T	<i>Leguminosae</i>	Dahar karanja	SD, L
105.	<i>Pongamia pinnata (Linn)</i>	T	<i>Leguminoceae</i>	Karanj	SD
106.	<i>Portulaca quedrifida (Linn)</i>	H	<i>Portulaceae</i>	Lonia	L
107.	<i>Premna integrifolia Linn.</i>	S	<i>Verbenaceae</i>	Ganiari	RT
108.	<i>Psidium guajiava(Linn)</i>	H	<i>Myrtaceae</i>	Amrud	L
109.	<i>Psoralia corylifolia Linn.</i>	C	<i>Leguminosae</i>	Bakuchi	SD
110.	<i>Pterocarpus marsupium</i>	S	<i>Leguminoceae</i>	Bijasar	L
111.	<i>Raulfia serpantinum (Bents)</i>	S	<i>Apocynaceae</i>	Chota chandra	RT, L
112.	<i>Rosa chinensis(Jacq)</i>	S	<i>Rosaceae</i>	Sada gulab	FU
113.	<i>Rumex crisper Linn.</i>	S	<i>Aristolochiaceae</i>	Betas	WH

114.	<i>Salmalia malabarica S & E</i>	S	<i>Bombacaceae</i>	Shimul	ST
115.	<i>Santalum albam Linn.</i>	T	<i>Santalaceae</i>	Swetchandana	ST
116.	<i>Semecarpus anacardium Linn.</i>	T	<i>Anacardaceae</i>	Bhallataka	RT
117.	<i>Sida cordifolia (Linn)</i>	H	<i>Malvaceae</i>	Bala	RT
118.	<i>Sida spinosa Linn.</i>	S	<i>Malvaceae</i>	Chakule	RT
119.	<i>Spaeranthus indicus Linn.</i>	H	<i>Asteraceae</i>	Mundi	RT
120.	<i>Syzygium cuminii (Linn.) Skeels</i>	T	<i>Myrtaceae</i>	Jambu, Jamun	ST, FU
121.	<i>Tephrosia purpurea Linn.</i>	H	<i>Leguminosae</i>	Sarapunkha	WH
122.	<i>Terminalia arjuna (Linn)</i>	T	<i>Combretaceae</i>	Kahu	ST
123.	<i>Terminalia chebula Retz.</i>	T	<i>Combretaceae</i>	Haritki	FU
124.	<i>Terminalia bellerica Roxb.</i>	T	<i>Combretaceae</i>	Bibhitaka	FU
125.	<i>Thuja orientalis (Linn)</i>	T	<i>Cupressaceae</i>	Vidya	ST
126.	<i>Tribulus terrestris Linn.</i>	R	<i>Zygophyllaceae</i>	Gokshura	FU
127.	<i>Tridax procumbens Linn.</i>	H	<i>Asteraceae</i>	Ekdandi	L
128.	<i>Vitex negundo Linn.</i>	S	<i>Verbenaceae</i>	Nishinda	L
129.	<i>Withania somnifera Dunal.</i>	S	<i>Solanaceae</i>	Ashwagandha	TU, RT
130.	<i>Zingiber officinale Rosc.</i>	H	<i>Zingiberaceae</i>	Sunthi	RH
131.	<i>Ziziphus jujube (Linn)</i>	T	<i>Rhamnaceae</i>	Bor	RT
132.	<i>Ziziphus mauritiana (Linn)</i>	T	<i>Rhamnaceae</i>	Bor	RT
133.	<i>Ziziphus vulgaris (Linn)</i>	T	<i>Rhamnaceae</i>	Bor	ST

Eleven plants mostly are practiced out of 283 were selected for evaluation of wound healing activity in an experimental animal model in our laboratory (Table 4).

Table 4 Routinely practiced wound healing plants by local tribals undertaken for evaluation of wound healing activity in experimental animal model.

Sr. no.	Name of plants	Habit	Family	Common name	Parts used
1.	<i>Azadirachta indica</i>	T	Meliaceae	Neem	Leaves, oil
2.	<i>Acalypha indica</i>	H	Euphorbiaceae	Khokali	Leaves, bark
3.	<i>Achyranthus aspera</i>	H	Verbanaceae	apamarg	Leaves
4.	<i>Curcuma longa</i>	H	Zingiberaceae	Halad	Root
5.	<i>Cynodon dactylon</i>	H	Cyperaceae	Durva	Leaves

6.	<i>Coriandar sativam</i>	H	Umbelliferae	Dhaniya	Fruit
7.	<i>Murraya koenigii</i>	S	Rutaceae	Kadhipatta	Root
8.	<i>Pongamia glabra</i>	T	Leguminosae	Karanj	Leaves, bark
9.	<i>Terminalia arjuna</i>	T	Combretaceae	Arjun	Bark
10.	<i>Vitex nigundo</i>	S	<i>Verbeneceae</i>	Nirgundi	Leaves
11.	<i>Zizipus jujuba</i>	T	Rhamnaceae	Bor	Root

About 133 plants are routinely practiced by local tribal community of Satpuda Hill region (Table 3) and hence we have selected 11 of them (Table 4) for screening purpose with special reference to Wound Healing activity.

The methods of preparation fall into four categories, viz.: plant parts applied as a paste, juice extracted from the fresh plant parts, powder made from fresh or dried plant parts, some fresh plant parts, and decoction.

External applications (mostly for skin diseases, snake bites and wounds) and internal consumption of the preparations are involved in the treatment of diseases. The most frequently used preparations are decoctions and powdered plant material. Local traditional healers are commonly using these plants to treat wounds and related diseases, preferably related to their availability very easily.

Conclusion

- The survey indicates that, the study area has plenty of medicinal plants to alleviate a wide spectrum of human ailments.
- Studies on traditional medicinal plants also revealed that the economically backward local and tribal people of Maharashtra prefer folk medicine due to low cost and sometimes it is a part of their social life and culture.
- It is evident from the interviews conducted in different villages; knowledge of medicinal plants is limited to traditional healers, herbalists and elderly persons who are living in rural areas.
- Right now traditional healers are very old, however some of them are reluctant to percolate their useful information to next generation.
- There is a likelihood of losing this wealth of knowledge in the near future due to lack of interest among the younger generation as well as their propensity to migrate to cities for money-spinning jobs.
- It thus becomes necessary to acquire and preserve this traditional system of medicine by proper documentation and identification of specimens.
- The active principle is extracted and purified from plant material for as long as that process remains

economically viable compared with chemical synthesis for example new drug is discovered from herbal source, *Curcumin* from the *Curcuma longa* (turmeric)⁹, is an important drug for some forms of wounds.

- Documenting the indigenous knowledge through ethnobotanical studies is important for the conservation and utilization of biological resources over and above there is lot of scope to search prototype of Natural product for further chemical synthesis.
- We further extended our studies on 4 plants as they exhibit promising wound healing activity in Excision, Incision and Dead space wound rat model. The result on these plants will be published elsewhere as it is the content of the thesis of one of the author.

Acknowledgement

The authors are thankful to the University Grant Commission, New Delhi, India for their financial support and to the Principal, Moolji Jaitha College, Jalgaon, Maharashtra, India for providing necessary facilities. Sincere thanks are also to Dr. G.S. Chaudhary, Head of department of Botany, Moolji Jaitha College, Jalgaon, for his extensive cooperation in providing taxonomical information of the plants.

References

1. Sharma S: **Ayurvedic drug production, regulatory status in India, domestic and export market.** In *Proceedings of the fourth International Seminar on Ayurvedic education, research and drug standardisation—a global perspective, Gujarat Ayurveda University, Jamnagar, India, January 5-7, 2003, p.4-15.*
2. Dutta C: **Dvivraniyachikitsa: Charaka Samhita (Sanskrit), edited by : VYT Acharya, Chikitsasthana,** Bombay: Satyabhamabhai Pandurang 1941: chap. 25, verse 6-8, 26.
3. Kar M: **Shariravrananidanam In** Madhavanidanam (Hindi), edited by Shastri S, UpadhyayaY, Chaukhamba Sanskrit Sansthan, Varanasi, 1989: chap. 42, verse 4.
4. Sushruta, *Sadyovrana. In: Sushruta Samhita (Sanskrit),* Chaukhamba Sanskrit Sansthan, Varanasi, 1989: Chikitsasthana, chapter 2, verse 6.
5. Rubin E, Farber J., *Repair, regeneration and fibrosis.* In: Pathology, 2nd edition. Philadelphia: *J. B. Lippincott*; 1994: 70-95.
6. Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell, *Harper's Illustrated Biochemistry*, Twenty-Sixth Edition Lange Medical Books/McGraw-Hill Medical Publishing Division New York
7. Ellis L, et al: **Down regulation of vascular endothelial growth factor in a human colon carcinoma cell line transfected with an antisense expression vector specific for c-SRC.** *Journal of Biological Chemistry* 1998, 273(2):1052-57
8. Sushruta, *Sushruta Samhita (Sanskrit),* Chaukhamba Sanskrit Sansthan, Varanasi, 1989: Chikitsasthanam, chap. 21, verse 22.
9. Tuhin Kanti Biswas and Biswapati Mukherjee: **Plant Medicines of Indian Origin for Wound Healing**

Activity: A Review *INTERNATIONAL JOURNAL OF LOWER EXTREME WOUNDS* 2003, 2: 25

10. Bhattacharjee, S.K: *Handbook of Medicinal Plants*, 4th revised and enlarged edition, Pointer publishers, Jaipur 2004

11. http://society.indianetzone.com/gardening/1/herbal_plants.htm

12. Cooke T: *The Flora of The Presidency of Bombay*, Vol.1 – 4, second reprinted edition, under the authority of the Government of India, Botanical Survey Of India, Printed by S.N. Guha Ray at sree Saraswaty Press Ltd., 32 Acharya Prafulla Chandra Road, Calcutta -9, 1967

13. Agharkar, S.P: *Gazetteer of Bombay*, Government Publication, 1953

14. Borse, and Patil, D.A: *Flora of Dhule and Nandurbar District*, 1990

15. **The Maharashtra state area**

[http://www.asiatradesh.com/India/state_maharashtra1.asp]

16. **The Map of India**

http://www.indianchild.com/india_map.htm

17. **The Map of Maharashtra**

http://www.jalgaon.nic.in/Images/Inner/Maps/Location_of_Jalgaon.jpg?name=../Images/Inner/Maps/Location_of_Jalgaon.jpg%27

18. **The forest information of Jalgaon**

<http://www.mahaforest.nic.in>

19. **The Sanctuary information of Jalgaon**

<http://www.mahaforest.nic.in/Sanctuary.htm>

20. **The National Park information of Jalgaon**

<http://www.mahaforest.nic.in/NationalPark.htm>

21. **The National Park information of Jalgaon**

http://www.mahaforest.nic.in/ProjectTiger_TigerReserve.htm

22. **The Map of Jalgaon**

http://www.jalgaon.nic.in/Images/Inner/Maps/Location_of_Jalgaon.jpg?name=../Images/Inner/Maps/Location_of_Jalgaon.jpg%27

23. Mahajan, R.T. and Chopda, M.Z: *Livestock economy in relation to Bhaunak watershed of Jalgaon district – A case study*, 12th World lake Conference Taal 2007 held at Jaipur, from 28th October to 2 November 2007

24. **About Jalgaon Information**

http://www.maharashtra.gov.in/english/gazetteer/JALGAON/about_jalgaon.html

25. Chopra, R.N., *Indigenous drug of India (Reprint)*, Academic Publisher, Kolkata, 1982.

26. Chopra, R.N., Nayar, S.C., and Chopra, I.C: *Glossary of Indian Medicinal Plants*, CSIR Publication, New

Delhi, 32, 1986

27. Singh, N.P., Lakshminarsimha, P., Karthikeyan, S. and Prasanna, P.V: *Flora of Maharashtra State, Botanical survey of India, Calcutta, 2001, Vol. I,*
28. Ghosh, T: **Wound healing activity of *Tagetes erecta* Linn leaves**, 2004 [http://www.pharminfo.net/exclusive/reviews/wound_healing_activity_of_...]
29. Manjunatha, B.K., Vidya, S.M., Rashmi, K.V., mankani, K.L., Shilpa, H.J., Jagadeesh Singh, S.D: **Evaluation of wound healing potency of *Vernonia arborea* Hk.**, *Indian journal of pharmacology*, 2005, vol 37, (4), 223-226
30. Shetty, S., Udupa, S., and Udupa, L: **Evaluation of antioxidant and wound healing effects of alcoholic and aqueous extract of *Ocimum sanctum* Linn in rats**, *eCAM advance access published*, 2007: 1-7
31. Subramoniam, A., Evans, D.A., Rajasekharan, S., and Sreekandan Nair, G: **Effect of *Hemigraphis colorata* (Blume) H.G. Hallier on wound healing and inflammation in mice**, *Indian journal of pharmacology*, 2001,33: 283-285
32. Rasik, A.M., Shukla, A., Patnaik, G.K., Dhawan, B.N., Kulshrestha, D.K., and Srivastava, S: **wound healing activity of latex of *Euphorbia nerifolia* Linn**, *Indian journal of pharmacology*, 1996, 28: 107-109
33. Chellaiah Muthu, Muniappan Ayyanar, Nagappan Raja and Savarimuthu Ignacimuthu : **Medicinal plants used by traditional healers in Kancheepuram District of Tamil Nadu, India**, *INTERNATIONAL JOURNAL OF LOWER EXTREMETY WOUNDS* 2003, 2: 25
34. Abinash Pratim Saikia, Venkat Kishore Ryakala, Pragya Sharma, Pranab Goswami and Utpal Bora : **Ethnobotany of medicinal plants used by Assamese people for various skin ailments and cosmetics** *Journal of Ethnopharmacology*, 2006,106(2): 149-157
35. V. H. Harsha, S. S. Hebbar, V. Shripathi and G. R. Hegde: **Ethnomedicobotany of Uttara Kannada District in Karnataka, India—plants in treatment of skin diseases** *Journal of Ethnopharmacology* ,January 2003,84(1): 37-40
36. Jain s.k: **Dictionary of Indian Folk Medicine and ethnobotany**. Deep publications, Paschim vihar, New Delhi.; 1991.
37. Mahajan, R. T. and Badgujar, S. B., Ethnomedicinal values of Laticiferous plants used by tribal people of North Maharashtra, India. *Research Link* . 2008, **55, VII (8)**: 20-25.
38. Badgujar S. B., Mahajan R. T. and Kosalge S. B.; Traditional Practice for Oral Health Care in Nandurbar District of Maharashtra, India *Ethnobotanical Leaflets*, 2008, 12: 1137-44.