

Wound healing herbs of the Pacific

SUBRAMANIAM SOTHEESWARAN, PhD, DSc*
SUDHARA SOTHEESWARAN, MSc*

Introduction

Twenty three herbs used in some of the South Pacific islands in herbal medicine are reviewed. The uses and efficacy of the herbs in healing wounds, and the chemical constituents of the plants are discussed.

The people of the Pacific depend on herbs to treat a large variety of illnesses. Many of the herbs used for healing in the Pacific countries are also found elsewhere in other tropical countries. However not all of them are listed as plants used in herbal medicine in those tropical countries. This paper reviews the herbs which are used in the Pacific for wound healing.

The wound healing herbs

Achyranthus aspera L. (Amaranthaceae)

Local Names: Piripiri (Cook Is.); kalaka (Fijian); tamatama (Tongan, Futunan, Tuvaluan); talamoā fisi (Niuean); 'aerofai (Tahitian); moki'o (Marquesas); lau tamatama (Samoan, Tokelauan).

In Tonga, the leaves are used to treat wounds caused by circumcision. It is thought that this plant has the ability to prevent infection and tetanus. The leaves contain protein, phenol and an enzyme¹. Samoans have used this plant to promote healing of wounds and abscesses.

Ageratum conyzoides L. (Asteraceae)

Local Names: Botebotekoro (Fijian); Uchunti (Indo-Fijian); Te'ekosi (Tongan).

The leaves of the plant have antiseptic properties. In Fiji, the crushed leaves are used to help stop bleeding (of

wounds) by encouraging clotting. The leaves are crushed and used as a poultice for boils, sores and swollen feet. In Tonga, the juice from the pounded leaves is applied to infected wounds. Essential oils from the plant have been shown to exhibit antibacterial activity against a certain strain of bacterium, *Staphylococcus aureus*. The essential oils also show marked wound-healing activity. It has also been shown that a fraction of the plant extract contained the compound 5-methoxy nobiletin which had the greatest wound-healing activity². The plant has also shown antifungal and anti-inflammatory activities³.

Artocarpus altilis (Parkinson) Fosberg (Moraceae)

Local Names: Bucu ni Viti, uto (Fijian); 'ulu (Samoan, Tokelauan, Hawai'ian); Mei (Tongan, Futunan, Niuean, Tuvaluan, Marquesas); maiore, 'uru (Tahitian); kuru (Cook Is.).

Puncture wounds to the eye are treated by applying to the wounds the white sap of the plant. The white sap has been reported to contain cerotic acid and ceryl alcohol. The juice of the leaves may be squeezed onto wounds; the wounds are then covered with the leaves and bandaged. The leaves contain hydrocyanic acid⁴. The root bark has been shown to have antibacterial activity⁵.

Calophyllum inophyllum L. (Clusiaceae)

Local Names: Dilo (Fijian); fetau (Samoan, Niuean, Tuvaluan); feta'u (Tongan); silo (Futunan); 'ati, tamanu (Tahitian, Tuamotus); temanu (Marquesas); tamanu (Cook Is.); kamani (Hawai'ian).

In New Guinea, the leaves of the plant are heated until they become soft and then applied to cuts. The gum from the bark is used to treat wounds. The bark contains inophyllic acid. The root bark contains an antimicrobial compound with the molecular formula C₃₂H₄₆O₆ which is highly active against many gram-positive bacteria⁵. The seeds of the plant show anti-HIV activity⁶.

Centella asiatica (Apiaceae)

Local Names: Totodro (Fijian); tona (Futunan); tono, togo (Samoan); tono (Tongan, Niuean); tohetupou (Tahitian); Kapukapu (Cook Is.); phoe kula (Hawai'ian).

The leaves have antiseptic as well as antimicrobial properties⁷. The leaves of *C. asiatica* are used to stop the bleeding of fresh wounds by promoting the clotting of blood. It had been shown that a plant extract of *C. asiatica*

*School of Pure and Applied Sciences, The University of the South Pacific, Suva, Fiji. Fax: (679) 302-548, E-mail: sotheeswaran@usp.ac.fj

contained the triterpenoids madecassic acid, asiatic acid and asiaticoside, and this extract had a therapeutic effect on rats. The plant also has anti-inflammatory and peptic ulcer healing activities³.

***Clidemia hirta* (L) D. Don (Melastomaceae)**

Local Names: *Draunisiga*, *kaurasiga* (Fijian).

The leaves are chewed and applied to wounds to control bleeding. The leaves contain poisonous alkaloids and show antimicrobial activity^{7,13}.

***Cordyline terminalis* L. Kunth (Agavaceae)**

Local Names: *Ti* (Fijian).

In New Guinea, the leaves are heated and placed over fresh cuts and wounds. The leaves have been shown to contain tyramine⁷.

***Crinum asiaticum* L. (Amaryllidaceae)**

Local Names: *Viavia* (Fijian); *Lau talotalo* (Samoan)

The leaves are used to treat and heal wounds. The plant has been shown to have antibacterial activity³.

***Epipremnum pinnatum* L. Engl. (Araceae)**

Local Names: *Yalu*, *Naca* (Fijian).

The inner sap of the plant is applied directly to large wounds. The bark of the plant contains pectin, glucose, a volatile oil and fat. The whole plant contains the alkaloid tongine⁷.

***Guettarda speciosa* L. (Rubiaceae)**

Local Names: *Buabua* (Fijian).

The bark is applied to pus-filled wounds¹³.

***Hibiscus rosa-sinensis* L. (Malvaceae)**

Local Names: *Senitoa* (Fijian); *'aute* (Samoa, Tuvalu, Tahiti); *kaute* (Tonga, Futuna, Cook Is.); *kause* (Niue); *koute*, *'oute* (Marquesas).

A preparation of the leaves and roots is used to treat cuts and wounds. It has been shown that the leaves have an antifertility effect and that the leaves contain taraxeryl acetate and *beta*-sitosterol⁸. The plant shows antifungal and anti-inflammatory activities³.

***Hibiscus tiliaceus* L. var *tiliaceus* (Malvaceae)**

Local Names: *'au* (Cook Is); *vauleka*, *vau* (Fijian); *fau* (Samoan, Tongan, Tuvaluan, Marquesas); *fou* (Niuean); *purau* (Tahitian, Tuamotus).

The leaves are directly applied to open, infected wounds. In Tahiti, the Cook Islands, and the Marquesas, the flowers, either fresh or boiled into a paste, are used as a poultice for cuts and boils. The plant contains sesquiterpenoid quinones whereas the flowers contain flavonoids⁹.

***Hoya australis* R. Br. ex. Traill. (Asclepiadaceae)**

Local Names: *Wabi Levu*, *bita bita*, *draubibi* (Fijian); *fue salela* (Samoan); *lau matolu* (Tongan).

This is a poisonous plant (two kg of the leaves have been

shown to cause the death of sheep within 24 hours). However, the plant is used in many countries to heal wounds. The whole plant contains acetates, cinnamates and triterpenoids. The leaves of the plant contain triterpenoids and flavones^{7,3}.

***Mikania micrantha* H.B. & K. (Asteraceae)**

Local Names: *Wa bosucu* (Fijian); *fue saina* (Samoan, Niuean).

The juice of the leaves is used to treat wounds and cuts by preventing excessive bleeding. The chewed, moist leaves are placed directly on minor wounds to stop bleeding by encouraging the clotting of blood. The leaves are thought to have antiseptic and antimicrobial properties^{7,3}.

***Miscanthus floridulus* (Labill.)**

Warb. syn. *Eulalia japonica* Ssensu Seem (Poaceae)

Local Names: *Gasau* (Fijian).

Wounds are treated with a salve made by chewing the new shoots of the plant. The leaves of the plant have been reported to contain triterpenes and sterols.

***Morinda citrifolia* L. (Rubiaceae)**

Local Names: *Kura* (Fijian); *nonu* (Samoan, Tongan, Futunan, Niuean, Tokelauan, Tuvaluan); *nono* (Tahitian, Tuamotus, Cook Is.); *noni* (Marquesas, Hawai'ian).

A preparation of the root is used to treat wounds caused by stonefish and sting-rays. The roots are reported to contain a variety of anthraquinones (e.g. moriadin, mono ethoxyrubiadin, *alpha*-methoxyalizarin, all three compounds can occur either free or as glycosides) and these anthraquinones have antibiotic and antimicrobial activities¹⁰. The plant also shows antiscariasis activity³.

***Phymatosorus nigrescens* (Blume) Pichi Sermolli (syn. *Phymatodes nigrescens* (Blume) J. Smith (Polypodiaceae)**

Local Names: *Vativati* (Fiji).

Wounds which have healed on the outside but not on the inside are treated with various parts of this plant¹³.

***Premna obtusifolia* R. Br. (Verbenaceae)**

Local Names: *Yaro* (Fijian); *valovalon* (Futunan); *aloalo* (Samoan, Niuean, Tuvaluan); *'avarro* (Tahitian); *valovalo* (Tongan);

The juice from the leaves together with salt water is used to make a preparation to treat fresh wounds. The roots have been shown to possess antimicrobial activity⁷.

***Psidium guajava* L. (Myrtaceae)**

Local Names: *Quwawa* (Fiji); *tuava* (Tahiti, Marquesas, Cook Is.); *ku'ava* (Samoa); *kuawa* (Hawa'ii).

Fresh wounds are treated by wrapping the leaves around the wounds. The leaves contain essential oils (such as limonene, caryophyllene and sesquiterpene alcohols)¹¹, triterpenoids (such as ursolic, oleanolic, crategolic and quajarolic acids) and nine tannins. The leaves also contain the compounds quercetin and quajaverin.

The plant shows antibacterial, antifungal, antimycobacterial and antiviral activities³.

***Terminalia catappa* L. (Combretaceae)**

Local Names: *Kauariki* (Cook Is); *Tavola* (Fijian); *mai'i* (Marquesas); *selle* (Niuean & Tongan); *talie* (Samoan, Futunan & Tuvaluan); *'autera'a*, *'aua* (Tahitian); *alita*, *alite* (Solomon Is).

The leaves have been shown to exhibit slight antibiotic activity against *Staphylococcus*. The leaves are used to treat wounds and burns. The young leaves contain the amino acids leucine, phenylalanine, methionine and valine. The bark is used to treat fungal skin diseases³.

***Thespesia populnea* (L) Solind ex. Correa (Malvaceae)**

Local Names: *Miro* (Cook Is.); *mulomulo* (Fijian); *mi'o*, *miro* (Marquesas); *milo* (Samoan, Tongan, Futunan, Niuean, Tuvaluan, Hawai'ian); *miro*, *'amae* (Tahitian).

In New Guinea, the leaves are directly applied to wounds and skin ulcers. The leaves contain populneol (a benzyl alcohol) and flavonoids. The plant has antibacterial and antifungal activities³. The leaf extracts have been shown to be active against *Salmonella tryphimurium*³.

***Vitex trifolia* L. (Verbenaceae)**

Local Names: *Rara* (Cook Is.); *Bulokaka* (Fijian); *lala* (Futunan); *lala sea* (Niuean); *namulega* (Samoan); *lala tahi* (Tongan).

Serious wounds are treated by holding the affected area over the steam of boiling leaves or by applying a salve made from the leaves. The leaves contain flavonoids [iso-orientin and casticin (a quercetagenin derivative)], the iridoid agnuside, friedelin, beta-sitosterol, beta-sitosteryl-beta-D-glucoside, as well as long chain hydrocarbons. The oil from the leaves contain sesquiterpenoids⁷. The dried leaves showed activity against the following bacteria: *Bacillus subtilis*, *Staphylococcus albus*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*¹².

***Wollastonia biflora* (L) DC**

syn *Wedelia biflora* (L) DC (Asteraceae)

Local Names: *Kovekove* (Fijian); *makakula* (Niuean); *ateate* (Samoan); *ate* (Tongan).

In Tonga, the leaves are pounded between hot stones and the juice from the leaves is used to treat serious wounds and to prevent tetanus³. The leaves contain many essential oils - the major one being (-)-alpha-pinene.

Acknowledgements

The NAPRALERT data base was used by the senior author to access the latest published information on some of the plants. The authors thank the Managing Director, NAPRALERT, Dr Mary Lou Quinn of the University of Illinois at Chicago, USA, for providing this facility.

References

1. Shekhawat NS, Ramawat KG, Arya, HC. Carbohydrate, protein, phenols and enzymes (PPO, PRO and IAA oxidase) in gall and normal tissues of *Achyranthus aspera* L. *Current Sci.* (India). 1978; 47 (20): 780-1.
2. Adesogen EK, Okunade AL. A new flavone from *Ageratum conyzoides*. *Phytochemistry*. 1979; 18 :1863-5.
3. Medicinal Plants in the South Pacific. Edited and Compiled by Sotheeswaran S, Doyle M, Aalbersberg, WGL. WHO Regional Publications, Western Pacific Series No: 19, Manila, Philippines; 1998: 3-231.
4. Tsurumi K, Hiramatsu Y, Hayashi M, Fujimura H. Effect of madecassol on wound healing. *Oyo Yakuri*. 1973; 7(6) : 833-43, [CA, (1974), 80, 66674].
5. Radhakrishnan PG, Kurup, PA. Antibacterial principle of the root bark of *Calophyllum inophyllum*: Isolation and antibacterial activity. *Indian Journal of Experimental Biology*. 1970; 8: 39-40.
6. Spino C, Dodier M, Sotheeswaran S. Coumarins from *Calophyllum* Seed Oil: A Renewable Source of the Potent HIV Reverse Transcriptase Inhibitors. *Bio-organic and Medicinal Chemistry Letters*. 1998 ; in press.
7. Cambie RC, Ash J. *Fijian Medicinal Plants*. CSIRO, Melbourne, Australia; 1994 : 1-275.
8. Agarwal SK, Rastogi PR. Triterpenoids of *Hibiscus rosasinensis*. *Indian Journal of Pharmacy*. 1971; 33 : 41-42.
9. Ali S, Singh P, Thompson, RH. Naturally Occurring Quinones. *J. C. S. Perkin I*. 1980; 257-258.
10. Bowie JH, Cooke RG. Colouring matters of Australian Plants, IX. Anthraquinones from *Morinda* species. *Australian Journal of Chemistry*. 1962; 15 : 332-333.
11. Hegnauer R. *Chemo taxonomie der pflanzen*, 5. Birkhauser Verlag, Basel; 1969 : 506-507.
12. Sundarrao K, Burrows I, Kuduk M, et al. Preliminary Screening of Antibacterial and Antitumour Activities of Papua New Guinean Native Medicinal Plants. *Int. J. Pharmacog.* 1993; 31 (1): 3-6.
13. Weiner MA. *Secrets of Fijian Medicine*, 1984 : 1-141. □