

**RESEARCH ARTICLE****SURVEY ON ETHNO-MEDICINAL PLANTS USED FOR CUTS, WOUNDS AND INFLAMMATIONS BY MALAPANDARAM TRIBAL COMMUNITY OF ADICHIPUZHA, PATHANAMTHITTA, KERALA.**

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**Abstract**

Plants have a crucial role in maintaining fitness of human beings in one way or other. These medicinal plants with complicated secondary metabolites provide medicinal and curative properties. Medicines based on plant and plant products, is the tradition of Kerala, which is now used as the basis of many of the modern medicaments. There are many plants, which are used by folklore for the treatment of cuts, wounds and burns that promote the repair mechanisms in the natural way. Since our traditional knowledge is on the verge of extinction, the present study was undertaken to document some of the medicinal plants used by Malapandaram tribal community settled at Adichipuzha, near Ranni to treat cuts and wounds.

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**Introduction:-**

Wounds have affected humans since prehistoric times and the treatment and healing of wounds is an art as old as humanity (Robson *et al.* 2001). It is defined as the disruption of the cellular and anatomic continuity of a tissue; it may be produced by physical, chemical, thermal, microbial or immunological insult to the tissue (Bennet 1988), which results in an opening or breaking of the skin that cause disturbance in the normal skin anatomy and function. Wound healing process is a complicated series of event that begins at the moment of injury and can continue for months to years. It is a well organized biochemical and cellular event leading to the growth and regeneration of wounded tissue that restores the function and integrity of damaged tissues (Agarwal *et al.* 2009). It involves the activity of an intricate net work of blood cells, cytokines and growth factors which ultimately leads to the restoration to normal condition of the injured skin or tissue (Jaina and Patil, 2011).

The presence of wide range of life-sustaining constituents in plants has urged scientists to examine these plants with a view to determine potential wound healing properties (Syed *et al.* 2008). These are not only cheap and affordable but are also safe as hyper-sensitive reactions are rarely encountered with the use of these agents (Narayan *et al.* 2011). These natural agents induce healing and regeneration of the lost tissue by multiple mechanisms. Several plant products have been reported to promote the process of wound healing, which contains bio-molecules like triterpenes, alkaloids, polyphenols, tannin, flavonoids (Sharma *et al.* 1990; Chithra *et al.* 1995; Suguna *et al.* 1998; Shenoy *et al.*, 2009; Francesko *et al.* 2011; Gautam *et al.*, 2013). Triterpenoids are known to wound-healing process mainly due to their astringent and antimicrobial property, which seems to be responsible for wound contraction and increased rate of epithelialisation (Scortichini and Rossi 1991). Saponins also promote wound healing process due to their antioxidant and anti-microbial activities (Senthil *et al.* 2011). Methods of preparation of the plant/part(s) for healing wound vary like fresh plant part, their juice, paste or decoction. The raw material base for drugs used for different conditions of wound such as ulcers, syphilitic ulcers, maggots, septic-wounds, cellulitis, purulative ulcer, diabetic carbuncle and other related disorders are derived from plants (Ramya *et al.* 2009).

For many decades, the tribal community has a traditionally self managed system of folk medicine and primary healthcare mainly based on herbal remedies. The knowledge about medicinal plants is rather specialized and is limited to a few members in the community and this precious ethnic knowledge was accumulated and passed on to next generation only orally. But this ethno-knowledge is at risk today due to ignorance of young generation because of the developmental activities monitored by the state Government and non-Government agencies. In this background the study was undertaken to document some of the potent natural wound healers used by Malapandaram tribal community of Adichipuzha.

#### Methodology:-

Kerala's unique climatic condition contributes the floral diversity from region to region and does its use. There are 32 tribals inhabited in Kerala living on the hill ranges. In Pathanamthitta (9°16'12"N Latitude & 76°46'48"E Longitude) 6 indigenous tribal communities are present (Binu 2010) and Malapandaram is one among them. It is the youngest district located in the southern part of Kerala endowed with very rich tropical biodiversity. Adichipuzha is the study area with an average elevation of 131 m above sea level situated near Ranni. The ethno-medicinal information was gathered from Malapandaram, one of the oldest groups of the branch of ethnic people in South India who are now inhabited in certain pockets of Pathanamthitta.

Field survey was conducted during October 2013 to March 2014. Initial study trips were to gather ethno-medicinal information through general conversations with the local people dwelling in the forest areas, who have sound knowledge of herbal remedies. Details of medicinal plants used, mode of treatment, methods of preparation etc were documented by interacting with them. The next trips were to know more about the habitat and to collect plants for taxonomic identification. In succeeding trips, the correct species of plants were collected from their original habitat with the help of tribal people. Collected plants were photographed and sample specimens were collected for the preparation of herbarium. Collected data was also cross checked in different areas from local informants by showing the plant specimen to verify the authenticity of claims and also cross checked with previous published reports. The Flora of Presidency of Madras (Gamble 1921) and Flora of Pathanamthitta (Kumar *et al.* 2005) were used to ascertain the nomenclature.

#### Result:-

Malapandaram tribal community resides in remote and inaccessible forest areas and practices indigenous phytotherapy to treat common ailments. There are 28 plants used by this community for healing wounds, ulcers, inflammations, cutaneous irruption etc and are very common in elevated areas of Pathanamthitta. The information about the plants were documented and presented as table (Nambiar *et al.* 1985; Anonymous 1986; Anonymous 1992; Sivaraman and Balachandran 1994; Khare 2007).

**1. *Achyranthus aspera* L.** [Common Name: Prickly Chaff Flower, Devil's horsewhip]: An erect pubescent herb with opposite, short petioled, obovate, softly tomentose leaves and terminal spikes containing greenish-white sessile, deflexed flowers. Bracts and bracteoles of flowers are spinescent. Seeds are subcylindric, reddish brown and truncate at the apex.

**2. *Allium cepa* L.** [Common Name: Onion]: A perennial with a single large bulb bearing hollow cylindrical fleshy leaves and a single leafless scape of 0.5m height bearing compound umbel of white flowers. The bulb may be round, flat, white or coloured.

**3. *Aristolochia indica* L.** [Common Name: Indian Birthwort]: A twining perennial with greenish white woody stems, wedge shaped and three nerved very variable leaves. Flowers are irregular (duck shaped) having pale green inflated lobed base narrowed into a cylindrical tube terminating in a horizontal funnel shaped purple mouth and tip clothed with tinged hairs. Fruits are oblong capsules enclosing many flat ovate winged seeds.

**4. *Asparagus racemosus* Willd.** [Vernacular Name: Satawari, Indian Asparagus]: A scandant much-branched spiny undershrub with short tuberous root stock bearing a number of tuberous roots, stem armed with numerous recurved spines, sickle shaped cladodes 2-6 in a node, leaves reduced to scale, small white flowers in racemes and globose berries.

**5. *Biophytum sensitivum* (L.) DC.** (Syn. *Oxalis sensitiva*) [Common Name: Little Tree Plant, Sikerpud]: A small herb with paripinnate leaves (leaflets 3-12 pairs), normally forming a rosette at the base, the terminal pair the largest; oblong, obliquely rounded and apiculate at apex, glabrous, yellow flowers in terminal peduncled umbels, elliptic shining capsule containing many transversely tubercled seeds.

**6. *Boerhaavia diffusa* L.** (Syn. *B. repens*, *B. procumbens*) [Red Spiderling, Spreading Hogweed]: A variable branched woody prostrate herb with stout woody fusiform root stock, purplish stem, swollen at nodes, long petioled,

ovate-cordate, often sinuous leaves (whitish beneath), purple or white small flowers in small umbels arranged in panicles, fruits oblong, 5-ribbed, glandular, pubescent.

**7. *Calotropis porcera* (Ait.) R.Br.** [Common Name: Swallow-Wart, Milk Weed, King's Crown]: An erect tomentose laticiferous shrub reaching a height up to 2m with large ovate subsessile leaves, white or purplish tainted flowers in umbellate cymes and a pair of sub-globose inflated follicles enclosing broadly ovate comose seeds.

**8. *Centella asiatica* (L.) Urban** (Syn. *Hydrocotyle asiatica*) [Common Name: Indian Pennywort, Coinwort, Spade leaf, Asiatic coinwort, American coinwort]: A creeping stoloniferous annual or perennial with prostrate stem, rooting at nodes, reniform, long-petioled leaves, -3 from each node, minute reddish flowers in umbels of 3 and a lateally compressed fruits with thickened pericarp.

**9. *Clerodendron infortunatum* auct. non Linn. C.B. Clarke** (Syn. *C. viscosum*) [Common Name: Hill Glory Bower]: A large shrub, 1.5-2m tall, leaves 15-20cm long, ovate or sub-rhomboid, pubescent, margin coarsey serrate, acute, flowers 4x1.25cm in size, cream, in axillary, terminal panicles. Calyx lobes 5, campanulate, corolla lobes 5, unequal, slightly pubescent outside, stamen 4, fruits 1.25cm in size, drupe, broadly ovoid, depressed.

**10. *Cocos nucifera* L.** [Common Name: Coconut Palm]: This palm often attaining a height of 30m or more, possesses a solitary bole and a heavy crown of many drooping pinnate leaves, 5-7m long with petiole based on net like brown fibre and long linear leaflets. The terminal flowers are borne on the upper part of interfoliar branching spadices and pistillate flowers on the lower parts, fruits large, sub-globose, 1- seeded drupe having fibrous mesocarp.

**11. *Coffea arabica* L.** [Common Name: Arabica coffee]: An evergreen shrub, large elliptic shining leaves in whorls of 2-3. Flowers pure white on axillary clusters, fruits deep crimson berries enclosing a pair of plano-convex grey seeds.

**12. *Curcuma longa* L.** (Syn. *C. domestica*) [Common Name: Turmeric]: A perennial with a short thick rhizome, a short aerial stem, simple, ovate-lanceolate leaves and pale yellow flowers in dense bracteates strobiliform spikes.

**13. *Cynodon dactylon* (L.) Pers.** [Common Name: Bermuda grass, dog's tooth grass, Devil's grass]: A hardy perennial prostrate creeping grass mostly with rhizomes; foliage dense, 10-40cm tall; leaf blade racemes, 1.5-8cm long, narrowly linear or lanceolate, finely acute, pungent, 2-10 cm x 1-3 mm. Spikes 2-6, radiating from the top of slender peduncle. Spikelets 2-3mm long, caryopses ovoid, yellow to reddish.

**14. *Datura stramonium* (Syn. *D. taluta*)** [Common Name: Jimson weed, Devil's snare]: The plant is 60-120 cm or more tall, branched and pubescent plant. Leaves are 8-17x4-13 cm, ovate, sinuately dentate and minutely puberulose. The flowers are trumpet-shaped, white to creamy or violet and 6 to 9 cm long.

**15. *Eupatorium odoratum* L.** (Syn: *E. conyzoides*, *E. brachiatum*, *E. atriplicifolium*, *Chromolaena odorata*, *Osmia odorata*) [Common Name: Christmas bush, Fragrant boneset, Jack in the bush, bitter bush, Siam weed, baby tea, Santa Maria]: A scrambling, multi-stemmed perennial herb reach up to to 2.5 m tall. It has soft stems but the base of the shrub is woody. The opposite, three-nerved leaves are deltoid to ovate-lanceolate, usually with a dentate margin and a long pointed tip. The leaves are aromatic when crushed. The inflorescences are corymbs of white to pale pink tubular flowers of cylindrical heads located on the terminals of lateral branches seeds achenes and somewhat hairy.

**16. *Glycosmis pentaphylla* (Retz) DC non Pierre ex Engl.** (syn. *G. mauritiana*, *Limonia pentaphyll*, *L. mauritiana*) [Common Name: Orange berry, Rum Berry, Gin Berry, Ash-sheora]: Branches are glabrous, unarmed, young parts finely rusty puberulent. Leaves alternate imparipinnate having three to five leaflets, petiolate, stipules absent; leaflets narrowly elliptical or oblong-elliptical, base acuminate, apex acuminate. Inflorescence axillary paniculate. Flowers mostly 5-merous, fragrant. Fruit a berry, subglobose, white to pink or crimson held in small grape like clusters.

**17. *Hemigraphis colorata* (Blume) H. G. Hallier** (syn: *H. alternata*) [Common Name: Aluminium plant, Cemetery plant, Metal leaf, Red flame Ivy, Waffle plant, Java Ivy]: A versatile tropical low-creeping perennial herb that reaches a height of 15 to 30 cm. The leaf has metallic purple luster on upper surface and a solid dark purple on ventral side. The leaves are opposite, ovate to cordate, serrate-crenate. Flowers are small, bell shaped, white coloured in terminal spikes. Capsules are small and light green in colour.

**18. *Hyptis suaveolens* (L.) Poit.** [Common Name: American mint, Wild Spikenard, Bush mint, Bush Tea Bush]: A rigid erect aromatic annual covered with glandular and non-glandular hairs with with a woody base, Stems 4-angled, hairy and hollow, leaves petiolate, ovate (lower cordate), serrate leaves and blue flowers in axillary cymes, fruit a lobed capsule and cacerule containing 4 elongate black nuts. Nutlets dark brown, shield-shaped.

**19. *Ixora coccinea* L.** [Common Name: Jungle Geranium, Jungle Flame, Flame of Woods, West Indian jasmine]: A glabrous shrub with obovate, opposite leaves having cordate base, interpetiolar cuspidate stipules, bright scarlet tetramerous flowers in terminal corymbose cymes and globose and red berries containing 2 ventrally concave seeds.

**20. *Lantana camara* L.** [Common Name: Bird's Brandy; Cherry Pie; Tick-berry]: A perennial straggling shrub of 1-2m tall, leaves opposite, ovate, with very small rounded teeth, somewhat rough and hairy, aromatic. Flowers in dense clusters, tubular with 4 lobes, initially yellow or pink, gradually changing to orange and deep red. Fruits fleshy, greenish blue to black and berry like, 1-seeded.

**21. *Lawsonia inermis* L.** (Syn. *L. alba*, *L. spinosa*) [Common Name: Mignonette tree, Henna tree]: A small tree. Leaves are small opposite, glabrous, sub-sessile, elliptic-lanceolate, flowers fragrant, in cymose panicles, fruit is a capsule

**22. *Leucas aspera* Spreng.** [Common Name: Thumbe, Common Leucas]: A diffusely branched annual herb; stem hispid attaining a height of about 20 to 100cm; leaves long narrow, two per node, subsessile, lanceolate to linear, acute, entire, pubescent; flowers white, small narrow needle shaped in axillary and terminal verticils; calyx tubular, 10-toothed, mouth oblique; corolla large bilipped; stamens 4; nutlets oblong, smooth, brown-black.

**23. *Mimosa pudica* L.** [Common Name: Touch-me-not Plant]: A prickly diffused prostrate short-lived undershrub. Stems and branches cover with weak bristles; leaves bipinnate, digitally arranged, very sensitive to touch; leaflets sessile, oblong, hispid, 12-20 pairs on each pinnae 5x3mm; flowers pink 2-3 in globose heads, peduncles long, prickly, bracteoles bristly, linear, stamens much exerted; pods flat, slightly recurved; joined at the seeds, clothed with bristles; seeds 3-4.

**24. *Moringa oleifera* Lam.** (Syn. *M. Pterygosperma*) [Common Name: Drumstick tree, Horseradish tree]: A soft wooded medium sized tree with pungent roots, large 3-pinnate leaves having articulated rachis, small elliptical leaflets (terminal leaflet obovate), white flower (with reflexed sepals and spatulate petals) in axillary or terminal panicles and long pendulous cylindrical 9-ribbed capsule constricted between seeds and enclosing trigonous seeds broadly winged at the angles.

**25. *Ocimum sanctum* L.** (Syn. *O. tenuiflorum*) [Vernacular Name: Holy Basil, Garden Basil]: An erect glabrous or slightly pubescent branching annual herb, 30-90cm in height, leaves 7-8cm, ovate to lanceolate, wedge shaped, glabrous, entire or toothed sometimes. Flowers small creamy or purple in densely racemes; bracts stalked; calyx enlarging in fruits, stamens 4, slightly exerted, seeds, mucilage mass when wetted.

**26. *Saraca asoca* (Roxb.) de Wilde** Syn. *S. indica* (Ashokam): [Common Name: Ashoka tree]: A medium sized evergreen tree somewhat erect, trunk covered over with greyish to dark brown scabrous bark with imparipinnate leaves having interpetiolar stipules which sometimes close around the terminal bud. Leaflets 4-6 pairs, oblong lanceolate. Flowers orange red in dense axillary corymbose cymes. Pods black, woody containing 4-8 ellipsoid seeds.

**27. *Selaginella* sps.** [Vernacular Name: Little Club Moss]: It is a Pteridophyte seen all over Pathnanamthitta on shady areas. It is light green in colour with very delicate narrow leaves with ligule. Stem is fleshy. Cones are seen on the tip of branched stem.

**28. *Ziziphus rugosa* Lamk** [Common Name: Wild Jujube, Wrinkled Jujube]: A scrambling, spiny evergreen shrub or small tree; 3-6m tall; spines solitary, leaves broadly elliptic or orbicular, 5-13cm long and 4-6cm wide, apex rotund mucronate, base oblique, glabrous above, tomentose beneath, margin serrate, petioles 0.5-1cm long tomentose; calyx 5 lobed, ovate, acute; petals absent; fruits drupe, edible, globose or pyriform, fleshy white when ripe; seeds 1-2, obovoid, compressed and black.

### Conclusion:-

Plant extracts used in ethno-medical treatments is enjoying great popularity now a day. There is vast knowledge kept among the tribal community, hidden to scientific world. There are about 28 species of plants found to be used by the malapandaram tribal community for curing cuts, wound, boils and inflammations and related pain. Scientific validation of this incredible source of knowledge is the need of hour. In our investigation, we came to know that most of the plants are weeds with some medicinal value and are utilized locally by these people as home remedy and this needs urgent documentation.

**Table 1:-** Ethnic plants used in the treatment of cut, wound and inflammations by Malapandaram tribes of Adichippuzha, Ranni, Pathanamthitta, Kerala

Sl. No.	Botanical Name and Family	Vernacular Name	Useful part	Mode of Application
1	<i>Achyranthes aspera</i> <b>Amaranthaceae</b>	Kadaladi	Leaf Flower	Leaf and flower is pasted with egg's white and applied on wounds using feather
2	<i>Allium cepa</i> <b>Liliaceae</b>	Cheriyu ulli	Scale leaves	Crushed onion is applied on wounds
3	<i>Aristolochia indica</i>	Kudukkamooli	Leaf	Leaf paste is applied on wounds

	<b>Aristolochiaceae</b>			
4	<i>Asparagus racemosus</i> <b>Liliaceae</b>	Sathavari	Root tuber	The juice is mixed with Vetiver powder to heal wounds and burning sensation of feet
5	<i>Biophytum sensitivum</i> <b>Oxalidaceae</b>	Theendanazhi, Nilathengu, Mukkutti	Whole plant	Whole plant paste is wrapped on wounds
6	<i>Boerhaavia diffusa</i> <b>Nyctaginaceae</b>	Thazhuthama	Whole plant	About 3-6 g of whole plant paste is administrated internally to reduce swelling due to wound
7	<i>Calotropis gigantea</i> <b>Asclepiadaceae</b>	Erukk	Leaf	Roasted leaves are bandaged locally
8	<i>Centella asiatica</i> <b>Apiaceae</b>	Kudangal	Leaf	Leaf paste is applied to wounds
9	<i>Clerodendron infortunatum</i> <b>Verbenaceae</b>	Peringalam	Bud	Young flower bud is pasted with water and is applied on wounds
10	<i>Cocos nucifera</i> <b>Aracaceae</b>	Thengu		Dust by scrapping the sides of the basal portion of the rachis is applied directly
11	<i>Coffea Arabica</i> <b>Rubiaceae</b>	Kappi chedi	Seed	Roasted seed powder is applied on wounds
12	<i>Curcuma longa</i> <b>Zingiberaceae</b>	Manjal	Rhizome	Rhizome paste is applied directly on wounds
13	<i>Cynadon dactylon</i> <b>Poaceae</b>	Karukappullu	Leaf	Leaf past is applied on wound to reduce swellings
14	<i>Datura stramonium</i> <b>Solanaceae</b>	Ummam	Leaf	Leaf paste is applied on wound to reduce swellings
15	<i>Eupatorium odoratum</i> <b>Asteraceae</b>	Communist Pacha	Leaf	Leaf paste is applied to wounds for quick healing
16	<i>Glycosmis mauritiana</i> <b>Rutaceae</b>	Paanal	Leaf	Leaf paste is applied on wounds
17	<i>Hemigraphis colorata</i> <b>Acanthaceae</b>	Murikoott, Murian pacha	Leaf	Leaf juice is applied on wounds
18	<i>Hyptis suaveolens</i> <b>Labiatae</b>	Naatapoochedi	Leaf	Leaf juice is applied directly on wounds to stop bleeding and for quick wound healing
19	<i>Leucas aspera</i> <b>Lamiaceae</b>	Thumpa	Leaf Flower	Leaf and flower are pasted together and applied topically on cuts and wounds
20	<i>Ixora coccinea</i> <b>Rubiaceae</b>	Thechi, Thetti	Flower	It is used to heal wounds and ulcers and to prevent pus. Root and coconut paste is used to reduce oedema, itching and ache of wounds
21	<i>Lantana camara</i> <b>Verbenaceae</b>	Arippoo, Kon-gini, Poochedi	Leaf	Powdered leaves are used to cure cuts and wounds
22	<i>Lawsonia inermis</i> <b>Lythraceae</b>	Mylanchi	Leaf	Leaf paste is applied on fresh wounds
23	<i>Mimosa pudica</i> <b>Mimosae</b>	Touch-me-not plant	Leaf, Root	Root and leaf infusion is applied on wounds
24	<i>Moringa oleifera</i> <b>Moringaceae</b>	Muringa	Leaf	Leaf paste is applied on wounds
25	<i>Ocimum sanctum</i> <b>Labiatae</b>	Krishna thulasi	Leaf	Leaf juice is applied on wound
26	<i>Saraca asoka</i> <b>Leguminosae</b>	Ashoka maram	Leaf	Leaf paste is applied on non-healing ulcers
27	<i>Selaginella plana</i> <b>Selaginellaceae</b>	Chiravapalli, Velipacha,	Leaf	Leaf juice is applied on fresh wounds

		Garudapacha		
28	<i>Ziziphus oenoplea</i> Rhamnaceae	Cheruthudali	Leaf	Chewed leaves are used for wound dressing

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### Reference:-

1. Robson M.C., Steed D.L., Franz M.G., 2001. Wound healing: biologic features and approaches to maximize healing trajectories, *Current Problems in Surgery*, 38 (2),72–140.
2. Bennet R.G., 1988. *Fundamentals of Cutaneous Surgery*, St. Louis: C.V.Mosby.
3. Agarwal P.K., Singh A., Gaurav K., Goel S., Khanna H.D., Goel R.K., 2009. Evaluation of wound healing activity of extracts of plantain banana (*Musa sapientum* var. *paradisiaca*) in rats, *Indian Journal of Experimental Biology*, 47(1) 32-40.
4. Jaina S., Patil U.K., 2011. Formulation and characterization of polyherbal cream with wound healing activity, *Pharmacologyonline*, 3, 1470-1477.
5. Syed N.A., Hasan T.N., Aalam S.M.M., 2008. Evaluation of wound healing potential of *Chicorium intybus*. L (Asteraceae) in rats, *Iranian Journal of Pharmacology & Therapeutics*, 7(2), 181-184.
6. Narayan S., Sasmal D., Mazumder P.M., 2011. Evaluation of the wound healing effect of herbal ointment formulated with *Salvia splendens* (Scarlet Sage). *International Journal of Pharmacy and Pharmaceutical Sciences*, 3 (3), 195-199.
7. Suguna L., Shivakumar P., Chandrakasan G., 1998. Effects of *Centella asiatica* extract on dermal wound healing in rats. *Indian Journal of Experimental Biology*, 34(12), 1208-1211.
8. Sharma S.P., Aithal K.S., Srinivasan K.K., Udupa A.L., Kumar V., Kulkarni D.R., 1990. Anti-inflammatory and wound healing activities of crude alcoholic extracts and flavonoids of *Vitex leucoxydon*, *Fitoterapia*, 61(3), 263-265.
9. Chithra P., Suguna L., Chandrakasan G., 1995. Influence of Arginine wound healing in rats. *Journal of Clinical Biochemistry and Nutrition*, 18(2), 111-117.
10. Francesko A., Rocasalbas G., Touriño S., Mattu C., Gentile P., Chiono V., Ciardelli G., Tzanov T., 2011. Cross-linked collagen sponges loaded with plant polyphenols with inhibitory activity towards chronic wound enzymes. *Biotechnology Journal*, 6(10), 1208-1218.
11. Gautam M.K., Ghatule R.R., Singh A., Gangwar M., Kumar M., Goel R.K., 2013. Healing effects of *Aegle marmelos*(L.) Correa fruit extract on experimental colitis. *Indian Journal of Experimental Biology*, 51(2), 157-164.
12. Shenoy C., Patil M.B., Kumar R., 2009. Wound Healing Activity of *Hyptis suaveolens* (L.) Poit(Lamiaceae). *International Journal of PharmTech Research*, 1(3),737-744.
13. Scortichini M., Rossi M.P., 1991. Preliminary *in vitro* evaluation of the antimicrobial activity of triterpenes and terpenoids towards *Erwinia amylovora* (Burrill). *Journal of Bacteriology*, 71(2), 109-112.
14. Senthil P., Kumar A.A., Manasa M., Kumar K.A., Sravanthi K., Deepa D., 2011. Wound healing activity of alcoholic extract of "*Guazuma ulmifolia*" leaves on albino Wistar rats. *International Journal of Pharma Bio Science*, 2(4), 34-37.
15. Ramya S., Alaguchamy N., Maruthappan V.M., Sivaperumal R., Sivalingam M., Krishnan A., Govindaraji V., Kannan K., Jayakumararaj R., 2009. Wound healing ethnomedicinal plants popular among the Malayali tribes in Vattal Hills, Dharmapuri, TN, India. *Ethnobotanical Leaflets*, 2009(10), 1257-1271.
16. Binu S., 2010. Wild edible plants used by the tribals in Pathanamthitta district, Kerala. *Indian Journal of Traditional Knowledge*, 9(2), 309-312.
17. Gamble J.S., 1921. *Flora of Presidency of Madras*, Vol 1-3, Adlard & Son Ltd., London.
18. Kumar N.A., Sivadasan M., Ravi N., 2005. *Flora of Pathanamthitta*. Daya Publishing House, Delhi.

19. Anonymous, 1992. Dictionary of Indian Medicinal Plants, Central Institute of Medicinal and Aromatic Plants, Lucknow, India.
20. Anonymous, 1986. The Glossary of Indian Medicinal Plants. Council of Scientific and Industrial Research, New Delhi, India.
21. Khare C.P., 2007. Indian Medicinal Plants, Springer.
22. Nambiar V.P.K., Sasidharan N., Renuka C., Balagopalan M., 1985. Studies on the Medicinal Plants of Kerala, KFRI Research Report 42, Forests Kerala Forest Research Institute, Thrissur.
23. Sivarajan V.V., Balachandran I., 1994. Ayurvedic drugs and their plant sources, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.