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**STYPTIC AND WOUND HEALING PROPERTIES OF
SIDDHA MEDICINAL PLANTS – A REVIEW.****S. MERISH¹, M. TAMIZHAMUTHU² AND THOMAS M. WALTER^{*3}**¹⁻² *Final Professional BSMS, Government Siddha Medical College, Palayamkottai, Tamilnadu, India.*^{*3} *Lecturer, Department of Pharmacology, Government Siddha Medical College, Palayamkottai, Tamilnadu, India.***ABSTRACT**

Traditional Siddha system of Medicine is widely practiced in Tamilnadu and Tamil speaking areas of the World. With the specialty as one of the World's ancient Traditional systems of Medicine, its importance is being felt and widely discussed now-a-days. Apart from its tremendous healing properties, it is also alleged of not having remedies for emergencies such as Cardiac conditions, acute respiratory conditions, bleeding disorders etc. On the other hand, such conditions have always been dealt by our forefathers' even centuries back. In olden days the Siddhars' (founders of Siddha Medicine) used lots of herbs to treat cardiac and respiratory conditions, heal wounds, treat Snake bites, Scorpion bite, dreaded diseases like Cancer and STD/VD etc and documented them in the form of Palm leaf manuscripts, stone and copper scriptures etc.. With the advancement of Medicine, the treatment options and parameters have changed, but the concepts that our ancestors followed so far remains in the old texts and literatures. Nowadays due to modern civilization, such age old practices are put in the dark and often forgotten. So the Authors of this review paper has chosen this topic and listed out the commonly identifiable, easily available, cost effective herbs having styptic action and wound healing properties as per the Siddha traditional literatures. In addition scientific data in the form of In-vivo studies already done in the selected plants have also been reviewed.

KEYWORDS: Styptic Herbs, Herbal Wound Healers, Siddha Medicine, In-vivo studies, Herbal Pharmacology.

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INTRODUCTION

Recently, the traditional use of plants for wound healing properties has received attention by the scientific Community¹. India has a rich tradition of plant-based knowledge on healthcare. A large number of plants/plant extracts/decoctions or pastes are equally used by Tribes and folklore traditions in India for treatment of cuts, wounds, and burns (Kumara *et al.*, 2007). This review article focuses in bringing out Siddha medicinal plants which are commonly identifiable, easily available throughout the year, cost effective and with lesser adverse effects. These plants are well documented as having potent styptic actions in traditional Siddha literatures which also serve as Standard Text books in imparting Siddha Education³. Evident research data favoring Wound healing activities of the above said plant are also compiled, reviewed and documented.

Styptics and Wound healing

The Styptic action is defined as 'Contracting the tissues or blood vessels'. It is also known as astringent and haemostatic which tends to check bleeding by contracting the tissues or blood vessels^{3, 29, 30}. Wound healing is an intricate process whereby the skin (or another organ-tissue) repairs itself after injury. In normal skin, the epidermis (outermost layer) and dermis (inner or deeper layer) exist in steady-state equilibrium and shield from the external environment. When the skin is broken, the normal (physiologic) process of wound

healing begins. The classic model of wound healing comprises three or four sequential, yet overlapping phases: (1) haemostasis, (2) inflammation, (3) proliferation and (4) remodeling³¹. Upon injury to the skin, a set of complex biochemical events takes place in a closely orchestrated cascade to repair the damage.

Plants with Styptic action

The Siddha aspect of the medicinal plants having styptic and wound healing properties is furnished in the *Table 1* followed by *Table II*, which contains the Siddha Medicines of Herbal, Metal & Mineral origin having styptic and wound healing activities. Following is the list of Single Herbs for Haemostatic action^{2, 3, 4, 5, 30}. (The regional/Tamil names are mentioned within the brackets).

1. Banyan tree (*Aala maram*)
2. Common Wireweed (*Arrivaal mookku pachilai*)
3. Chay root (*Impural*)
4. Barmuda grass (*Arugan pul*)
5. Country Fig (*Atthi*)
6. Purging nut (*Kaatamanakku*)
7. Magic nuts (*Maasikkai*)
8. Pomegranate (*Maathulai*)
9. Red silk cotton (*Mul elavu*)
10. Rhus oline (*Othi maram*)
11. Plantain tree (*Vaalai*)
12. Kino tree (*Vengai*).

Table 1
Information about individual plants.

Herbs	Botanical Name/ Family	Parts Used	Uses In Siddha
Banyan tree	Ficus benghalensis/ Moraceae	<ul style="list-style-type: none"> • Leaf • Fruit • Latex • Flower 	<ul style="list-style-type: none"> • Diabetes • Body Heat • Ulcer
Common Wire weed	Sida acuta/ Malvaceae	<ul style="list-style-type: none"> • Leaf 	<ul style="list-style-type: none"> • Analgesic • Styptic
Chay root	Oldenlandia umbellata / Rubiaceae	<ul style="list-style-type: none"> • Whole plant 	<ul style="list-style-type: none"> • Expectorant • Haemoptysis

Barnuda grass	Cynodon dactylon/ Poaceae	<ul style="list-style-type: none"> • Whole plant 	<ul style="list-style-type: none"> • Skin Diseases • Eye diseases • Antidote
Country Fig	Ficus racemosa/ Moraceae	<ul style="list-style-type: none"> • Fruit • Latex • Bark 	<ul style="list-style-type: none"> • Improves blood • Laxative
Purging nut	Jatropha curcas/ Euphorbiaceae	<ul style="list-style-type: none"> • Leaf • Seed • Fruit 	<ul style="list-style-type: none"> • Skin diseases • Tooth ache • Anti inflammatory
Magic nut	Quercus infectoria/ Fagaceae.	<ul style="list-style-type: none"> • Galls • Fruit 	<ul style="list-style-type: none"> • Gingivitis • Coolant
Pomegranate	Punica granatum/ Lythraceae	<ul style="list-style-type: none"> • Whole plant 	<ul style="list-style-type: none"> • Improves blood • Fever • Anthelmintic
Red silk cotton	Bombax malabaricum/ Malvaceae	<ul style="list-style-type: none"> • Leaf • Flower • Seed • Bark 	<ul style="list-style-type: none"> • Burning micturation • Leucorrhoea • Haemoptysis
Rhus olina	Lanea coromandelica/ Anacardiaceae	<ul style="list-style-type: none"> • Bark • Leaf 	<ul style="list-style-type: none"> • Anti inflammatory • Leucorrhoea • Uterine bleeding
Plantain tree	Musa paradisiaca/ Musaceae.	<ul style="list-style-type: none"> • Leaf • Stem 	<ul style="list-style-type: none"> • Leucorrhoea • Anaemia • Coolant
Kino tree	Pterocarpus marsupium/ Fabaceae	<ul style="list-style-type: none"> • Latex 	<ul style="list-style-type: none"> • Astringent • Antiseptic • Leucorrhoea • Skin diseases

Table 2

Siddha Medicines having Styptic actions (of Herbal, Metal & Mineral origin^{2,3}).

Name of the Medicine	Main Ingredients	Uses in Siddha	Reference
Athi chaaru	Ficus benghalensis	Menorrhagia	Siddha Materia Medica
Maathulai choornam	Punica granatum Velam Resin	Dysentery Haematuria	Siddha Materia Medica
Elavu choornam	Bombax malabaricum Cubebs	Haematemesis	Siddha Materia Medica
Vengai choornam	Resin Papaver	Bleeding from wounds	Siddha Materia Medica
Impural vadagam	oldenlandia Pepper	Haematological disorders	Siddha vaithya thirattu
Padigalinga chendooram	Cinnabar (Lingam) Alum.	Menorrhagia	Siddha vaithya thirattu
Padikara chendooram	Alum (Padikaram)	Dysentery (with blood) Menorrhagia	Siddha vaithya thirattu
Kavikkal choornam	Kavikkal (Red ochre) Amomum subulatum	Menorrhagia	Siddha Materia Medica
Kombarakku choornam	Lac Aleppo Oak	Dysentery (with blood)	Siddha Materia Medica
Naaga parpam	Zinc (Naagam)	Menorrhagia, Bleeding Piles.	Siddha Materia Medica
Chundai vatral choornam	Punica granatum, <i>Solanum verbascifolium</i>	Amoebiasis	Siddha Materia medica

IN-VIVO STUDIES – A DATA COLLECTION.

1. Banyan tree (*Ficus benghalensis*)

The wound-healing efficacy of ethanolic and aqueous extracts of *F. benghalensis* was evaluated in excision and incision wound models⁶. Both the ethanolic and aqueous extracts of *F. benghalensis* were found to possess significant wound-healing activity,

which was evidenced by decrease in the period of epithelialization, an increase in the rate of wound contraction and skin-breaking strength⁷. The ground substance mainly consists of proteoglycans, which are heterogeneous, nonfibrillar components of the extracellular matrix. These complex macromolecules are made up of a protein core linked covalently to

linear heteropolysaccharides, the glycosaminoglycans (GAGS). Proteoglycans and GAGS have been shown to play important roles in all the above-mentioned events of wound healing^{8,9}.

2. Common Wireweed (*Sida acuta*)

Effects of topical administration of methanolic extract of *Sida acuta* ointment was studied respectively on two types of wound models in rats, (i) the excision and (ii) the incision wound model. It is observed that the wounds contracting ability of the *Sida acuta* ointment (5% w/w) significantly greater than that of the control NFZ ointment (0.2% w/w). In the case of NFZ ointment and *Sida acuta* ointment treated groups it was found to be 18 ± 2 d¹⁰.

3. Bermuda grass (*Cynodon dactylon*)

Flavanoid fraction of *Cynodon dactylon* in Swiss albino Mice Shows the Wound healing activity, were applied externally daily on excised wound area for 8days. The samples were defatted with Chloroform: methanol (2:1) and lyophilized. 5mg of lyophilized tissue was hydrolyzed with 5ml of 6N Hydrochloric acid for 20 hours in sealed tubes. After hydrolysis, the sample were evaporated to dryness; the residue was dissolved in water and made up to 3 ml which was used for estimation of Total collagen, protein, lipid peroxide. This fraction facilitates the healing process as evidenced by increase in collagen and protein and decrease in lipid peroxide in granulation tissue^{11,12}.

4. Country fig (*Ficus racemosa*)

The wound healing activity of aqueous and ethanolic extract of roots of *Ficus racemosa* (F. racemosa) in Wistar albino rats¹³. Initially the wound should made with the help of Ketamine anaesthetics. Thereby the percentage wound closure, epithelization time and scar area on complete epithelization was measured. The ethanolic extract of the root of the plant F. racemosa showed significant increase in percentage closure by enhanced epithelialization. This enhanced epithelialization may be due to the effect of F. racemosa extracts on enhanced collagen synthesis. The higher breaking strength indicates better healing

of wounds^{14,15}. Extract of *Ficus racemosa* Linn showed marked reduction in wound area in comparison to control group from 4th day onwards. The result obtained indicates that aqueous extract of *Ficus racemosa* Linn accelerates the wound healing process by decreasing the surface area of the wound the activity of the extract was found to be highly Significant (P<0.001). Many bioactive components also have been isolate from F. racemosa like tiglic acid, higher hydrocarbons and other phytosterol from fruit, taraxerone etc^{16,17}.

5. Purging nut (*Jatropha curcas*)

The Bark extract of *Jatropha curcas* shows Significant wound healing activity in albino rat models. It accelerates the healing process by increasing the skin breaking strength, wound contraction, dry granulation tissue weight and hydroxyproline levels. A significant decrease in epithelization period was also seen. Therefore the bark extract showed very effective in accelerating wound healing process¹⁸.

6. Maasikkai (*Quercus infectoria*)

Ethanol extract of the shade-dried leaves of *Quercus infectoria* was studied for its effect on wound healing in rats, the plant showed a definite, positive effect on wound healing, with a significant increase in the levels of the antioxidant enzymes, superoxide dismutase and catalase, in the granuloma tissue. This finding provides an insight into the usage of the galls of *Q. infectoria* in traditional treatment of wounds or burns associated with bacterial infection¹⁹. The main constituents found in the galls of *Q. infectoria* are tannin (50-70%) and small amounts of free gallic acid and ellagic acid²⁰.

7. Pomegranate (*Punica granatum*)

Ethanol successive extract of *Punica granatum*, on wistar rat showed significant the wound healing activity. The extract of *Punica granatum* significantly increased the rate of wound contraction and collagen turnover²¹. Collagen, the major component which strengthens and supports extracellular tissue, is composed of the

amino acid, hydroxyproline, which has been used as a biochemical marker for tissue collagen²².

8. Red silk cotton (*Bombax malabaricum*)

Alcoholic Bark extract of *Bombax malabaricum* resulted in a significant ($P < 0.05$) declines potent Wound healing activity by incorporating extract in simple ointment base B.P. in concentration of 2% (w/w) and 4% (w/w)²³. The Results were also comparable to those of a standard drug, nitrofurazone in terms of wound contracting ability, wound closure time, tensile strength. The statistical data indicated that the wound with ointment containing 4% w/w alcoholic extract exhibited significant ($P < 0.001$) wound contracting ability and period of epithelization.

9. *Rhus olina* (*Lannea coromandelica*)

Ethanol and acetone extracts of *Lannea coromandelica* (Houtt) merr barks were applied to male wistar rats in the form of simple ointments exhibited wound healing activity in excision and incision methods. Framycetin sulphate was taken as standard both methods. The ethanolic and acetone extracts gave 97.11% and 95.95% activity respectively in excision method and even showed sustainable results in incision method also. The results shown that *Lannea coromandelica* extract has potent wound healing activity by in terms of significant wound contraction and increased tensile strength^{24, 25}

10. Plantain tree (*Musa paradisiaca*)

The extract of *Musa Paradisiaca* posses significant wound healing activity in rat models. Multicentric trial has shown plantain banana to be helping in early healing of ulcer dyspepsias and delaying ulcer recurrences²⁶. Flavanoids are known to reduce lipid peroxidation not only by preventing or slowing the onset of cell

necrosis but also by improving vascularity. In the tissue repair process, inflammatory cells promote the migration and proliferation of endothelial cells leading to neovascularization of connective tissue cells which synthesize extracellular matrices including collagen resulting in re-epithelialization of wounded tissue²⁷.

11. Kino tree (*Pterocarpus marsupium*)

The effect of heart wood extract of *P. marsupium* on wound healing has been studied in diabetic and normal animals. The effect has also been compared with standard (mupirocin ointment) application. The results show that application of heart wood extract of *P. marsupium* significantly increased wound healing in both normal and diabetic animals. Thus plant extracts Promotes wound healing activity.

CONCLUSION

Haemorrhage is responsible for 50% deaths occurring within 24 hours of traumatic injury. Haemorrhage is also a leading cause of death associated with blood transfusion. There is a need for the improvement of current treatments of bleeding associated with surgery, trauma or other tissue damages. An ideal styptic with fewer side effects, of natural origin, easily available and cost effective is the need of the hour. In that way, the list of single herbs and poly herbal/metal/mineral drugs having potent styptic activity are documented through this review paper. The potency of the herbs mentioned in this review paper are also proved by the in-vivo study results compiled herewith. Hence it is evident that what our Siddhars' documented centuries back are true and in accordance with the test results done through Scientific parameters.

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