An overview of medicinal plants as wound healers

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ABSTRACT
Wound healing is an integrated cellular and biochemical process of restoring normal structure functions of damaged tissue. Healing is a natural phenomenon by which body itself overcome the damaged to the tissue but the rate of healing is very slow and chance of microbial infection is high. Improvement in healing process can be accomplish either shorten the time required for healing or to minimize the undesired consequences. India has a rich tradition of plant-based knowledge on healthcare system. Several herbs and medicinal plants proved to be a wound healers were identified and formulated for treatment and management of wounds. Various herbal products have been used in management and treatment of wounds over the years. The present review attempt to highlight some herbs and medicinal plants proved to be scientifically used for the treatment of cuts and wounds as a wound healer.

INTRODUCTION
Wound may be defined as a disruption of the cellular and anatomic continuity of a tissue, with or without microbial infection and is produced due to any accident or cut with sharp edged things. It may be produced due to physical, chemical, thermal, microbial or immunological exploitation to the tissues. Wound healing is a process of restoring normal structure functions of damaged tissue. Healing is a natural phenomenon by which body itself overcome the damaged to the tissue but the rate of healing is very slow and chance of microbial infection is high. This creates demand of a substance that speeds up the rate of healing. Wound healers are one of the most critical requirement in the essential medicaments for soldier and may help in putting injured soldier back on the war field as quickly as possible. A wound healer also minimizes demand of other drugs like antibiotics and also their probable side effects by their use. (Lazarus., et al 1994). 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 tribals and folklore traditions in India for treatment of cuts, wounds, and burns.

Besides this, there is not a single synthetic drug formulation in the market which can claims for its wound healing properties. The drugs available are either bacteriostatic or bactericidal and in these cases healing is by a natural phenomenon only (Lawrence et al 1994; Nguyen., et al 2009).

Classification of Wound
Wounds may be classified by several methods; their aetiology, location, type of injury or presenting symptoms, wound depth and tissue loss or clinical appearance of the wound. Wounds are classified as open and closed wound on the underlying cause of wound creation and acute and chronic wounds on the basis of physiology of wound healing.

Open wounds
In this case blood escapes the body and bleeding is clearly visible. It is further classified as: Incised wound, Laceration or tear wound, Abrasions or superficial wounds, Puncture wounds, Penetration wounds and gunshot wounds (Strodtbeck et al 2001).

Closed wounds
In closed wounds blood escapes the circulatory system but remains in the body. It includes Contusion or bruises, heamatomas or blood tumor, Crush injury etc.
Acute wounds

Acute wound is a tissue injury that normally precedes through an orderly and timely reparative process that results in sustained restoration of anatomic and functional integrity. Acute wounds are usually caused by cuts or surgical incisions and complete the wound healing process within the expected time frame (Kumar et al 2007).

Chronic wounds

Chronic wounds are wounds that have failed to progress through the normal stages of healing and therefore enter a state of pathologic inflammation chronic wounds either require a prolonged time to heal or recur frequently (Kumar et al 2007; Robert et al 1998).

Physiology of Wound Healing

Cellular activity

The process of healing which restores normal structure and function involves two different processes (Thomson, 2006).

Regeneration

proliferation of parenchyma cells which results in complete restoration of original tissue.

On the basis of capacity to divide cells are of three types. They are labelled in table-1.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Type</th>
<th>Situation</th>
<th>Regeneration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Labile</td>
<td>Epidermis, g.i.t. respiratory tract, urinary tract, cells of lymph node and spleen.</td>
<td>Under normal physiological condition, they are continuously dividing.</td>
</tr>
<tr>
<td>2</td>
<td>Stable</td>
<td>Parenchymal cells of liver, kidney, pancreas, smooth muscles and cartilage cells.</td>
<td>Cells are in G0 phase and enter cell cycle after situation.</td>
</tr>
<tr>
<td>3</td>
<td>Permanent</td>
<td>Nervous system, skeletal system, cardiac muscle.</td>
<td>Can’t regenerate.</td>
</tr>
</tbody>
</table>

In order to maintain proper structure of tissue cells enters the cell cycle under the constant regulatory control of growth factors like epidermal growth factor, fibroblast growth factor, platelet derived growth factor and endothelial growth factor. Regeneration of parenchymal cells involves two processes .

1. Proliferation of original cells from the margin of injury with migration so as to cover the gap.

2. Proliferation of migrated cells with subsequent differentiation and maturation so as to reconstitute the original tissue.

Repair

Proliferation of connective tissue element resulting in healing. Repair takes place by participation of mesenchymal cells, fibrocytes, endothelial cells and platelets of injured organ (Mutsaers et al., 1997). Two processes are involved in repair,

1. Granulation tissue information

In this process after inflammation, cleaning of debris, in growth of granular tissue take place. In growth take place by angiogenesis (formation of new blood vessels by proliferation of endothelial cells) and fibrous tissue formation as a result of mitotic division of fibroblast.

2. Contraction of wound

Contracted wound heals rapidly as less surface area is there contraction involves activities like dehydration, contraction of collagen and my fibroblast appearance.

Extra cellular matrix

It is responsible to strengthen the wound. In addition they also direct cell migration, differentiation and organization. Extracellular matrix has five main components. These are labelled in table-2.

Steps Involved In Wound Healing

Steps involved in healing depends on the characteristics of the wound and wound are of two types on the basis of the character (Falanga et al., 2005).

Primary union of wound

This is seen when wound is characterized by small, clean and uninfected condition without much loss of cells. Steps in primary union include (a) haemorrhage (b) inflammation (c) proliferation and migration of basal cells of epidermis towards incision (d) fibroblast and new collagen fibbers invasion.

Secondary union of wound

Characters of secondary union include open with large tissue defect having excessive loss of cells and tissues. First three steps in secondary union is same as the primary union. There are after following step is seen. In forth step main bulk of secondary healing is formed by granulation and granulation tissue a formed by proliferation of fibroblast and angiogenesis. In final step, wound contraction take place by the action of myofibroblasts. In the first type of wound sutures can be used but for the second type. Wound healers are the only option.

Factors influencing healing

two types of factor influencing the wound healing (Thomas, 2011).

1. Local factors: includes

   ▶ Infection by tissue organization which delay healing
- Poor blood supply which shows healing
- Movement of affected part of delay healing
- Exposure to ionizing radiation delay granulation
- Exposure to ultraviolet light facilitates healing
- Foreign bodies including sutures interferes in healing

2. Systematic factors: includes
- Wound healing is rapid in young and slow in aged people
- Nutritional deficiency of vitamin C and zinc delay healing
- Haematological abnormalities also affects healing
- Diabetics are more prone to infection and hence delay healing
- Administration of glucocorticoids (anti-inflammatory) delay healing.

### Table 2: Components of extracellular matrix in cell repair.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Component</th>
<th>Function</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Collagen</td>
<td>Structural support</td>
<td>Proteinous nature Synthesized and secreted by Ribosomes.</td>
</tr>
<tr>
<td>2</td>
<td>Glycoproteins</td>
<td>Adhesive for cells and support material</td>
<td>Fibronectin Tenasein Thromboplastin</td>
</tr>
<tr>
<td>3</td>
<td>Basement membrane</td>
<td>Acts as a base</td>
<td>Consists of Collagen IV and laminin.</td>
</tr>
<tr>
<td>4</td>
<td>Elastic fibres</td>
<td>Provide ability To recol</td>
<td>Consist of two Components elastin glycoprotein elastin micro fibril</td>
</tr>
<tr>
<td>5</td>
<td>Protoplycan</td>
<td>Helps in Formation of collagen</td>
<td>Carbohydrate polymer protein bound to it.</td>
</tr>
</tbody>
</table>

### Commonly Used Medicinal Plants as Wound Healers

**Aloe Vera**

*Aloe Vera* commonly known as Kumari is a perennial herb belonging to liliaceae family. It has short stem and shallow root system with large fleshy, rosettes sessile leaves. It can be seen as wild herb in dried parts of India (Heggars et al., 1996). Today aloe vera gel is an active ingredient in hundreds of skin lotions, sun blocks and Cosmetics (Grindlay et al., 1986). *Aloe Vera* is an excellent remedy for minor burns, cuts and sunburns. Both juice and aqueous extract from the leaves shows significant healing properties. It is also reported that it not only speeds up healing but also prevents injured surface from getting infected (Chitra et al., 1998).

*Aloe Vera* was studied for burn wounds by routine dressing by A. Vera extract every 3rd day in chemically produced burn on healing subjects. The wound healing time and bacteriological control was significantly in Aloe group (Udupa et al., 1994). The working mechanism of Aloe Vera for wound healing is reported to be enhancing collagens turnover rate and increased level of lysyl oxidase (responsible for cross linking of newly synthesized collages (Chitra et al., 1998). Beside wound healing effect, it is reported to have ulcer healing property (when taken internally) and protective action on skin.

**Gingko biloba**

It belongs to the family Gingkoaceae and commonly known as Kew tree. It is widely planted in Korea and China. Propagation type includes seeds and vegetative methods. *Gingko biloba* has found to have significant activity against both dead space and excision wound models in male rats. A 50 mg/kg of dose has significantly promoted the breaking strength and hydroxyproline content of granulation issue in dead space wounds and in case of excision wound model, it is found to shorten the epithelization period (Bairy et al., 2001). It is also reported that the activity of G.B. is due to its high amino acid content which absorbs rapidly in blood stream and in combination with vitamins; they provide essential nutrients to the wound area to promote healing. Beyond wound healing, it is used as an anti-inflammatory and antiallergic agent in ancient Chinese medicine.

**Centella asiatica**

*Centella asiatica* is a small trailing herb bearing white to reddish flowers which normally grows widely in the wet places. Commonly it is known as Brahmi and it is propagated by seeds and vegetative propagation. Clinical studies of the formulation (ointment, cream & gels) of aqueous extracts of *Centella asiatica* reports that, when it is applied topically thrice daily for 24 days on open wound site. The treated wound epithelized faster and the rate of wound contraction was higher as compared to control wound. Gel formulation produce better results as compared to other two formulations (Kumar et al., 1998). It is reported that the active constituents responsible for the activities of *Centella asiatica* are found to be asiaticosides and madicassoides (Shetty et al., 2006).

**Nelumba nucifera**

*Nelumba nucifera* belonging to family Nymphacaceae is called as Kamal in Hindi and Lotus in English. It is perineal aquatic herb embedded in mud with large flower. It is commonly cultivated in ponds and swamps by using rhizomes for propagation. *Nelumba nucifera* is very common among natural and traditional healers. They collect leaves and rhizomes, dry them and burn to produce ash which acts as wound healer. But now it is reported that the methonolic extract of rhizomes of *Nelumba nucifera* in the formulation of ointment is effective in different types of wound model in rats. The effect were studied on excision wound model, incision wound model and dead space wound model by using two different concentrations i.e. 5 % w/w & 10 % w/w ointment. The ointment in both the concentration responded significantly in all the wound models. Both the extract ointment shows the significant effect in respect with wound contracting activity, wound closer time, tensile strength, regeneration of tissue at the wound site and lysyl oxidase activity. The effects produced are comparable to that of standard drug¹² (Mukherjee et al., 2000).

**St. John wort**

*Hypericum mysoresense* is a perennial flowering plant and has been long used in folk medicine it belongs to the family Hypericaceae and is commonly known as St. Johns Wort.
The flowering tops are commonly used as tea or fresh tincture. It is reported that the methanolic extract of *Hypericum mysorensense* produces wound healing in rats. The extract, in the form of ointment (5% w/w and 10% w/w of aerial part) was evaluated in excision and incision wound models in rat. Both the concentration of the ointment showed significant response in both type of wound when compared to the control. The effect is comparable with standard drugs 'Mukherjee et al., 2000, Harsh et al., 2000).

**Tulsi**

This extract is derived from the plant of *Ocimum sanctum* belonging to family Labiatae. It has been widely grown throughout the world and commonly cultivated in gardens. Traditionally Ocimum sanctum is used in malarial fevers, gastric disorders and in hepatic infections. Ocimum sanctum leaves are also used in bronchitis, ringworm and other cutaneous diseases and earache. The leaves are used as a nerve tonic and to sharpen memory. Ocimum sanctum leaves are abundant in tannins like gallic acid, chlorogenic acid etc and also contain alkaloids, glycosides, and saponins along with the volatile oil. The major active constituent of Holy basil leaves include urosolic acid. It contains 70% eugenol, carvenol and eugenol-methyl-ether (Udupa et al., 2006).

**Eucalyptus**

It is also called Dinkum Oil. This oil is obtained by steam distillation of fresh leaves of *Eucalyptus globules* belonging to family Myrtaceae. It is indigenous to Australia and Tasmania. It is cultivated in United States, Spain, Portugal, and in India. It contains cineole, also known as eucalyptol. It also contains pinene, camphene, and phellandrene, citronellal, geranyl acetate. In skin care it can be used for burns, blisters, herpes, cuts, wounds, skin infections and insect bites. It can furthermore boost the immune system and is helpful in cases of chicken pox, colds, flu and measles. Oil is used as a counter irritant, an antiseptic, and expectorant. It is used to relieve cough and in chronic bronchitis in the form of inhalation. It is ingredient of several liniment s and ointments. Solution of eucalyptus oil is used as nasal drop (Hukkeri et al., 2002).

**Bael**

It is also called a Bael fruits, Indian bael. It consists of unripe or ripe fruits of the plant knowns as *Aegel marmelos* belonging to family Rutaceae. It is indigenous to India and found in Mynmar and Sri Lanka. The pulp is red in colour with mucilaginous and astringent taste. The chief constituent of drug is marmelosin which is furocoumarin. The drug also contains carbohydrates, protein, volatile oil and tannins. The pulp also contains vitamin C and vitamin A. two alkaloids O-methylhalfordional and isopentylhalfordinol have been isolated from fruits. It is used as digestive, appetizer and also used in the treatment of diarrhea and dysentery. It is also a tonic and it has a wound healing properties (Jaswanth et al., 2001).

**Myrobalan (Harde)**

It also called Haritaki, chebulic myrobalan. It consists of dried, ripe, and fully matured fruits of *Terminalia Chebula* belonging to family Combretaceae. It is found in sub-Himalayan tracks from Ravi to West Bengal, Asam and all forest in India. It is found growing at an altitude of 1800 m; it is not cultivated and fruits are collected from wild grown forest plants. It is a tree, 15 to 25 m in height, and 1.5 to 2.5 m in diameter. It has yellowish-white flowers in the terminal spike. It contains hydrolysable tannins which upon hydrolysis yield chebulic acid and d-gallyl glucoside. It also contains chebulagic, chebulinic, ellagic and gallic acids. It is used mainly as a astringent, laxatives, stomachic and tonic, anthelmintic. Fruit plup used to cure bleeding. It is an ingredient of ayurvedic preparation ‘Triphala’. It is also used in piles and external ulcers (Suguna et al., 2002).

**Neem**

Alcoholic extract of neem is useful in eczema, ringworm and scabies. Neem leaf extracts and oil from seeds has proven anti-microbial effect. This keeps any wound or lesion free from secondary infections by microorganisms. Clinical studies have also revealed that neem inhibits inflammation as effectively as cortisone acetate; this effect further accelerates wound healing. Neem oil contains margassic acid, glycerides of fatty acids, butyric acid and trace valeric acid.

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**Turmeric**

It is also called Indian saffron, curcuma. It consists of dried as well as fresh rhizomes of the plant known as *Curcuma longa* belonging to family zingiberaceae. It contains not less than 4% of volatile oil. India account for as much as 90% of the total output of the world.

*Curcuma longa* is the main species of commerce and is cultivated for its rhizomes in India, China and in Sri Lanka. India is the major grower with almost 80,000 hectors under the crop producing 1, 44,000 tonnes per annum. The plants are grown for 7 to 9 months after which the rhizomes are harvested, cooked, dried and then processed for powder, oleo-resin and curcumin. The extraction of powder is carried out by using solvents, water or both. It contains about 5% of volatile oil, resin. Starch grains and curcuminooids which is the chief constitutes of curcumin. Volatile oil, content sesquiterpenes such as α and β pinene, α-phellandrene, camphor, zingiberene. It is used as a condiment or spices, and colouring agent, especially for ointments and creams. It is used for the detection of boric acid. Traditionally it has been proved as antiinflammatory, anticancer, antiseptic (Mehra et al., 1984).
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Common Name</th>
<th>Source and Family</th>
<th>Parts Used</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aleppo Oak</td>
<td>Quercus infectoria Fagaceae</td>
<td>Galls</td>
<td>Jalalpure et al., 2008</td>
</tr>
<tr>
<td>3</td>
<td>Amla</td>
<td>Phyllanthus emblica Euphorbiaceae</td>
<td>Ethanolic extracts of fruits</td>
<td>Suguna et al., 2000</td>
</tr>
<tr>
<td>4</td>
<td>Angelica</td>
<td>Bryophyllum pinnatum Crassulaceae</td>
<td>Aqueous &amp; alcoholic extract of leaves</td>
<td>Khan et al., 2004</td>
</tr>
<tr>
<td>5</td>
<td>Apamarga</td>
<td>Achrynthus aspera Amaranthaceae</td>
<td>Ethanolic extract of leaves</td>
<td>Ghosh et al., 2011</td>
</tr>
<tr>
<td>6</td>
<td>Aritana</td>
<td>Bryophyllum pinnatum Crassulaceae.</td>
<td>Aq. Alcoholic &amp; petroleum extract of leaves</td>
<td>Mahmood et al., 2002</td>
</tr>
<tr>
<td>7</td>
<td>Bach</td>
<td>Acerus calamus Araceae</td>
<td>Ethanolic extract of leaves</td>
<td>Jain et al., 2010</td>
</tr>
<tr>
<td>8</td>
<td>Bael</td>
<td>Aegle marmelos Rutaceae</td>
<td>Methanolic extract of root.</td>
<td>Jaswanth et al., 2001; Udupa et al 1994</td>
</tr>
<tr>
<td>9</td>
<td>Brahmi</td>
<td>Gentella asiatica Umbelliferae</td>
<td>Aq. Extract of flowers</td>
<td>Kumar et al. 1998 Shetty et al, 2006</td>
</tr>
<tr>
<td>10</td>
<td>Brazilian Pepper</td>
<td>Schinus terebinthifolius Anacardiaceae</td>
<td>Hydroalchholic extract of leaves</td>
<td>Lucena et al., 2006</td>
</tr>
<tr>
<td>11</td>
<td>Charoli</td>
<td>Buchania lanzan Anacardiaceae</td>
<td>Alcoholic Extract</td>
<td>Chitra et al., 2009</td>
</tr>
<tr>
<td>12</td>
<td>Chaturangi</td>
<td>Lanata camara Verbanaceae</td>
<td>The Ethanolic extract of Leaf juice</td>
<td>Nayak et al., 2009</td>
</tr>
<tr>
<td>13</td>
<td>Chaulmosgra</td>
<td>Hydnocarpus weighuana Flacourtriaceae</td>
<td>oil</td>
<td>Oommen et al., 1999</td>
</tr>
<tr>
<td>14</td>
<td>Cumin</td>
<td>Cuminum cyminum Umbelliferae</td>
<td>Aqueous extract of leaves, Seed</td>
<td>Patil et al., 2009</td>
</tr>
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<td>15</td>
<td>Devadaru</td>
<td>Cedrus decodara Pinaceae</td>
<td>Oil</td>
<td>Dikshit et al., 1982</td>
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<td>16</td>
<td>Eucalyptus</td>
<td>Eucalyptus globules Myrtaceae</td>
<td>Oil</td>
<td>Hukkeri et al., 2002</td>
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<td>17</td>
<td>Figwort</td>
<td>Scrophelaria nodosa Scrophulariaceae</td>
<td>Seeds,pods,alcoholic &amp; aqueous extracts of leaves</td>
<td>Stevenson et al., 2002</td>
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<tr>
<td>18</td>
<td>Gandana</td>
<td>Achillea millefolium Asteraceae</td>
<td>Alcoholic &amp; aerial parts</td>
<td>Nirmala et al., 2001</td>
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<td>19</td>
<td>Ghamra</td>
<td>Tridax procumbens Asteraceae</td>
<td>Whole plants extract &amp; alcoholic extract of leaves</td>
<td>Diwan et al., 1983;</td>
</tr>
<tr>
<td>20</td>
<td>Ginkgo (GB)</td>
<td>Ginkgo biloba Ginkgoaceae</td>
<td>Ethanolic extract of stem</td>
<td>Raina et al., 2008</td>
</tr>
<tr>
<td>21</td>
<td>Hadjod</td>
<td>Cissus quadrangularis Vitaceae</td>
<td>Whole plants</td>
<td>Inngerdingen et al., 2004</td>
</tr>
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<td>22</td>
<td>Indigofera</td>
<td>Indigofera enneaphylla Fabaceae</td>
<td>Alcoholic extract of leaf &amp; flowers</td>
<td>Hemulatha et al., 2001</td>
</tr>
<tr>
<td>23</td>
<td>Jasmine</td>
<td>Jasminum auriculatum Oleaceae</td>
<td>Ethanolonic extract of leaves</td>
<td>Deshpande et al., 1967</td>
</tr>
<tr>
<td>24</td>
<td>Kamal</td>
<td>Neembo nucera Nymphaeaceae</td>
<td>Methanolic Extract of rhizomes</td>
<td>Mukherjee et al., 2000</td>
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<td>25</td>
<td>Leopards bune</td>
<td>Arnica Montana Asteraceae</td>
<td>Flowers, Rhizones</td>
<td>Karow et al., 2008</td>
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<td>26</td>
<td>Liquorice</td>
<td>Glycyrrhiza glabra Leguminosae</td>
<td>Vacuum dried Ethanolic extract of bark &amp; root</td>
<td>Kishore et al., 2001</td>
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<tr>
<td>27</td>
<td>Marigold</td>
<td>Clyenda officinalis Compositae</td>
<td>Flower extract</td>
<td>Preethi et al., 2001</td>
</tr>
<tr>
<td>28</td>
<td>Mexican/prickly poppy</td>
<td>Argemone mexicana Papaveraceae</td>
<td>Ethanolonic &amp; aqueous extracts of leaves</td>
<td>Dash et al., 2011</td>
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<tr>
<td>29</td>
<td>Myrobolan harda</td>
<td>Terminala chebula Combretoraceae</td>
<td>Alcoholic extract of leaves &amp; fruit</td>
<td>Suguna et al., 2002; Choudhary, 2011</td>
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<td>30</td>
<td>Ndende</td>
<td>Entoda Africana Fabaceae</td>
<td>Ethanolic extracts of leaves</td>
<td>Diolo et al., 2001</td>
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<td>31</td>
<td>Neem</td>
<td>Azardica indica Meliaceae</td>
<td>Methanol extract of leaves</td>
<td>Barua et al., 2007</td>
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<td>32</td>
<td>Nagarmotha</td>
<td>Cypres rotundus Cypereaceae</td>
<td>extract of tubers</td>
<td>Puratchikody et al., 2006</td>
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<td>Napoleona</td>
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<td>Esimone et al., 2010</td>
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<td>Nagappa et al., 2001</td>
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<td>37</td>
<td>Paste Rubber</td>
<td>Saba Florida</td>
<td>Leaves extract</td>
<td>James et al., 2010</td>
</tr>
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<td>Peepal</td>
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<td>39</td>
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<td>Villegas et al., 2001</td>
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<tr>
<td>No.</td>
<td>Plant/Extract</td>
<td>Active Ingredient(s)</td>
<td>Result/Reference</td>
<td></td>
</tr>
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<td>-----</td>
<td>---------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------</td>
<td></td>
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<td>40</td>
<td>Prickly pear</td>
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<td>Park et al., 2001</td>
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<tr>
<td>41</td>
<td>Quince</td>
<td>Aq. Extract</td>
<td>Hemmati et al., 2001</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Rooirabas</td>
<td>Aerial parts extract &amp; leaves</td>
<td>Kayser et al., 1997; Pepeljnjak et al. 2005.</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Rue, Pismaram Sabab</td>
<td>Ethanolic extract of whole plants, oil</td>
<td>Ivanova et al., 2005</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Sarphomka</td>
<td>Ethanolic Extract</td>
<td>Lodhi et al., 2002</td>
<td></td>
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<tr>
<td>45</td>
<td>St. John wort</td>
<td>Methanolic extract of latex</td>
<td>Rasik et al., 1996</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Sunflower</td>
<td>Leaves, seeds, flowers, roots</td>
<td>Subashini et al., 2012</td>
<td></td>
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<tr>
<td>47</td>
<td>Tulsi</td>
<td>Ethanolic extract of whole part</td>
<td>Udupa et al., 2006</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Turmeric</td>
<td>Rhizomes</td>
<td>Mehra et al., 1984</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Yellow-berried Nightshade</td>
<td>Ethanolic extract of leaves &amp; fruits</td>
<td>Dewangan et al., 2012</td>
<td></td>
</tr>
</tbody>
</table>

**CONCLUSION**

There are a number of plants which are used traditionally used the tribal people of India are not been validated or such plants not been evaluated keeping the traditional and conventional claim in mind. Generally pharmacologist should study traditional systems of medicine in scientific way and validate by screening plant/plant extracts for pharmacological activity. This review focused on the pharmacological reports of plant/plant extracts screens the soluble extracts in the development of an acceptable wound healing preparation, which if validated properly and proven scientifically can act as substitute or may even replace the modern wound healing agents.

Considering the principle drawbacks, associated with synthetic compounds, plants which are the gift from nature having traditional knowledge, provides excellent raw material for the treatment of various diseases and disorders. As in the allopathic system of medicine, wound healers are available but traditional knowledge in the form of literature provides number of traditional and household preparations for those purposes. Preliminary scientific investigations on plants indicate that natural products could be exploited to discover some novel wound healers.

**REFERENCES**


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