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Medicinal plants with potential wound healing activity: a review article

Abstract

Wound is common biological injury dew to internal and external cut of skin. Wound is subsequently problem of immunological reactions, such as inflammation, necrosis, and which effect of cell injury .The wound healing is a natural process where in the medications applied on the wound site may reduce the rate of healing. The Natures has god gifted us herbal plant based drugs with potential to wound healing. Which play and important role in wound healing. Herbal Plants play an essential role in wound healing, there are many herbal plants in nature have wound healing activates such as *Azadirachta indicia, Curcuma domestica Valeton, Olea europaea, Ocimum sanctum, Bryophyllum pinnatum, Punica granatum, Elephantopus scabe, Alternantherasessili*, *Arnebia densiflora, Carallia brachiate,* and in the various phytochemical active constituent present in different parts of plant which is effective for wound healing pharmacological activates. Such as tannins, flavonoids, alkaloids, and glycoside of the wound healing potential. This review highlights all the plants which are traditionally and scientifically proven for the used in treated of wounds and wound care. It also covers the list of the plants and its part of plant used traditionally and scientifically for wound care.

Keywords: wound healing, medicinal plant, phytoconstituent, plant extracts

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Introduction

Wounds are the primary cause of physical injury Diseases result from physical, chemical, microbial (or) immune (or) tissue disorders, often associated with dysfunction.[1] According to the Medical Centre, a wound is a physical injury that causes damage (or tearing) of the skin, resulting in disruption of the body's physical and functional functions. Wound healing is the interaction of a combination of cellular and biochemical healing effects to restore process and function while restoring the strength of injured tissue. Includes cell-cell and cell-matrix interactions; inflammation allows processes to occur in many overlapping phases and processes, including wound healing, tissue reepithelialisation, new repair, and angiogenesis and granulation tissue formation.[3] There are many factors that can delay (or) slow the wound healing process, including bacterial infection, necrotic tissue, blood flow obstruction, lymphatic congestion, and diabetes can be improved.[4] In addition, painkillers are cheap, easily available and have few side effects. Despite the great success of allopathic medicine, the use of herbal medicines has become increasingly popular due to the dangers and side effects of allopathic medicine. Alkaloids, tannins, flavonoids, and phenolic chemicals are examples of bioactive secondary metabolites with interesting pharmacophores related to the effects of medicinal plants. Traditional medicine practices have expanded rapidly over the past few decades.[5] Approximately 20% of modern allopathic medicines are derived from plants. Medicines made from plants are safer in the treatment of many diseases. Since traditional knowledge is lost for many reasons, it must be preserved for the benefit of future generations. There is greater demand for new, better medicines made from natural ingredients.[6] Diseases such as stomach ache, wound healing, skin diseases, inflammation, itching, leprosy and sexually transmitted diseases can be treated and cured with herbs. Herbs are used to cleanse wounds, remove dead tissue, and provide a moist environment that supports optimal health. In folklore, many plants are used to heal burns, wounds and cuts[7] Antibacterial coagulants and wound cleansers are made from plant ingredients and are used in first aid. Treat plants with wounds. Treatment can be achieved through a variety of mechanisms, including modification of wound healing, reduction of bacterial count, improvement of collagen deposition, and stimulation of fibroblasts and fibroblasts.[8]

Classification of wound

Wounds can be classified in number of ways, depending on healing time they can be acute or chronic

Acute wounds

Acute pain is defined as disruption of the normal structure and function of tissue that has not recently been injured. Acute wound healing is a regulated series of cellular, humoral and molecular events that are activated during injury, resulting in a time-dependent but predictable pattern of tissue repair.[9]

Chronic wounds

Chronic wounds are defined as wounds that do not heal the body with appropriate and timely procedures before treatment and cannot function properly or cannot provide their anatomical functions and functions effectively.[10] According to the effect of the skin system, there will be external wounds that are only epidermal damage. Some cortical lesions damage the epidermis and deeper dermis, including blood vessels, sweat glands, and hair follicles. Full-thickness wounds occur when the underlying subcutaneous fat or deep tissue is damaged.

Process of wound healing

Process of wound healing may be considered as a dynamic process in which cellular and matrix components act together to re-establish the integrity of damaged tissue and replace lost tissue. Regardless of the source or the extent of tissue damage, under normal conditions the wound healing process occurs in predictable fashion in four stages: inflammation, migration, proliferation and maturation (remodelling). Wound Healing is considered to complete when the skin surface has reformed and has regained its tensile strength.[11]

Stages of wound healing

Haemostasis and coagulation

In wound healing the platelets act as utility workers sealing off the damaged blood vessels. The blood vessels themselves constrict in response to injury, but this spasm ultimately relaxes. The platelets secrete vasoconstriction substances to this process but their prime role is to form a stable clot sealing the damaged vessel.[12,13]

Inflammation

Inflammation is the body's response to injury and includes cellular and vascular reactions. The release of histamine and many other cell-mediated factors into the wound causes vasodilation increased capillary permeability, and nociception stimulation. Protein-rich exudate, containing phagocytes and other materials, is released from the blood vessels into the wound, engulfing dead cells and bacterial debris.[14]

Migration

Growth factors in wound exudate promote the growth and migration of epithelial cells, fibroblasts, and keratinocytes to the injured area to replace damaged and lost tissue. These cells regenerate from the edges and grow rapidly from the wound underneath the dry bone. Epithelial thickening and basal cell proliferation.[15]

Proliferation

The proliferation Phase involves the development of new tissue and occurs simultaneously or just after the migration phase, lasting from 5 to 20 days. Granulation tissue is formed by infiltration of blood capillaries and lymphatic vessels into the wound and by the supporting collagen network synthesized by fibroblast. This process is known as granulation.

Maturation

The final period of wound healing, also known as the adaptation period, involves constriction of the vascular structure and expansion of collagen fibers, which increases the tensile strength of the healing. Wound healing time generally ranges from 3 weeks to 2 years, and scar tensile strength returns to 70–90% of pre-injury tissue (Figure 1, Table 1, 2).[16]

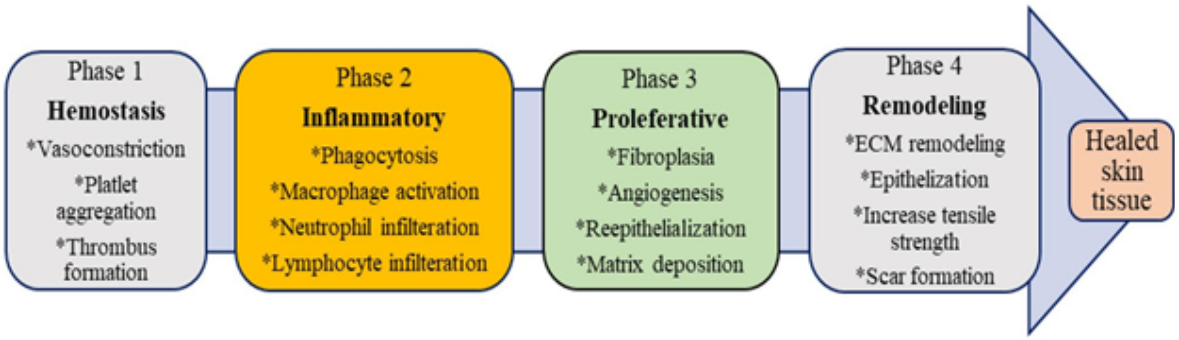

Figure 1

Table 1 List of plants with wound healing activity

S.no	Plant name	Part used	Pharmacological Model	Ref
1.	*Azadirachta indica (Meliaceae)*	pure neem oil and neem ointment	incised and gap wounds in bovine calves	16
2.	*Ocimum sanctum Linn. (Labiaceae)*	ethanolic extract of leaves	excision, incision and dead space	17
3.	*Acalypha indica Linn. (Euphorbiaceae*	whole plant ethanolic extract	excision and incision	18
4.	*Wedelia calendulacea (L.) Less. (Asteraceae)*	Aqueous extract	incision and excision	19
5.	*Vanda roxburghii R. Br. (Orchidaceae)*	Crude aqueous extract of plant	excision, incision and dead space	20
6.	*Trigonella foenum-graecum Linn. (Fabaceae)*	Aqueous extract of seed	excision, incision and dead space	21
7.	*Aegle marmelos Corr. (Rutaceae)*	Methanolic extract of plant	excision and incision	18
8.	*Quercus infectoria Oliver (Fagaceae)*	Crude aqueous extract of galls	excision, incision and dead space	19
9.	*Hevea brasiliensis Müll.Arg. (Euphorbiaceae)*	Ethanol extract of flower	excision, incision and dead space models	20
10.	*Hypericum patulatum Thumb (Hypericaceae)*	Methanolic extract of leaf	excision and incision	22
11.	*Hyptis suaveolens (L.) (Lamiaceae*	Ethanolic extract of leaf	excision, incision and dead space	23
12.	*Nelumbo Nucifera(Nymphaceae)*	Methanol extract of rhizomes	excision, incision and dead space	24
13.	*Embelia ribes Burm (Myrsinaceae)*	Ethanol extract of the leaves	excision, incision and dead space	25
14.	*Gmelina arborea Roxb. (Verbenaceae)*	Alcoholic extract of leaf	excision, incision and dead space	26
15.	*Plagiochasma appendiculatum Lehm. et Lind. (Aytoniaceae)*	Alcohol and ethanolic extract	excision and incision	18
16.	*Cecropia peltata L. (Cecropiaceae)*	Alcohol and ethanolic extract	excision	19
17.	*Areca catechu L. (Arecaceae)*	betel nut extract	excision, incision and dead space	20
18.	*Butea monosperma (Lam.) Kuntze (Papilionaceae)*	Alcoholic bark extract	excision	22
19.	*Calendula officinalis L. (Asteraceae)*	Alcohol and ethanolic extract	By stimulating the proliferation and, to a higher extent, the migration of fibroblasts.	23
20.	*Terminalia bellirica Roxb. (Combretaceae)*	ethanol extract of fruits	excision and incision wounds	24

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Table 1 Continued...

S.no	Plant name	Part used	Pharmacological Model	Ref
21.	*Pterocarpus santalinus Linn. (Fabaceae)*	stem	by stimulating a growth factor or factors signal cascade system	25
22.	*Acalypha indica Linn. (Euphorbiaceae)*	whole plant ethanolic extract	excision and incision	26
23.	*Aegle marmelos Corr. (Rutaceae)*	Methanolic extract of plant	excision and incision	27
24.	*Datura alba (Bernh.) Rumph. ex Nees (Solanaccae)*	alcoholic leaf extract	burn rat wound	28
25.	*Tragia involucrate L. (Euphorbiaceae)*	methanol extract	excision	29

Table 2 Medicinal plants with wound healing effects

S.NO	Plant Name & Biological Sources	Family Local identity	Pharmacological Activity	Images
1.	*Azadirachta indicia A. Juss.*	*Meliaceae, (Neem)*	Wound healing, Antibacterial, antiviral, and anti-inflammatory.	
2.	*Curcuma domestica Valeton*	*Zingiberaceae (Haldi)*	It has potent anti-inflammatory and antibacterial properties & Wound healing	
3.	*Olea europaea*	*Oleaceae, (Jaitoon)*	Anti-inflammatory property. Wound healing. antiseptic,	
4.	*Ocimum sanctum*	*Lamiaceae. (Tulsi)*	Wound healing, Antimicrobial, antifungal, antiprotozoal, antimalarial,	
5.	*Bryophyllum pinnatum*	*Crassulaceae, (Panfuti, miracle leaf)*	Wound healing, Antimicrobial, anti-ulcer, antihypertensive, antileishmanial, anti-cancer, anti-diabetic,	
6.	*Punica granatum*	*Lythraceae. (Annar)*	Wound healing, Antimicrobial, anti-ulcer, antihypertensive, Antileishmanial, anti-cancer, anti-diabetic,	
7.	*Elephantopus scaber*	*(Asteraceae) (Adhomukha)*	Wound healing ability. Anticancer, antimicrobial, hepatoprotective, antioxidant, antidiabetic, anti-inflammatory, analgesic,	
8.	*Alternantherasessilis*	*Amaranthaceae*	Antioxidant, anti-inflammatory, analgesic, and wound healing effects	
9.	*Arnebia densiflora*	*Boraginaceae (Arnebia)*	Wound healing, Antileishmanial, anti-cancer, anti-diabetic	
10.	*Carallia brachiata*	*Rhizophoracea Merrill*	Anti-inflammatory, Wound healing, Antidiabetic activity, Anti-Oxidant,	

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Conclusion

This review article is suggests that herbal plants have more efficacy in healing wounds, This review studies the investigation, description, and experimental study of native medicines and their biological activity with a focus on herbal plants with the capacity to heal wounds. Table provides an overview of the herbal plants Botanical name, Family, Local name, and Parts and pharmacological model used. Specifically, Curcuma longa, Ocimum sanctum, centella asiatica, Tribulus terrestris, Azadirachta indica are well liked herbal products in a number of international markets and are traditionally used for treatment of wounds.

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None.

Conflicts of interest

Authors declare that there is no conflict of interest.

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