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HERBAL FORMULATIONS-A PARADIGM SHIFT IN BIOMEDICAL APPLICATION

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ABSTRACT

Wounds are just characterized as the disturbance of cell and anatomic progression of a tissue. These are prime reason for physical incapacities. Plants and their concentrates have a gigantic potential in the administration and treatment of wounds. The phyto-medications for wound mending are modest and financially savvy as well as apparently sheltered when contrasted with allopathic medications in connection of touchy responses. The vicinity of different life supporting constituents in the plants has likewise asked researcher to look at these plants with a perspective to focus their potentiating injury mending properties. Around the world, there is a tremendous requirement for the accumulation of ethno-natural information with respect to wound mending action. The present audit is an earnest endeavour to break down and order different pharmacological reports of Indian therapeutic plants utilized in wound healing.

KEYWORDS: wounds, plants, injury.

INTRODUCTION

Wound is a physical injury where the skin is torn, cut, burnt or punctured.[1] Wound healing is a repair process, when the in place tissue is harmed, cells neighbouring it relocate to the site, multiply, synthesize grid segments and have a tendency to close the injury. The target in wound administration is to recuperate the injury in the briefest time conceivable, with negligible torment, distress, and scarring to the patient.[2] Wound healing is an intricate and element process where the cell structures are restored to regularity. Be that as it may, the complex procedure of wound recuperating relies on upon cell movement and expansion. Fibroblasts are the key cells responsible for starting epithelialization, angiogenesis and

collagen arrangement. Presently there is a deficiency of investigative reports on operators that can improve the procedure of wound healing at cell level.

Wounds have been characterized as an interruption of ordinary anatomical structure and all the more vitally capacity. Accordingly, mending is the perplexing and element handle that outcomes in the rebuilding of anatomical congruity and capacity.

Classification of Wound[3]

Wounds can be classified as open and closed wound based on the cause of wound creation and also as acute and chronic wounds on the basis of wound healing physiology.

On the basis of cause of wound creation

A. Open wounds- In this type, blood escapes the body and bleeding is clearly visible. It can be again classified into various types as: Incised wound, Laceration or tear wound, Abrasions or superficial wounds, Puncture wounds, Penetration wounds and Gunshot wounds.

- Incised wounds- In this hardly tissue loss and minimum amount of tissue damage happens. This is caused by a sharp object such as a scalpel or knife. Bleeding in such cases can be excessive, so immediate action should be taken.

- Laceration wounds or Tear wounds- This is non-surgical injury in concomitant with some type of trauma, resulting in tissue loss and damage.

- Abrasions or Superficial wounds- Abrasion is caused by a sliding fall onto a rough surface. During abrasions the topmost layer of the skin i.e., epidermis is shed off which results in exposure of nerve endings and painful injury.

- Puncture wounds- They are caused by an objectlike nail,needle which puncture the skin. In this case chances of infection are higher because dirt enter into the depth of the wound.

- Penetration wounds- Penetration wounds are caused by an object such as a knife entering and coming out from the skin.

- Gunshot wounds- They are caused by a bullet or similar projectile driving into or through the body.

- Avulsions- It occurs when an entire structure or part of it, is forcibly pulled away. Such as the loss of a permanent tooth or an ear lobe, animal bites may also cause avulsions.

- Cuts- These are slicing wounds made with a sharp instrument leaving even edges. They may be as minimal as a paper cut or as significant as a surgical incision.

- Fish-hook wound- An injury caused by a fish-hook becoming embedded in soft tissue.

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

- Contusions or Bruises- These are the results of a forceful trauma that injures an internal structure without breaking the skin. Blows to the chest, abdomen or head with a blunt instrument (e.g. football or fist) can also cause contusions.

- Hematomas or Blood tumor- They are caused by damage to a blood vessel that consequently causes blood to collect under the skin.

- Crush wound- Crush wound is caused when great or extreme amount of force is applied on the skin over a long period of time.

On the basis of physiology of wound healing

- Acute wounds- It is a tissue injury that normally progresses 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.

- Chronic wounds- Wounds that have failed to progress through the normal stages of healing and enter a state of pathologic inflammation are chronic wounds. They either require a prolonged time to heal or reoccur frequently. Local infection, hypoxia, trauma, foreign bodies and systemic problems such as diabetes mellitus, malnutrition, immunodeficiency or medications are the most frequent causes of chronic wounds.

The wound healing mechanism

Wound healing Mechanism is a complex process, where the tissue or the skin undergoes healing or repair after the injury after itself.[4] In typical skin, the peripheral layer epidermis and the inward or the profound layer subsist in unflattering equilibrium state, framing a protective barrier against the outer environment. When the protective barrier is broken, the normal wound healing procedure begins immediately. The whole process of wound healing beginning right after injury may last from days to years.[5]

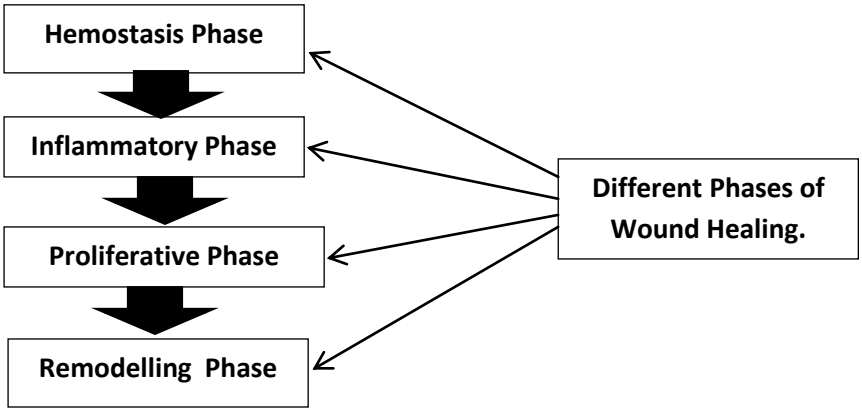

Fig:1 Phases of wound healing

The process of wound healing is such complex that it has to interact with different cells such as fibroblasts, endothelial cells and keratinocytes. The wound healing process undergoes four different stages such as

1. Haemostasis
2. Inflammation
3. Proliferation
4. Remodelling.

- **Haemostasis:** The moment when injury occurs to the skin, a set of complex, bio-chemical events occur in a firmly organised course to undo the damage occurred. Haemostasis happens to take place within the minutes of injury unless any clotting disorders. Haemostasis consists of two major processes: development of fibrin clot and coagulation. The blood vessels contract immediately after the injury but the spasm relaxes. In this stage the injured veins are fixed by platelets. These platelets emit a vasoconstrictive substance to help this procedure; yet their major role is to shape a steady coagulation for fixing the injured veins. Affected by ADP (Adenosine-di-Phosphate) spilling from harmed tissues the platelets totals and holds fast to the uncovered tissue.[6]

They secrete substance which interact and stimulate intrinsic course through the generation of thrombin which initiates the formation of fibrin from fibrinogen. The fibrin cross section reinforces the platelets totals into a stable haemostatic plug.

- Inflammatory Phase: The second stage is inflammatory phase, which begins instantly after the damage and ordinarily lasts between 24 and 48 hours and may endure up to 2 weeks in some case.[7] In this inflammatory phase of wound healing which includes erythema, swelling and warmth associated with agony, microscopic organisms and debris are phagocytosed and variables PDGF (Platelet determined development component) and TGFβ (Transforming Development Element Beta) are discharged which causes the movement and division of cells included in the proliferative phase.[8] This phase lasts upto four days of post damage.

- Proliferative Phase: The third stage is the proliferative stage that keeps going up to 2 days to 3 weeks after the inflammatory stage. It is typically portrayed by angiogenesis, collagen deposition, tissue arrangement, epithelialization and wound compression. In the wound healing similarity once the site has been cleared of debris, proliferative stage come into existence. In this stage fibroblasts move in, to start the proliferative stage and store new extracellular grid. Fibroblasts are the cells which secrete collagen structure in which facilitate dermal recovery occurs.[9] The new collagen matrix then gets to be cross connected and sorted out amid the last rebuilding stage. The "pericytes" cells which recover the external layer of vessels and the endothelial cells which create the coating. In the last phase of epithelialization "Keratinocytes" separate to frame the defensive external layer.

- Remodelling Phase:This stage goes on for 3 weeks to 2 years. New collagen is framed in this stage. Tissue rigidity is expanded because of between sub-atomic cross-connecting of collagen through vitamin C-subordinate hydroxylation. The scar straightens and scar tissues turn into 80% as solid as the first tissue.[10,11]

Utilization of sterilizers and anti-infection agents can just counteract or treat contaminations. Henceforth, arrangements to increase other unavoidable systems in charge of wound mending are of prime significance and are investigated.

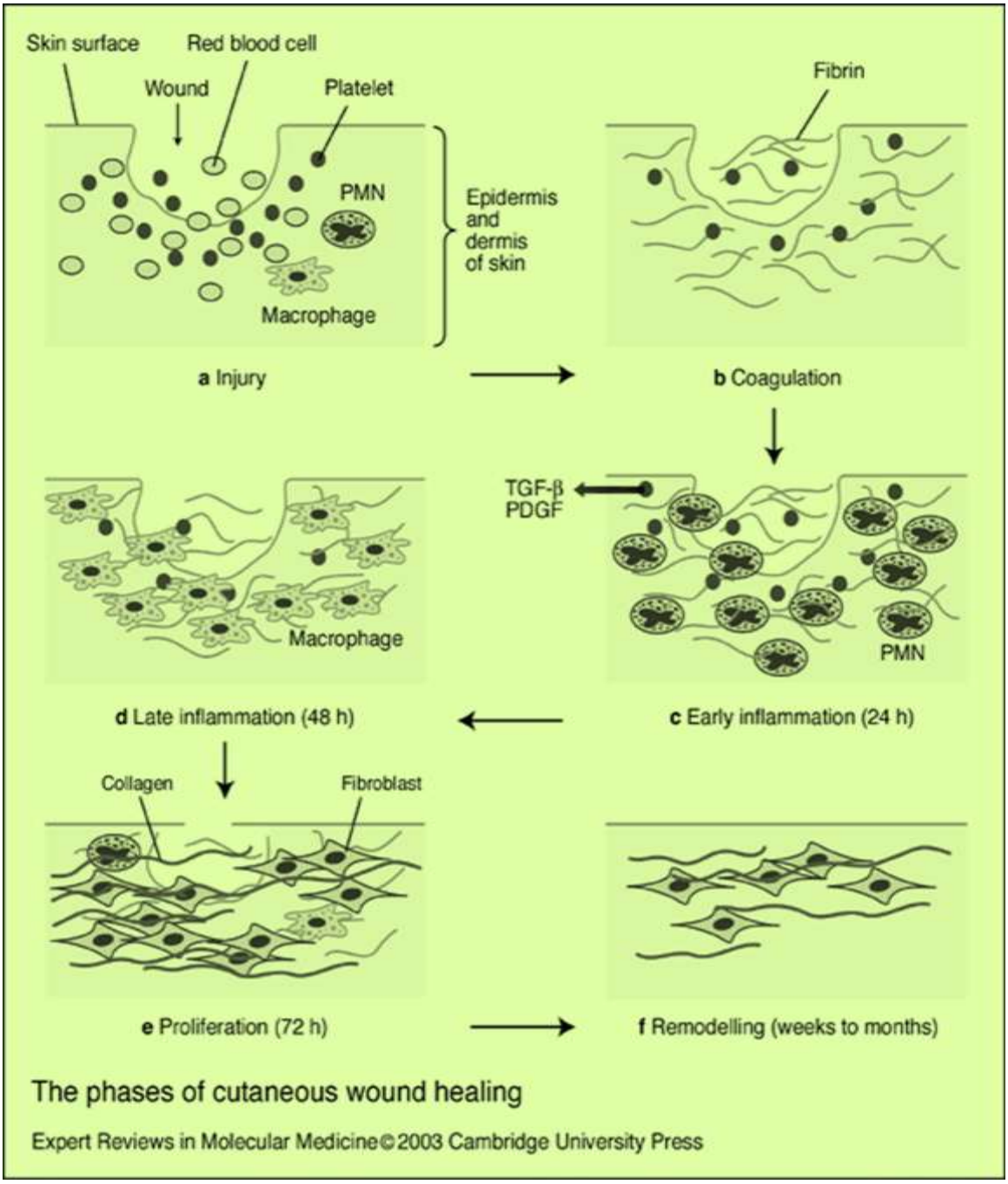

Fig 2 phases of wound healing

Factors affecting wound healing

Wound healing is a typical biologic process in the human body. Numerous etiological components can adversely influence this procedure and lead to despicable and weakened injury healing.[12] A careful comprehension of these components and their impact on twisted recuperating is key for growing better restorative alternatives for wound treatment.[13]

1. Improper diet- Wound healing is an anabolic procedure that requires both vitality and nutritive substrates. It is accounted for that serum albumin level of 3.5 gm/dl or more is

important for healing. Protein is vital for collagen synthesis on injured site. A condition of lack of healthy sustenance may give a deficient measure of protein and this can bring about the diminished rate of collagen synthesis wound tensile strength or an expanded chance for infection.[14]

2. Infection at the injury site-Wound disease is presumably the most widely recognized reason behind weakened injury healing. Staphylococcus aureus, Streptococcus pyogenes, Corynebacterium sp., Escherichia coli and Pseudomonas aeruginosa are some essential life forms bringing about wound infection.[15]
3. Inadequate oxygen supply and tissue perfusion to the injury zone- Adequate blood supply and tissue perfusion is critical for fitting injury healing. Exorbitant pain, cool or uneasiness can cause vasoconstriction and increased healing time.[16] Smoking and utilization of tobacco lessening tissue perfusion and oxygen pressure in wounds.[17]
4. Drugs-Many medications are known to impair wound healing. Chemo-helpful medications utilized as a part of malignancy are the biggest gathering surely understood to defer injury healing. Systemic glucocorticoids interfere in the ordinary healing process by lessening collagen synthesis and fibroblast expansion.[18]
5. Elderly age-Elderly age is found to be connected with deferred injury healing. It is accounted for that fibroblast development and action decreases prompting moderating of collagen generation and twisted withdrawal in harmed more established individuals.[19]
6. Diabetes and other diseased conditions-Diabetic patients are more vulnerable to wound infection. In a study, wound infection rate was discovered 11% higher in diabetic patients than in the general patient population. Acute and chronic liver disease are likewise connected with deferrals in wound healing. Patients with modified resistant capacity have an expanded defencelessness to wound infection.[20]
7. The helpful efficacies of numerous indigenous plants for wound healing have been explained by herbal medicine experts. Natural products are a source of synthetic and conventional herbal drug. The vicinity of different life sustaining constituents in plants has encouraged researchers to examine these plants with a perspective to focus potential injury healing properties. The Indian traditional arrangement of medication depicted a few medications of plant, mineral, and animal origin are in the Ayurveda Unani and Siddha for their wound healing properties.

Role of Phyto-constituents in wound healing

- Tannins-Promote wound healing because of their astringent and hostile to microbial property. These additionally go about as free radical scavengers.[21, 22]
- Flavonoids-Flavonoids are known not lipid peroxidation not just by counteracting or abating the onset of cell putrefaction additionally by enhancing vascularity. Subsequently, any medication that restrains lipid peroxidation is accepted to expand the suitability of collagen fibrils by expanding the quality of collagen strands, expanding the flow, keeping the cell injury and by advancing the DNA synthesis. Flavonoids likewise known not the injury mending process essentially because of their astringent and against microbial property, which is by all accounts in charge of wound contraction and expanded rate of epithelialisation.[21-24]
- Saponins-Saponins are powerful because of their hostile to oxidant and against microbial action, which seems, by all accounts, to be in charge of wound withdrawal and lifted rate of epithelialization.[21 ,22, 25]
- Sterols & Poly phenols-Sterols & Poly phenols are responsible for wound healing because of their free radical scavenging and anti-oxidant action, which are known not lipid per oxidation, along these lines lessen cell necrosis and enhancing vascularity.[21,22,26]
- Tri-terpenoids-Promote wound healing because of their astringent and hostile to microbial property which is by all accounts responsible for wound constriction and improved rate of epithelialisation.[21,22,27]

The remedial efficacies of numerous indigenous plants for wound healing have been portrayed by traditional herbal medicine professionals .Natural herbals are a wellspring of synthetic and traditional drug.

The vicinity of different life managing constituents in plants has asked researchers to look at these plants with a perspective to focus potential injury mending properties. The Indian traditional arrangement of medicine described a few medications of plant, mineral, and creature source are in the Ayurveda Unani and Siddha for their wound healing properties.

MEDICINAL PLANTS SHOWING WOUND HEALING ACTIVITY

Several plant compounds are reported to have enhanced wound healing activity. It is shown in the table 1

Table 1: Medicinal plants and their activity.

Sl.No	Plant	Part used	Extract	Reference
1	Acalypha langiana (Euphorbiaceae)	Leaves	Aqueous	[34]
2	Acalypha indica (Euphorbiaceae)	Whole plant	Whole plant	[35]
3	Achillea kellalensis (Compositae)	Flowers	Aqueous	[36]
4	Achillea biebersteinii Afan. (Asteraceae)	Aerial parts	Methanolic	[37]
5	Achillea millefolium (Asteraceae)	Aerial parts	Hydroalcoholic	[38]
6	Acorus calamus(Acoraceae)	Leaves	Ethanolic	[39]
7	Adhatoda vasica (Acanthaceae)	Leaves	Methanolic	[40]
8	Aegle marmelos (Rutaceae)	Seeds	Methanolic	[41]
9	Ageratum conyzoides (Asteraceae)	Leaves	Aqueous	[42]
10	Alangium salvifolium (Alangiaceae)	Leaves	Ethanolic	[43]
11	Allamanda cathartica (Apocynaceae)	Leaves	Aqueous	[44]
12	Allium cepa (Liliaceae)	Bulbs	Chloroform Alcohol	[45]
13	Aloe ferox (Liliaceae)	Leaves	Juice	[46]
14	Alternanthera brasiliana Kuntz (Amaranthacea)	Leaves	Methanolic	[47]
15	Alternanthera sessilis (Amaranthaceae)	Leaves	Pet.ether Chloroform	[48]
16	Andrographis paniculata (Acanthaceae)	Whole Plant	Alcoholic Pet.ether	[49]
17	Anogeissus latifolia (Combretaceae)	Bark	Ethanolic extract	[50]
18	*Anthocleista djalonensis* (Loganiaceae)	Roots	Methanolic	[51]
19	*Areca catechu(Areaceae)*	Nuts	Alcoholic	[52]
20	*Argemone mexicana* Linn (Papaveraceae)	Leaves	Ethanolic	[53]
21	*Argyreia nervosa* (Convolvulaceae)	Leaves	Ethanolic	[54]
22	*Arisaema leschenaultia Blume (Araceae)*	Tubers	Ethanol	[55]
23	*Aristolochia bracteolate* (Aristolochiaceae)	Leaves	Ethanolic	[56]

24	*Arrabidaea chica* Verlot (Bignoniaceae)	Leaves	Ethanolic	[57]
25	*Arnebia densiflora* (Nordm.) Ledeb. (Boraginaceae)	Roots	Extract in olive oil	[58]
26	*Asparagus racemosus* Wild. (Liliaceae)	Roots	Aqueous ,ethylacetate	[59]
27	*Astilbe thunbergii* (Saxifragaceae)	Rhizomes	Ethanolic	[60]
28	*Azadirachta indica* (Meliaceae)	Twigs	Oil	[61]
29	*Berberis lyceum* Royle (Berberidaceae)	Roots	Aqueous Methanolic	[62]
30	*Blechanum orientale* (Blechnaceae)	Leaves	Aqueous	[63]
31	*Brassica juncea* Linn(Brassicaceae)	Leaves	Aqueous	[64]
32	*Bryophyllum pinnatum* (Crassulaceae)	Leaves	Alcoholic	[65]
33	*Buchanania lanzan* (Anacardiaceae)	Fruits	Ethanolic	[66]
34	*Buddleja globosa* (Buddlejaceae)	Leaves	Aqueous Ethanolic	[67]
35	*Butea monosperma* (Fabaceae)	Barks	Alcoholic	[68]
36	*Calendula officinalis* (Asteraceae)	Flowers	-------	[69]
37	*Calotropis gigantea* (Apocynaceae)	Latex Leaves	Methanolic	[70]
38	*Calotropis procera* (Asclepidiaceae)	Latex	----	[71]
39	*Canthium parviflorum* lam. (Rubiaceae)	Leaves	Ethanolic	[72]
40	*Carallia brachiata* Merrill (*Rhizophoracea*)	Bark	Pet.ether, Ethylacetate Methanolic	[73]
41	*Carica candamarcensis* (Caricaceae)	Fruits	----	[74]
42	*Carica papaya Linn. (Caricaceae)*	Roots	Aqueous	[75]
43	*Caryocar cariaceum* (Caryocaraceae)	Seeds	Fixed oil	[76]
44	*Cassia fistula*(Fabaceae)	Leaves	Alcohol	[77]
45	*Cassia occidentalis* (Fabaceae)	Leaves	Methanolic	[78]
46	*Catharanthus roseus* (Apocynaceae)	Leaves	Ethanolic	[79]
47	*Centaurea sadleriana* Janka (Asteraceae)	Aerial parts	n-hexane fractionof	[80]

			methanolic extract	
48	*Centella asiatica* (Apiaceae)	Leaves	Hydro alcoholic	[81]
49	*Centraurea iberica* (Loranthaceae)	Aerial parts	Ethanolic	[82]
50	*Cecropia peltata* L. (*Cecropiaceae*)	Leaves	Ethanolic Aqueous	[83]
51	*Chromolaena odorata* Linn. (Asteraceaes)	Leaves	Ethanolic Aqueous	[84]
52	*Cinnamomum zeylanicum* (Lauraceae)	Barks	Methanolic	[85]
53	*Clerodendron splendens* (Verbenaceae)	Aerial parts	Methanolic	[86]
54	*Colebrookea oppositifola* (Lamiaceae)	Leaves	Alcoholic	[87]
55	*Colutea cilicica* (fabaceae)	Fruits leaves	Aqueous	[88]
56	*Copaifera longsdorffi* (Fabaceae)	Barks	Oleo-resin	[89]
57	*Coronopus didynamous* (Brassicaceae)	whole plant	Ethanolic Aqueous	[90]
58	*Cordia dichotoma* (Boraginaceae)	Fruit	Alcoholic	[91]
59	*Crataeva nurvala* (Capparidaceae)	Root Barks	Ethanolic	[92]
60	*Croton bonplandianum* Baill (Euphorbiaceae)	Leaves	Ethanolic	[93]
61	*Curcuma aromatica* (Zingiberaceae)	Rhizome, Leaves	Aqueous Ethanolic	[94]
62	*Curculigo orchioids* (Hypoxidaceae)	Root	Methanolic	[95]
63	*Cyperus rotundus* (Cyperaceae)	Leaves	Alcoholic	[96]
64	*Datura alba(Solanaceae)*	Leaves	Alcoholic	[97]
65	*Dendrophthae falcate* (Loranthaceae)	Aerial parts	Ethanolic	[98]
66	*Dissotis theifolia* (Melastomataceae)	Stem	Methanolic	[99]
67	*Desmodium triquetrum* (Fabaceae)	Leaves	Ethanolic	[100]
68	*Echinacea pallida* (Asteraceae)	Leaves	Alcoholic	[101]
69	*Echinops echinatus* (Asteraceae)	Roots	Ethanolic Aqueous	[102]
70	*Elaeis guineensis*(Palmae)	Leaves	Methanolic	[103]
71	*Elephantopus scaber*	Leaves	Ethanolic	[104]

	(Asteraceae)			
72	*Embelia ribes*(Myrsinaceae)	Leaves	Ethanolic	[105]
73	*Eucalyptus globulus* (Myrtaceae)	Leaves	Ethanolic	[106]
74	*Euphorbea heterophylla* (Euphorbiaceae)	Leaves	Ethanolic	[107]
75	*Euphorbia neriifolia* (Euphorbiaceae)	Latex	Aqueous	[108]
76	*Evolvulus numularius* (Convolvulaceae)	Leaves	Methanolic Aqueous	[109]
77	*Ficus bengalensis* (Moraceae)	Barks	Ethanolic Aqueous	[110]
78	*Ficus religlosa*(Moraceae)	Leaves	Hydro-alcoholic	[111]
79	*Ficus deltoidea*(Moraceae)	Whole plant	Aqueous	[112]
80	*Flabellaria paniculata* (Malphighiaceae)	Leaves	Methanolic Chloroform	[113]
81	*Flaveria trinervia* (Asteraceae)	Leaves	Methanolic	[114]
82	*Gentiana lutea* (Gentianaceae)	Rhizomes	Alcoholic Pet.ether	[115]
83	*Glyceyrrhiza glabra* (Fabaceae)	Roots	Oil	[116]
84	*Glycosmis* arborea(Rutaceae)	Leaves	Ethanolic	[117]
85	*Gmelina arborea* Roxb. (Verbenaceae)	Leaves	Ethanolic	[118]
86	Gymnema sylvestre R.Br(Asteraceae)	Leaves	Ethanolic	[119]
87	*Heliotropium indicum* (Boraginaceae)	Leaves	Ethanolic Aqueous	[120]
88	*Hemigraphis colorata* (Acanthaceae)	Leaves	----	[121]
89	*Hibiscus rosa sinensis* L. (Malvaceae)	Flowers	Ethanolic	[122]
90	*Hippophae rhamnoides* (Elaeagnaceae)	Leaves	Aqueous	[123]
91	*Hoslundia opposita* (Lamiaceae)	Leaves	Methanolic	[124]
92	*Hylocereus undatus* (Cactaceae)	Leaves Fruits	Aqueous	[125]
93	*Hypericum hookerianum* (Clusiaceae)	Leaves Stems	Methanolic	[126]
94	*Hypericum mysorense* (Guttiferae)	Leaves	Methanolic	[127]
95	*Hypericum patulum* (Hypericaceae)	Leaves	Methanolic	[128]

96	*Hyptis suaveolens* (Lamiaceae)	Leaves	Chloroform Pet.ether Alcoholic	[129]
97	*Indigofera enneaphylla* (Leguminosae)	Aerial parts	Alcoholic	[130]
98	*Ixora coccinea(rubiaceae)*	Flower	Alcohol	[131]
99	*Jasminum grandiflorum* (Oleaceae)	Flower	Ethanolic	[132]
100	*Jatropha curcas* (Euphorbiaceae)	Leaves	Methanolic	[133]
101	*Kaempferia galanga* (Zingiberaceae)	Rhizomes	Alcohol	[134]
102	*Kalanchoe pinnata* (Crassulaceae)	Leaves	Ethanolic	[135]
103	*Lanata camara* (Verbenaceae)	Leaves	Ethanolic	[136]
104	*Laurus nobilis*(Lauraceae)	Plant	Aqueous	[137]
105	*Lawsonia innermis* (Lythraceae)	Leaves	Pet. Ether	[138]
106	*Leucas hirta*(Lamiaceae)	Leaves	Aqueous Methanolic	[139]
107	*Limonia acidissima* (Rutaceae)	Fruit pulp	Hexane	[140]
108	*Lucas lavandulaefolia* (Labiatae)	Leaves	Methanolic	[141]
109	*Lycopodium serratum(lycopodiaceae)*	Leaves	Ethanolic	[142]
110	*Madhuca longifera* (Sapotaceae)	Leaves	Chloroform Ether	[143]
111	*Memecylon edule* (Melastomataceae)	Leaves	Methanolic	[144]
112	*Michelia champaca* (Magnoliaceae)	Plant	Aqueous	[145]
113	*Mimosa tenuiflora*(Fabaceae)	Barks	Aqueous	[146]
114	*Mimosa pudica*(Fabaceae)	Roots	Methanolic Chloroform	[147]
115	*Mimusops elengi* Linn. (Sapotaceae)	Barks	Methanolic	[148]
116	*Momardica balsamina* (Cucurbitaceae)	Fruit pulp	Hexane Methanolic	[149]
117	*Momordica charantia* (Cucurbitaceae)	Leaves	Benzene Ethanolic	[150]
118	*Morinda citrifolia* (Rubiaceae)	Leaves	Ethanolic	[151]
119	*Moringa oleifera* (Moringaceae)	Leaves Roots Bark	Aqueous	[152]

120	*Mussaenda trondosa* (Rubiaceae)	Leaves	Alcoholic	[153]
121	*Napoleona imperialis* (Lecythidaceae)	Leaves	Methanolic	[154]
122	*Nelumbo nucifera* (Nymphaceae)	Rhizome	Methanolic	[155]
123	*Ocimum gratissimum* (Lamiaceae)	Leaves	Essential oil	[156]
124	*Ocimum sanctum*(Labiatae)	Leaves	Methanolic	[157]
125	*Oncidium flexuosum* Sims (Orchidaceae)	Leaves	Hydro alcoholic	[158]
126	*Onosma hispidum* (Boraginaceae)	Roots	Methanolic	[159]
127	*Oxalis corniculata* (Oxalidaceae)	Whole plant	Alcoholic Pet. ether	[160]
128	*Pentas lanceolata* (Rubiaceae)	Flowers	Ethanolic	[161]
129	*Phyllanthus niruri* (Euphorbiaceae)	Aerial parts	Methanolic	[162]
130	*Piper betle(piperaceae)*	Rhizome	Aqueous	[163]
131	*Plagiochasma appendiculatum* Lehm.et Lind. (*Aytoniaceae*)	Leaves	Ethanolic	[164]
132	*Plantain banana*(Musaceae)	Fruits	Aqueous, Methanolic	[165]
133	*Plantago ovata* (Plantaginaceae)	Seeds	Ethanolic	[166]
134	*Plantago major* (Plantaginaceae)	Plant	Ethanolic	[167]
135	*Plumbago zeylanicum* (Plumbaginaceae)	Plant	Ethanolic	[168]
136	*Polyscias scutellaria* (Araliaceae)	Leaves	Chloroform	[169]
137	*Portulaca oleracea* L. (Portulacaceae)	Aerial parts	Crude	[170]
138	*Prosthechea michuacana* (Orchidaceae)	Bulbs, Aerial parts	Hexane Incision	[171]
139	*Psidium guajava* (Myrtaceae)	Leaves	Methanolic	[172]
140	*Pterospermum acerifolium* Wild *(Malvaceae)*	flowers	ethanolic	[173]
141	*Punica granatum* (Punicaceae)	Flowers	Ethanolic	[174]
142	*Quercus infectoria* (Fagaceae)	Leaves	Ethanolic	[175]
143	*Radix*	Roots	Aqueous	[176]

	paeoniae(Paeoniaceae)			
144	*Rafflesia hasseltii* (Rafflesiaeae)	Flowers	Methanolic	[177]
145	*Rheum officinale*(Asteraceae)	Roots	Ethanolic	[178]

SELECTION OF PLANTS

The plants were chosen on the bases of their antimicrobial exercises and wide therapeutic uses in the customary literary works. The simplicity of accessibility of plant is likewise taken into considered while choice.

FORMULATIONS

Table 2 : Gel formulations

Sl.No	Formulation	Plants used
1	Simple gel	*Carica papaya, Azardirachta indica*
2	Herbal gel	*Basel alba*
3	Thee gel	*Wrightia tinctoria,Aloe vera, Curcuma longa,Terminalia chebula*
4	Gel	*Aloe barbedensis,Centella asiatica, Curcuma longa*
5.	Gel	*Centella asiatica,Curcuma longa, Terminalia arjuna*
6.	Hydrogel	Pomegranate, curcuma longa

SIMPLE GEL [177]

With the concentrates of Carica papaya , Azadirachta Indica,diverse gel formulation were readied with carbapol as the base. Honey was utilized on experimentation premise, and mulling over its movement.

After the extraction of the plant material, Carbopol 934P NF 1gm and measured amount of concentrate was scattered in 80ml of refined water and blended by mixing constantly in an magnetic stirrer at 800 rpm for 1 h. Glycerol 5ml was added to the blend under consistent mixing. The blend was neutralized by drop-wise expansion of half triethanolamine (w/w). Blending was proceeded until a straightforward gel was shaped. Four sorts of gel details were readied viz. Detailing I gel containing 1.0% (w/w) Azadirachta Indica takes off extricate, Formulation II gel containing 1% (w/w) Carica papaya natural product remove, Formulation III gel containing 1% (w/w) Honey and Formulation IV gel containing 3% (w/w) Azadirachta Indica leaves, Carica papaya organic product concentrate and Honey (i.e. 1% ofeach extricate). Silveleb cream (Silver sulphadiazine 1% w/w) was utilized as a standard treatment for positive control.

HERBAL GEL[178]

A herbal gel was readied with the concentrate of plant Basel alba.The gel was readied utilizing differing convergances of Carbopol 934 and Carbopol 940 (0.5-2%). Precisely measured amount of Carbopol 934 and Carbopol 940 was scattered in refined water with steady mixing utilizing a mechanical stirrer for 30 min at 1200rpm. After all the Carbopol was scattered, the concentrate disintegrated in water and the additives were included and blended well. The pH was changed in accordance with unbiased utilizing triethanolamine until a reasonable steady gel was obtained.

THEE GEL [179]

The coconut oil concentrates of Wrightia tinctoria was readied.[29] Propylene glycol remove of Aloe vera mash, alcoholic concentrates of Curcuma longa and Terminalia chebula were arranged independently and utilized. To sum things up, the concentrates were fused into carbomer gel and honey bees wax base with the assistance of an emulsifier. The rates joining of distinctive concentrates in test definition are Wrightia tinctoria and Aloe vera at 0.4% and Curcuma longa what's more, Terminalia chebula at 0.08%.

GEL

Concentrated gel powder of Aloe barbedensis was added in purified water and left overnight. Phase 1 was prepared by dissolving centella asiatica ,Curcuma long and the aloe extract prepared previously. To these three extracts glycerine was mixed withconstant stirring. Phase 2 was prepared by melting white soft paraffin at 70˚c along with cetostearyl alcohol and polysorbate 60.finally methyl and propyl paraben and Butylated hydroxyl anisole(BHA) were added to the mixture with stirring.phase 2 was added to phase 1 with continuous stirring and allow it to cool.

Gel

The topical gel was prepared by soaking the carbopol 934 in water for 24 h and their compositions are given in Table1. The herbal extracts were incorporated into prepared gel base in two different concentrations.

Ingredients	Formulation 1	Formulation 2
	G1	G2
C. asiatica extract (%w/w)	1	2
C. longa extract (%w/w)	1	2
T. arjuna extract (%w/w)	1	2

Carbopol 934 (%w/w)	1	2
Propylene glycol	2 ml	2 ml
Ethanol	5 ml	5 ml
Triethanolamine	q.s to neutralize	q.s to neutralize
Water	q.s	q.s

Hydrogel[188]

Prepared a water-solvent gel utilizing the dried methanol concentrate of Pomegranate peel and Curcuma longa rhizome. The gel was made out of carbapol-934 - 2.5%, propylene glycol - 25.75%, propylparaben - 2.5%, Tri ethanol amine-0.8 ml and distil water in an amount adequate to set up 100gm of gel if there should be an occurrence of clear gel .Water needed for these details was partitioned into two sections .In one section the exact measure of concentrate was broken up and in other part, carbapol was doused overnight And to this solution propylene glycol and propylparaben were included. Both these solutions were blended in a measuring glass and triethanolamine was added to the blend dropwise to acquire the best possible gel consistency.

Evaluation of Gel

Physical evaluation

The colour, appearance and the feel on application of the prepared herbal gel formulations were noted.

Subjective Properties

Subjective properties such as consistency, texture and irritation are observed

pH measurement

The pH of the gel was controlled by utilizing a computerized pH meter (Systronics pH meter sort 335) 5gm gel disintegrated in 50 ml water and pH was dictated by dunking the glass terminal totally into gel arrangement framework in order to cover the anode. At that point instrument perusing as far as pH are classified .The pH was contemplated for 30 days.

Steadiness testing

Since the time of steadiness testing can be the length of two year, it is lengthy and expensive.Therefore it is fundamental to gadget a strategy that will help quick expectation of long haul security of medication. The quickened solidness testing is characterized as the accepted strategy by which the item strength may be anticipated by capacity of the item under condition that quickened the change in characterized and unsurprising way. The soundness

investigations of planned gels were completed at 4°C, 25°C, 45°C and at a room temperature for the time of one month The impact of temperature, moistness and time on the physical portrayal of the gels was assessed for surveying the dependability of prepared formulation.

OINTMENT

Sl.No	Formulation	Plants used
1	Poly herbal ointment	*Eclipta alba,curcuma longa,tridax procumbens*
2	Poly herbal ointment	*Terminalia arjuna ,Curcuma longa, Ficus religiosa*
3	Poly herbal ointment	*Ficus religiosa, Tectona grandis, and Caesalpinia pulcherrima*
4	Herbal ointment	*Napoleona imperialis*
5	Ointment	*Plumbago zeylanica*
6	Poly herbal ointment	*Curcuma longa, Terminalia chebula, Azadirachta indica, Lawsonia inermis and Achyranthus asperus*
7	Herbal wound guard	*Ficus religiosa, Mentha arvensis and Rauwolfia serpentinaas*
8	Tilvadi ghrita	*Sesamum indicum (25%) ,Glycyrrhiza glabra*

POLY HERBAL OINTMENT[180]

A poly herbal balm was prepared with the concentrates of the plants Eclipta alba, Curcuma longa, Tridax procumbens. After the preparation of herbal concentrate and phytochemical studies the following step was to set up the detailing of diverse plant concentrates.. The natural concentrates were consolidated into the topical definition bases in three focuses:

formulation 1 contains of 4% of the concentrate of rhizomes of curcuma long), 4% concentrate of Eclipta alba and 4% of Tridax procumbens.

formulation 2 contains 5% of the concentrate of plant 1, 5% concentrate Eclipta alba and 5%of Tridax procumbens.

Plan 3 contains 6% of concentrate of plant I, 6% of Eclipta alba and 6% of Tridax procumbens. The readied details were then assessed by different parameters.

POLY HERBAL OINTMENT[181]

a polyherbal ointment with Terminalia arjuna(Arjuna), rhizomes of Curcuma longa (Turmeric), stem-bark of Ficusreligiosa(Peepal) and leaves of Tamarindus indica(Tamarind). After arrangement of concentrate and phytochemical studies,the next step was to figure a polyherbal preparation. An balm with water dissolvable base was of first decision because of their simplicity of readiness furthermore facilitates of cleaning after application. Polyethylene

Glycol (PEG) Ointment base, a blend of PEG 4000 and PEG 600 found to have adequate consistency in proportion 3:7 separately, in this way suitable for planning with amassing of 10 % w/w of extracts.Two definitions were arranged by Fusion strategy e.g.one containing T. arjuna leaf extricate (10% w/w) in PEG balm base (Treated as fundamental or TEST-I) and the other one containing every one of the four concentrates of aforementioned plants parts in equivalent proportions i.e. containing 2.5% w/w of every concentrate, equivalent to add up to 10% w/w in PEG balm base (Treated as polyherbal or TEST-II). The prepared details was then assessed by different parameters e.g. consistency, soundness and so forth.

POLYHERBAL OINTMENT[182]

A polyherbal balm including methanolic concentrates of the leaves of Ficus religiosa, Tectona grandis, and Caesalpinia pulcherrima was prepared. Emulsifying wax, white delicate paraffin, fluid paraffin, agar and methanol are the chemicals utilized. The obliged amount of the chemicals was measured and the polyherbal treatment was defined by combination system utilizing emulsifying ointment base.

HERBAL OINTMENT[183]

A herbal ointment balm was prepared from the plant concentrate of Napoleona imperialis

The sedated balms were prepared by taking after following formula:

(a) Anionic

Anionic emulsifying treatment - 90%

Napoleona imperialis separate – 10%

(b) Cationic

Cationic emulsifying treatment – 90%

Napoleona imperialis separate – 10%

(c) Non-ionic

Non-ionic emulsifying treatment – 90%

Napoleona imperialis separate – 10%

The combination technique was utilized in the arrangement of the sedated ointment. The obliged amount of the ointment base was measured and liquefied at a temperature of around 70 C in a boiling point water bath. The assigned amount of the concentrate (s) were individually added to the liquefied base at 40 C and the blend, mixed delicately and persistently until a homogenous scattering is gotten. Each of the activities was rehashed utilizing Cicatrin® powder rather than the NI extracts.

Ointment[184]

a topical preparation was prepard with methanolic extract of Plumbago zeylanica[184] belongs family Plumbaginaceae.the ointment was prepared by fusion method.

(a) Preparation of simple ointment: Wool fat - 2 gm: Hard Paraffin-2 gm; Cetostearyl alcohol -2gm; White Soft Paraffin-34 gm. Each ingredient was mixed and heated gently with stirring thencooled. The base was then packed in a wide mouth container.

(b)Preparation of 10% ointment: 4 gm methanol root extract of plumbago zeylanica was added slowly to the above melted ingredients and stirred thoroughly until the mass cools down and a homogeneous product is formed. The ointment was then packed in a wide mouth container.

OINTMENT[185]

Curcuma longa, Terminalia chebula, Azadirachta indica, Lawsonia inermis and Achyranthus asperus were the plants used for the preparation of poly herbal ointment.after the extraxtion, 1g, 2g and 3g formulation of polyherbal extracts was admixed with simple ointment base to obtain 1% (w/w),2% (w/w) and 3% (w/w) respectively. Povidone-Iodine ointment USP (Betadine 5% w/w) was used as standard drug for comparing wound healing potential of the extract**.**

HERBAL WOUND GUARD[186]

The polyherbal formulation was prepared by utilizing 6% hydroalcoholic concentrates of Ficus religiosa, Mentha arvensis and Rauwolfia serpentine as bioactive ingredient and prepared in the form of ointment base BP Dissolve determined amount of concentrate in 7.75 ml of water and included remaining ingredients in water and warmth the mixture at 70 C in a container. Melt the stearyl alcohol and white petrolatum on a hot plate. Heat this blend to 70 C. Add the oleaginous phase gradually to the aqueous phase with consistent mixing. Expel from the heat and mix the blend until it solidifies.

TILVADI GHRITA[189]

Tilvadi ghrita (TG) contains Sesamum indicum (25%) ,Glycyrrhiza glabra (25%) and Ghee (half) as its constituents. TG was arranged according to the system definite in antiquated Ayurvedic substance. The bases of G. glabra and seeds of S. indicum were crushed to acquire fine powder. The powder from S. indicum seeds was suspended into water with mixing to get a uniform dispersing. Freely, illustrated margarine (ghee) was warmed in a vessel till it get dense and to it , dissipating of S. indicum and G. glabra which was powdered and included

and mixed with relentless blending and slight warming to vanish the water until a liquid to semisolid consistency is accomplished. The ghrita plan was then arranged by allowing the entire mix to cool.

Evaluation of ointment

The formulation was evaluated by the following physicochemical parameters[30]

Colour and odour

Color and odor was examined by visual examination.

Loss on drying

Ointment is placed in a petridish on a water bath and dried until constant weight was obtained.

pH

The pH of the formulation was recorded utilizing an advanced pH meter. Measured amount of the sample was dissolved in distilled water and kept aside for two hours. The estimation of pH was done in triplicate and normal qualities were considered.

Spreadability

The spread capacity was expressed in terms of times in seconds taken by two slides to slip off from ointment placed in between the slides under the direction of certain load. Spread capacity was ascertained by utilizing the formula.

$S = (M.L/T)$

Where, S = Spreadability, M = Weight tied to upper slide, L = Length of glass slides and

T = Time taken to separate the slides.

Diffusion study

The diffusion study was done by preparing agar nutrient medium of known concentration. It was filled a petridish and allowed to set. An opening was exhausted at the centre of the petridish and the prepared formulation was kept it in it. The time taken for the ointment to get diffused was noted.

Skin irritation study[187]

Healthy rabbits were chosen and were shaved in two unique regions of the dorsal side, each around 500 mm2.The rabbit was kept in rabbit holder and the first area was kept as control, to

which emulsifying ointment base was applied, the second region was treated with polyherbal salve. After 4hrs the skin was watched and contrasted with the control.

Stability studies

The stability studies were carried out for the prepared Polyherbal formulation at different temperature conditions (4˚C, 27˚ C and 37˚C) for 3 months.

CONCLUSION

The greater part of the characteristic plants are having wound healing activity.since they advance the repair system in a characteristic manner ,they are intense healers. The mending procedure can be observed physically by different routines. They are by surveying the rate of withdrawal of wound,period of epithelisation, tensile strength,histopathology of the injury and weight of granuloma in diverse injury models.the mending tissue delivers more collagen to give elasticity to quicker twisted recuperating.

The interest for natural definitions are expanding step by step in view of its protected and very much endured conduct contrasting with allopathic medications. overall researchers are exploring the injury recuperating action of restorative plants.These plants are subjected to creature and human studies to focus its viability.

REFERENCES

1. Md. shafiuddin, abdullah khan and sadath ali: wound healing activity of traditional herbal formulation; International Journal Chemical Science., 2009; 7(2): 639-643.
2. Swati Rawat and Akhilesh Gupta: Development and Study of Wound Healing Activity of an Ayurvedic Formulation; Asian J. Res. Pharm. Sci., 2011; 1(1): 26-28.
3. S.Ganeshan,S.Parasuraman,S.Uma maheshwaran and N Gnanashekar:Wound healing activity of Hemidesmus indicus formulation,journal of pharmacology and pharmacotherapeutics, 2012 jan-mar 3(1).
4. Thomson PD. Immunology, microbiology and the recalcitrant wound. Ostomy Wound Manage., 2000; 46: 77-82.
5. Nagori BP, Solanki R. Role of medicinal plants in wound healing. Research Journal of Medicinal Plant., 2011; 5(4): 392-405.
6. Macleod J(ed). Davidson's Principle and Practice of Medicine. 13th edition, Edinburgh UK., 1981; 590-592.

7. Li J, Chen J, Kirsner R. Pathophysiology of acute wound healing. Clin. Dermatol., 2007; 25: 9-18.
8. Wahl LM, Wahl SM. Inflammation, in Cohen IK, Diegelman RF, Lindblad WJ (eds): Wound healing: Biochemical and clinical aspects, Philadelphia: PA, W.B. Saunders., 1992; 40-62.
9. Stadelmann WK, Digenis AG, Tobin GR. Physiology and healing dynamics of chronic cutaneous wounds. Am. J. Surg., 1998; 176: 26-38.
10. Madden JW, Peacock J. Studies on the biology of collagen during wound healing. I. Rate of collagen synthesis and deposition in cutaneous wounds of the rat. Surgery., 1968; 64: 288-294.
11. Prockop DJ, Kivirikko KI, Tuderman L, Guzman NA, The biosynthesis of collagen and its disorders. N. Engl. J. Med., 1979; 301: 13-23.
12. Kerstein MD. Factors affecting wound healing. Adv. Wound Care., 2007; 10: 30-36.
13. Hanna JR, Giacopelli JA. A review of wound healing and wound dressing products. J. Foot Ankle Surg., 1997; 36: 2-14.
14. Albritton JS. Complications of wound repair. Clin. Podiatr. Med. Surg., 1991; 8: 773-785.
15. Rosen JS, Cleary JE. Surgical management of wounds. Clin. Podiatr. Med. Surg., 1991; 8: 891-907.
16. Kumar MS, Sripriya R, Raghavan HV, Sehgal PK. Wound healing potential of cassia fistula on infected albino rat model. J. Surg. Res., 2006; 131: 283-289.
17. Cuzzell JZ, Stotts NA. Wound care: Trial and error yields to knowledge. Am. J. Nurs., 1990; 90: 53-63.
18. LaVan FB, Hunt TK. Oxygen and wound healing. Clin. Plastic Surgery., 1990; 17(3): 463-472.
19. Franz MG, Steed DL, Robson MC. Optimizing healing of the acute wound by minimizing complications. Curr. Probl. Surg., 2007; 44: 691-763.
20. Sherman RA. A new dressing design for treating pressure ulcers with maggot therapy. Plast. Reconstr. Surg., 1997; 100: 451-456.
21. M. Ismail Shareef1, P. Jagan Mohan Reddy, S. M. Gopinath, K. S. Dayananda, Ajay Mandal,Purushotham K.M: Evaluation of wound healing activity of polyherbal formulation of roots of TerminaliaArjuna ; International Journal of Innovative Research in Science,Engineering and Technology., March 2014; 3(3).
22. R. Sudeendra Bhat, J. Shankarappa, H. G. Shivakumar, Formulation and evaluation of poly herbal wound treatments;Asian journal of pharmaceutical sciences., 2007; 2(1).

23. K.M Sakthivel,C.Guruvayoorappan ;Biophytum sensitivum;Ancient medicine,modern targets;Journal of advanced pharmaceutical technology and research 2012 april-june3(2)
24. T. Pagno, L.Z. Blind, M.W. Biavatti and M.R.O. Kreuger :Cytotoxic activity of the dichloromethane fraction from Vernonia scorpioides (Lam.)Pers. (Asteraceae) against Ehrlich's tumor cells in mice;Brazilian journal of medical and biological research 2006; 39.
25. M.S.S Devi,B.sampath Kumar:Evaluation of wound healing activity of poly herbal siddha formulation; Journal of pharmaceutical and biomedical sciences., 2011; 5(06)
26. Archana A.Bele, Dr Varsha M.Jadhav, Dr V.J.Kadam: Wound healing activity of herbal formulation ; Journal of pharmacy research, march 2009; 2(3): 28.
27. Shivani Rawat, Raman deep singh, Preeti Takur,satinder kaur,alok semwal;wound healing agents from medicinal plants:a review;Asian pacific journal of tropical biomedicine.
28. Deepika Yadav, Shiv Kumar Yadav, Roop Krishen Khar, Mohammad Mujeeb, Mohammad Akhtar: Turmeric (Curcuma longa L.): A promising spice for phytochemical and pharmacological activities; International journal of green pharmacy.
29. payal dande, anis khan: evaluation of wound healing potential of cynodon dactylon; Asian Journal of Pharmaceutical and Clinical Research., 2012; 5(3).
30. a. subramoniam, d. a. evans, s. rajasekharan, g. sreekandan nair: effect of hemigraphis colorata (blume) h. g. hallier leaf on wound healing and inflammation in mice; Indian Journal of Pharmacology., 2001; 33: 283-285.
31. Jain Sachin*, Jain Neetesh, Tiwari A, Balekar N and Jain D KSimple Evaluation of Wound Healing Activity of Polyherbal Formulation of Roots of Ageratum conyzoides;Linn Asian J. Research Chem., April.-June, 2009; 2(2).
32. K.M Sakthivel,C.Guruvayoorappan; Biophytum sensitivum; Ancient medicine, modern targets; Journal of advanced pharmaceutical technology and research 2012 april-june3(2)
33. Clinical and Experimental studies on the efficacy of 777 oil, a siddha preparation in the treatment of Kalanja padai (Psoriasis). Research Monograph on 777 oil. Published by Central Council for Research in Siddha and Ayurveda, Ministry of Health and FamilyWelfare, Govt. of India, New Delhi., 1987.
34. Taranallin A D & Kuppast I J, Study of wound healing activity of seeds of Trigonella foenum graecum in rats, Indian J Pharm Sci, 1996; 56(3): 117-119.
35. N.R.N. Jagdish and R. Mohamood, "Wound healing effect of Echinops echinatus Roxb. Roots", Indian Drugs., 2009; 46(4): 342-346.

36. Perez RM, Gutierrez R, Vargas RS. Evaluation of wound healing properties of Acalypha langiana in diabetic rats. Fitoterapia., 2006; 77: 286-289.
37. Reddy JS, Rao PR, Reddy MS. Wound healing effects of Heliotropium indicum, Plumbago zeylanicum and Acalypha indica in rats. J Ethnopharmacol., 2002; 79(2): 249-251.
38. Pirbalouti AG, Koohpayeh A. The wound healing activity of flower of Punica granatum and Achillea kelallensis in wistar rats. Acta Poloniae Pharmaceutica Drug Res., 2010; 67(1): 107-110.
39. Akkoi EK, Koca U et al. Evaluation of wound healing potential of Achillea biebersteinii (Asteraceae) by in vivo excision and incision models. Evid. Based Comp. and Alt. Med., 2011; 1-7.
40. Hemmati AA, Arzi A, Amin M. Effect of Achillea millefolium extract in wound healing of rabbit. Journal of Natural Remedies., 2002; 2(2): 164-167.
41. Jain N, Jain R, Jain A. Evaluation of wound healing activity of Acorus calamus Linn. Nat Prod Res., 2010; 24(6): 534-41.
42. Vinothapooshan G, Sundhar K. Wound healing effect of various extracts of Adhatoda vasica. Int J of Pharm Bio Sci., 2010; 1(4): 530-536.
43. Sharma GN, Dubey SK, Sati N, Sanadya J. Evaluation of wound healing activity of Aegle marmelos seeds. Pharmacologyonline., 2011; 2: 171-178.
44. Mustafa MR, Mahmood AA, Sidik K, Noor SM. Evaluation of wound healing potential of Ageratum conyzoides leaf extract in combination with honey in rats as animal models. Int J Mol Med Adv Sci., 2005; 1(4): 406-10.
45. Asif KA, Shariff WR, Sikarwar MS. Wound healing property of alcoholic extract of leaves of Alangium salvifolium. J Pharm Res., 2010; 3(2): 267-269. 53.
46. Nayak S, Nalabothu P, Sandiford S, Bhogadi V et al. Evaluation of wound healing activity of Allamanda cathartica. L. and Laurus nobilis. L. extracts on rats. Evid. Based Comp. and Alt. Med., 2006; 5: 6-12.
47. Shenoy C, Patil MB, Kumar R, Patil S. Preliminary phytochemical investigation and wound healing activity of Allium cepa . IJPPS., 2009; 2(2): 167-175.
48. Jia Y, Zhao G, Jicheng J. Preliminary evaluation: The effects of Aloe ferox Miller. and Aloe arborescence Miller on wound healing. J Ethnopharmacol., 2008; 120(2): 181-189.
49. Barua CC, Talukdar A, Begum SA, Sharma DK et al. Wound healing activity of methanolic extract of leaves of Alternanthera brasiliana Kuntz using in vivo and in vitro model. Ind J Exper Biol., 2009; 47: 1001-5.

50. Jalalpure SS, Agrawal N, Patil MB, Chimkode R, Tripathi A. Antimicrobial and wound healing activities of leaves of Alternanthera sessilis Linn. Int J Green Pharm., 2008; 2(3): 141-144.
51. Mohanty A, Pradhan DK, Mishra MR, Sahoo JK , Mishra A et al. Preliminary pytochemical screening and wound healing activity of Andrographis peniculata. J. Chem. Pharm. Res., 2010; 2(4): 649-654.
52. Govindarajan R, Vijayakumar M, Rao CV, Shirwaikar A, Mehrotra S, Pushpangadan P. Healing potential of Anogeissus latifolia for dermal wounds in rats. Acta Pharmaceutica., 2004; 54: 331-338.
53. Chah KF, Eze CA, Emuelosi CE , Esimone CO. Antibacterial and wound healing properties of methanolic extracts of some Nigerian medicinal plants. J Ethnopharmacology., 2006; 104(1– 2): 164–167.
54. Azeez S, Amudhan S, Adiga S, Rao N, Laxminarayan AU. Wound healing profile of Areca catechu extracts on different wound models in wistar rats. Kuvait Med J., 2007; 39(1): 48-52.
55. Patil MD, Jalalpure SS, Ali A. Preliminary phytochemical investigation and wound healing activity of the leaves of Argemone mexicana Linn. (Papavaraceae). Indian Drugs., 2001; 38: 288-293.
56. Singhal AK, Gupta H, Bhati VS. Wound healing activity of Argyreia nervosa leaves extract. Int J App Basic Med Res., 2011; 1(1): 36-39.
57. Suruse P, Kale MK, Gunde M, Amnerkar N, Pathak AK. Evaluation of wound healing activity of Arisaema leschenaultii Blume. in rats. Der Pharmacia Lettre., 2011; 3(4): 200-206.
58. Shirwaikar A, Somashekar AP, Udupa AL, Udupa SL, Somashekar S. Wound healing studies of Aristolochia bracteolate Lam. with supportive action of antioxidants enzymes. Phytomedicine., 2003; 10(6-7): 558-62.
59. Jorge MP, Madjarof C. Evaluation of wound healing properties of Arrabidaea chica Verlot extract. J Ethnopharmacol., 2008; 118(3): 361-66.
60. Akkol EK, Koca U, Pesin I, Yilmazer D et al. Exploring the wound healing activity of Arnebia densiflora (Nordm.) Ledeb. by in vivo models. J Ethanopharmacol., 2009; 124: 137-141.
61. Prabhath Kodancha G, Satish Kumar MC, Rajput RS, Patil VL, Udupa A et al. Wound healing profile of Asparagus racemosus (Liliaceae) Wild. Current Pharma Research., 2011; 1(2): 111-114.

62. Kimura Y, Sumiyoshi M, Sakanaka M. Effects of Astilbe thunbergii rhizomes on wound healing. J Ethnopharmacol., 2007; 109: 72-77.
63. Chaudhari RY, Patil VR. Promotion of cutaneous wound healing by herbal formulation containing Azadirachta indica and Cynodon dactalon extract in wistar. Int J Pharm Res., 2011; 3(4): 80-86.
64. Asif A, Kabub G, Mehmood S, Khunum R et al. Wound healing activity of root extract of Berberis lyceum Royle in rats. Phytother Res., 2007; 21: 589-91.
65. Lai HY, Lim YY, Kim KH. Potential dermal wound healing agent in Blechnum orientale Linn. BMC Complementary and Alt Med., 2011; 11: 62.
66. Gupta S, Malan R, Walia A, Saini V. Comparison of different extracts leaf of Brassica juncea Linn. on wound healing activity. European Journal of Experimental Biology., 2011; 1(2): 33-40.
67. Khan M, Patil PA, Shobha JC. Influence of Bryophyllum pinnatum (Lam.) leaf extract on wound healing in albino rats. Journal of Natural Remedies., 2004; 4: 41-46.
68. Prasad P, Pawan KK, Alla NR. Wound healing activity of alcoholic extract of Buchanania lanzan in albino rats. Int J Chem. Tech Res., 2009; 1026-31.
69. Mensah AY, Sampson J, Houghton PJ, Hylands PJ, Westbrook J, Dunn M. Effects of Buddleja globosa leaf and its constituents relevant to wound healing. J Ethnopharmacol., 2001; 77(2-3):219-26.
70. Sumitra M, Manikandan P, Suguna L. Efficacy of Butea monosperma on dermal wound healing in rats. Int J of Bio & Cell Bio 2005; 37:566–573.
71. Preethi KC, Kuttan R Wound healing activity of flower extract of Calendula officinalis. J Basic Clin Physiol Pharmacol 2009; 20(1): 73-69.
72. Nalwaya N, Pokharna G, Deb L, Jain NK. Wound healing activity of latex of Calotropis gigantea. IJPPS 2009; 1(1):176-81.
73. Rasik AM, Raghubir R, Gupta A, Shukla A, Dubey MP, Srivatava S et al. Healing potential of Calotropis procera on dermal wounds in guinea pigs. J Ethnopharmacol 1999; 68(1-3):261-66.
74. Mohideen S, Illavarasan R, Hemalatha S, Anitha N, Sasikala E. Wound healing and diuretic activity of Canthium parviflorum Lam. Natural Product Sciences 2003;4:102-104.
75. Krishnaveni B, Neeharika V, Venkatesh S, Padmavathy R et al. Wound healing activity of Carallia brachiata bark. Int J Pharm Sci 2009; 576-8.

76. Gomes FSL, Spinola CDV, Ribeiro HA, Lopes MTP, Cassali GD, Salas CE. Wound-healing activity of a proteolytic fraction from Carica candamarcensis on experimentally induced burn. Burns 2010; 36(2):277-83.
77. Tiwari P, Kumar K, Panik R, Pandey A, Sahu PK. Evaluation of aqueous extract of roots of Carica papaya on wound healing activity in albino Rats. J of Chem and Pharma Research 2011; 3(4): 291-295.
78. Oliveria MLM, Nunes-Pinherio DCS, Tome AR, Mota Ef, Islene. In vivo topical anti-inflammatory and wound healing activities of the fixed oil of Caryocar coriaceum wittm. Seeds. J Ethnopharmacol 2010; 129(2): 214-19.
79. Muthusamy SK, Sripriya R, Raghavan HV, Sehgal PK. Wound healing potential of Cassia fistula on infected albino rat model. J Surg Res 2006; 131(2): 283-89.
80. Sheeba M, Emmanule S, Revathi K, Ignacimuthu S. Wound healing activity of Cassia occidentalis Linn. in albino rats. Int J Integ Bio. 2009; 8(1):1-6.
81. Nayak BS et al. Catharanthus roseus flower extract has wound healing activity in sprague dawley rats. Fitoterapia 2007; 78(7-8):540-44.
82. Csupor D, Blazso G. The international Hungarian medicinal plant Centaurea sadlerjana Janka accelerates wound healing in rats. J Ethnopharmacol 2010; 127(1):193-95.
83. Sandipan Chatterjee, Tigari Prakash, Dupadahalli Kotrsha, Nadendla Rama Rao, Divakar Goli. Comparative Efficacy of
84. Tagetes erecta and Centella asiatica extracts on wound healing in albino rats. Chinese Medicine 2011; 2:138-142.
85. Koca U, Suntar IP, Keles H, Yesilada E, Akkol EK. In vivo anti-inflammatory and wound healing activities of Centaurea iberica Trev. Ex Spreng. J Ethnopharmacol 2009; 126(3):551-556.
86. Vaisakh MN, Pandey A. The invasive weed with healing properties: A review on chromolaena odorata. IJPSR 2012; 3(1): 80-83.
87. Kamath JV, Rana AC, Chowdhury AR. Pro-healing effect of Cinnamomum zeylanicum bark. Phytotheraphy Research 2003; 17:970-972.
88. Gbedema SY, Emelia K, Francis A, Kofi A, Eric W. Antimicrobial and wound healing activities of Clerodendron splendens G. Fitoterpia 2010; 2(2):63-8.
89. Madhavan V, Yadav DK, Murali A, Yoganarasimhan SN. Wound healing activity of aqueous and alcoholic extracts of Colebrookea oppositifolia Smith. Indian Drugs. 2009; 46(3):209-213.

90. Suntar IP, Koca U, Esra KA, Yılmazer D, Alper M. Assessment of wound healing activity of the aqueous extracts of Colutea cilicica Boiss. & Bal. fruits and leaves. Evid Based Compl and Alt Med 2011; 2011: 1-7.
91. Paiva LAF, Cunha A, Santos FA, Gramosa NV, Silveira ER, Rao VSN. Investigation on the wound healing activity of oleo-resin from Copaifera langsdorffi in rats. Phytother Res 2002; 16(8):737-9.
92. Prabhakar KR, Srinivasan KK, Rao PGM. Chemical investigations, antiinflammatory and wound healing properties of Coronopus didynamous. Pharm Biol 2002; 40: 490-3.
93. Kuppast I J and Nayak P V. Wound healing activity of Cordia dichotoma Forst. fruits. Natural Product Radiance.2006; 5(2):99-101.
94. Dinesh M, Manjunath C, Joshi VG, Karigar AA, Sikarwar MS. Wound healing property of ethanolic extract of Crataeva nurvala root bark. J Pharm Res 2010; 3(11):2788-9.
95. Divya K, Naveen K, Ramachandran S, Dhanaraju MD. Wound Healing and in vitro antioxidant activitiesof Crotonbon plandianum leaf extract in rats.Global Journal of Pharmacology 2011; 5(3): 159-163.
96. Santhanam G, Nagarjan S. Wound healing activity of Curcuma aromatica and Piper betle. Fitoterpia 2007; 61(5):458-9.
97. Kumar A. Anti inflammatory and wound healing activity of Curcuma aromatica salisb extract and its formulation. Journal of Chemical and Pharmaceutical Research 2009, 1(1):304-310.
98. Agrahari AK, Panda SK, Meheri A, Padhan AR. Screening of wound healing activity of Curculigo orchioides Gaertn root tubers methanolic extract. International J Phar Appl Sci 2010; 1(1):91-5.
99. Puratchikody A, Devi CN, Nagalakshmi G. Wound healing activity of Cyperus rotundus Linn. Indian Journal of Pharmaceutical Sciences 2006; 68:97-101.
100. Mittal et al.Int J Pharm Pharm Sci, Vol 5, Issue 2, 1-12

101. Shanmuga PK, Radhakrishnan N et al. Healing potential of Datura alba wounds in albino rats. J Ethnopharmacol 2002; 83 (3):193-9.
102. Pattanayak SP, Sunita P. Wound healing, anti-microbial and antioxidant potentials of Dendrophthoe falcate (L.f) Ettingsh. Journal of Ethnopharmacology 2008; 120:241-247.
103. Odimegwu DC, Ibezim EC, Esimone CO, Nworu CS, Okoye FBC.Wound healing and antibacterial activities of the extract of Dissotis theifolia (Melastomataceae) stem

formulated in a simple ointment base. Journal of Medicinal Plants Research. 2008; 2(1), 11-16.

104. Shirwaikar A, Jahangirdas S, Udupa L. Wound healing activity of Desmodium triquetrum leaves. Indian J of Pharmaceutical Sci., 2004; 65: 461-464.
105. Zhai Z, Haney DM, Wu L, Solco AK, Murphy PA, Wurtele ES, et al. Alcohol extract of Echinacea pallida reverses stress-delayed wound healing in mice. Phytomedicine., 2009; 16(6-7): 669-78.
106. Jagadish NRN, Mohmood R. Wound healing effect of Echinops echinatus Roxb. roots. Indian Drugs., 2009; 46(4): 342-346.
107. Sasidharan S, Nilawatyi R, Xavier R, Latha LY, Amala R. Wound healing potential of Elaeis guineensis Jacq leaves in an infected albino rat model. Molecules., 2010; 15: 3186-99.
108. Singh SDJ, Krishna V, Mankani KL, Manjunatha BK, Vidya SM, Manohara YN. Wound healing activity of leaf extract and deoxyelephantopin isolated from Elephantopus scaber Linn. Indian J Pharmacol., 2005; 37(4): 238-42.
109. Kumara Swami HM, Krishna V. Wound healing activity of embelin isolated from the ethanol extract of leaves of Embelia ribes Burm. J Ethnopharmacol., 2007; 109(3): 529-34.
110. Hukkeri VT, Karadi RV, Akki KS, Savadi RV, Jaiprakash B, Kuppast J et al. Wound healing property of Eucalyptus globulus leaf extract. Indian Drugs., 2002; 39: 481-483.
111. James O, Friday ET. Phytochemical composition, bioactivity and wound healing potential of Euphorbia heterophylla (Euphorbiacea) leaf. IJPBR., 2010; 1(1): 54-63.
112. Rasik AM, Shukla A, Patnaik GK, Dhawan BN, Kulshrestha DK, Srivastava S. Wound healing activity of latex of Euphorbia neriifolia Linn. Indian Journal of Pharmacology., 1996; 28: 107-109.
113. Saini V, Kinger HK, Sharma DK, Ahuja N, Middha A, Gupta VB.Wound healing activity of Evolvulus numularius Linn. Asian J Chem., 2007; 19(7): 5772-4.
114. Garg VK, Paliwal SK. Wound healing activity of ethanolic and aqueous extracts of Ficus bengalensis. J Adv Pharm Tech Res., 2011; 2: 110-114.
115. Roy K, Shivakumar H. Wound healing potential of leaf extracts of Ficus religiosa on wistar albino strain rats. Int J of Pharm Tech., 2009; 3: 506-508.
116. Abdulla MA, Ahmed KA, Abu-luhoom FM, Muhanid M. Wound healing potential of Ficus deltoidea. Biomedical Research 2010; 21(3): 241-245.

117. Olugbuyiro AO, Abo KA, Leigh OO. Wound healing effect of Flabellaria paniculata leaf extracts. J Ethnopharmacol 2010; 127(3):786-788.
118. Umadevi, S., Mohanta GP, Kalaichelvan VK, Manavalan R. Studies on wound healing effect of Flaveria trinervia leaf in mice. Indian Journal of Pharmaceutical Sciences 2006; 68:106-108.
119. Mathew AD, Taranalli AD, Torgal SS. Evaluation of anti-inflammatory and wound healing activity of Gentiana lutea rhizome extracts in animals. Pharmaceutical Biology 2004; 42:8-12.
120. Oloumi MM, Derakhshanfar A, Nikpoor A. Healing potential of Glycyrrhiza glabra root extract on dermal wounds in Rats. J Vet Res 2007; 62(4):147-154.
121. Silambujanaki P, Bala Tejo Chandra Ch, Anil Kumar K, Chitra V. Wound healing activity of Glycosmis arborea leaf extract in rats. J Ethnopharmacol 2011; 8:134(1) 198-201.
122. Shirwaikar A, Ghosh S, Rao PGM. Effect of Gmelina arborea Roxb. leaves on wound healing in rats. J Natural Remedies 2002; 3: 45-8.
123. Kiranmai M, Kazim SM, Ibrahim M. Combined wound healing activity of Gymnema sylvestere and Tagetes erecta Linn. Int J of Pharm App 2011; 2(2): 135-140.
124. Shenoy Ashoka M, Shastry C, Shashidhar; Shetiya Prakash; Evaluation of wound healing activity of Heliotropium indicum leaves. Int. Research Journal of Pharmacy 2011; 2(1): 279-284.
125. Subramoniam A, Evans DA, Rajasekharan S, Nair GS. Effect of Hemigraphis colorata (Blume)H.G.Hallier leaf on wound healing and inflammation in mice. Indian Journal of Pharmacology 2001; 33:283-285.
126. Nayak B, Raju SS, Orette FA, Rao AVC. Effects of Hibiscus rosa sinensis L. (Malvaceae) on wound healing activity: A preclinical study in a sprague dawley rat. Int J Low Extrem Wounds 2007; 6:76-81.
127. Upadhyay NK, Kumar R, Siddiqui MS, Gupta A. Mechanism of wounds-healing activity of Hippophae rhamnoides. L. leaf extract in experimental animals. Burns., 2009; 4: 1-4.
128. Annan K, Dickson R. Evalution of wound healing actions of Hoslundia Opposita Vahl., Anthoclesita nobillis G. Don. And Balanites aegyptiacal. J Sci Tech., 2008; (2): 48-51.
129. Perez GRM, Vargas SR, Ortiz HYD, Wound healing properties of Hylocereus undatus on diabetic rats. Phytother Res., 2005; 19(8): 665-8.

130. Mukherjee PK, Suresh B. The evaluation of wound healing potential of Hypericum hookerianum leaf and stem extracts. Journal of Alternative and Complementary Medicine., 2000; 6: 61-69.
131. Mukherjee, P.K., Suresh, B. Studies on in vivo wound healing activity of leaf extract of Hypericum mysorense with different wound models in rats. Natural Product Sciences., 2000; 6(2): 73-78.
132. Mukherjee PK, Verpoorte R, Suresh B. Evaluation of in vivo wound healing activity of Hypericum patulum (Family: Hypericaceae) leaf extract on different wound models in rats. Journal of Ethnopharmacology., 2000; 70: 315-321.
133. Shenoy C, Patil MB, Kumar R. Wound healing activity of Hypits suaveolens (L.) Poit (Lamiaceae). Int J Pharm Tech Res., 2009; 1(3): 77-44.
134. Hemalatha S, Subramanian N, Ravichandran, V, Chinnaswamy K. Wound healing activity of Indigofera enneaphylla Linn. Indian Journal of Pharmaceutical Sciences., 2001; 63: 331-333.
135. Nayak BS, Udupa AL, Udupa SL. Effect of Ixora coccinea flowers on dead space wound healing in rats. Fitoterapia 1999; 70(3):233–236.
136. Nayak BS, Mohan K. Influence of ethanolic extract of Jasminum grandiflorum Linn. flower on wound healing activity in rats. Indian J Physiol Pharmacol., 2007; 51(2):189-94.
137. Sachdeva K, Garg P, Singhal M, Srivastava B. Wound healing potential of Jatropha curcas L. (stem bark) in rats. Pharmacognosy Journal., 2011; 25: 12.
138. Shanbhag T, Sharma C, Adiga S, Bairy LK, Shenoy S, Shenoy G. Wound healing activity of alcoholic extract of Kaempferia galanga in wistar rats. Indian J Physiol Pharmacol., 2006; 50(4): 384-390.
139. Nayak BS, Marshall JR, Isitor G. Wound healing potential of ethanolic extract of Kalanchoe pinnata. Ind J Exp Biol., 2010; 48: 572-576.
140. Nayak BS, Raju SS, Ramsubhag A. Investigation of wound healing activity of Lanata camara L. in sprague dawley rats using a burn wound model. Int J App Res Nat Prod 2008; 1(1):15-19.
141. Skarkar DM, Vyas JV et al. Wound healing properties of Henna Leaves. Nat Prod Radiance., 2004; 3(6): 406-11.
142. Manjunatha BK, Vidya SM, Krishna V, Mankani KL. Wound healing activity of Leucas hirta. Indian Journal of Pharmaceutical Sciences., 2006; 68: 380-384.

143. Ilango K and Chitra V. Wound healing and antioxidant activities of the fruit pulp of Limonia acidissima Linn. in rats. Tropical J Pharm Res., 2010; 9(3): 223-230.
144. Saha K, Mukherjee PK, Das J, Pal M, Saha BP. Wound healing activity of Leucas lavandulaefolia Rees. J of Ethnopharmacology 1997; 56(2):139-144.
145. Manjunatha BK, Krishna V, Vidya SM, et al. Wound healing activity of Lycopodium serratum. Indian J Pharma Sci., 2007; 69(2): 283-7.
146. Sharma S, Sharma M C, Kohli DV. Wound healing activity and formulation of ether-benzene- 95% ethanol extract of herbal.
147. 10 Mittal et al.Int J Pharm Pharm Sci, Vol 5, Issue 2, 1-12 drug Madhuca longifolia leaves in albino rats. J of Optoelectronics and Biomedical Materials., 2010; 1(1): 13-15.
148. Nualkaew S, rattanamanee K, Thongpraditcohote S, Wrongkrajang Y, Nahrsted T. Anti-inflammatory, analgesic and wound healing activities of the leaves of Memecylon edule Roxb. J Ethnopharmacol., 2009; 121(2): 278-81.
149. Dwajani S, Shanbhag T. Michelia champaca: wound-healing activity in Immunosuppressed rats. Int J Altern Med., 2009; 7(2): 28-30.
150. Zippela J, Detersa A, Hensel A. Arabinogalactans from Mimosa tenuiflora (Wild.)Poiret bark as active principles for wound-healing properties. J Ethnopharmacol 2009; 124(3): 391-96.
151. Paul J, Khan S, Asdaq SMB. Wound healing evaluation of chloroform and methanolic extracts of Mimosa pudica roots in rats. Int J Biol Med Res., 2010; 1(4): 223-7.
152. Gupta N, Jain UK. Investigation of wound healing activity of methanolic extract of stem bark of Mimusops elengi Linn. Afr J Trad. Complement Altern Med., 2011; 8(2): 98-103.
153. Ilango K, Yoganandam PG, Usha K, Priyanga K S, Ilansezhiyan M, Kalaiarasi V. Evaluation of wound healing activity of hexane and methanolic extracts of fruit pulp of Momordica balsamina Linn. in albino rats. Int J Pharm & Phramaceut Sci 2010; 2(1): 88-92.
154. Sharma S, Sharma MC, Kohli DV. Formulation, Evaluation, Wound healing studies of benzene-95% absolute ethanol extract of leaves Mamordica charantia. J of Optoelectronics and Biomedical Materials., 2009; 1(4): 375-378.
155. Nayak S, Sandiford S, Maxwell A. Evaluation of the wound-healing activity of ehtonolic extract of Morinda citrifolia L. Leaf. Evid-Based Comp and Alt Med., 2009; 6(3): 351-356.

156. Udupa SL, Udupa AL, Kulkarni DR. Studies on antiinflammatory and wound healing properties of Moringa oleifera and Aegle marmelos. Fitoterapia. 1994; 65: 119-123.
157. Patil SA and Joshi VG. Evaluation of antibacterial and wound healing activity of leaves of Mussaenda trondosa Linn. Int J of Res in Pharmaceutical and Bio med Sci., 2011; 2(1):147-54.
158. Esimone CO, Ibezim EC, Chah KF. The wound healing effect of herbal ointments fromulated with Napoleona Imperialis. J Pharm Allied Sci., 2005; 3(1): 294-299.
159. Mukherjee PK, Mukherjee K, Pal M, Saha BP. Wound healing potential of Nelumbo nucifera (Nymphaceae) rhizome extract. Phytomedicine., 2006; 7: 66.
160. Lara OO, Fakoya FA, Agbani EO, Iwalewa EO. Vascular permeability- increasing effect of the leaf essential oil of Ocimum gratissimum Linn. as a mechanism for its wound healing property. Afr. J. Trad. Comp and Alt Med., 2005; 2(3): 253-258.
161. Udupa SL, Shetty S, Udupa L. Evaluation of antioxidant and wound healing effects of alcoholic and aqueous extract of Ocimum sanctum Linn. in rats. Evid. Based Comp and Alt., 2008; 5: 95-101.
162. Kiranmai M, Kazim SM, Ibrahim M. Combined wound healing activity of Gymnema sylvestere and Tagetes erecta Linn. Int J of Pharm App., 2011; 2(2): 135-140.
163. Dwajani S, Shanbhag T. Michelia champaca: wound-healing activity in Immunosuppressed rats. Int J Altern Med., 2009; 7(2): 28-30.
164. Zippela J, Detersa A, Hensel A. Arabinogalactans from Mimosa tenuiflora (Wild.)Poiret bark as active principles for wound-healing properties. J Ethnopharmacol., 2009; 124(3): 391-96.
165. Paul J, Khan S, Asdaq SMB. Wound healing evaluation of chloroform and methanolic extracts of Mimosa pudica roots in rats. Int J Biol Med Res., 2010; 1(4): 223-7.
166. Gupta N, Jain UK. Investigation of wound healing activity of methanolic extract of stem bark of Mimusops elengi Linn. Afr J Trad. Complement Altern Med., 2011; 8(2): 98-103.
167. Ilango K, Yoganandam PG, Usha K, Priyanga K S, Ilansezhiyan M, Kalaiarasi V. Evaluation of wound healing activity of hexane and methanolic extracts of fruit pulp of Momordica balsamina Linn. in albino rats. Int J Pharm & Phramaceut Sci., 2010; 2(1): 88-92.
168. Sharma S, Sharma MC, Kohli DV. Formulation, Evaluation, Wound healing studies of benzene-95% absolute ethanol extract of leaves Mamordica charantia. J of Optoelectronics and Biomedical Materials., 2009; 1(4): 375-378.

169. ESIMONE. C, IBEZIM, E. C. AND CHAH, K. F:the wound healing effect of herbal ointments formulated with napoleona imperialis ; Journal of Pharmaceutical and Allied Sciences., 2005; 3(1): 294 -299.
170. Devender Rao Kodati*, Shashidher Burra and Kumar Goud P:Evaluation of wound healing activity of methanolic root extract ofPlumbago zeylanica L. in wistar albino rats; Asian Journal of Plant Science and Research, 2011; 1(2): 26-34
171. N.K.Mishra,M. Pallavi,Geethanjali Mishra; Poly herbal therapy in ointment base for wound healing activity in rats;journal of engineering computers and applied sciences,volume 04,no 02,feb 2015
172. Dinesh, JS; Anupama, B and Sunil, K, "Anticonvulsant effect of ethanol extract of Caesalpinia pulcherrima leaves", Bra J Pharmacog, 2010; 20(5): 1410.
173. Raja shree, PH; Vidya,V; Merin, C; Jincy, E and Ranjith, S (2012), "Formulation and evaluation of antiseptic polyherbal ointment", Int J Pharm Life Sci, 2012; 3(10).
174. Fernanda Oliveira de G, Gaspi de et al. Effects of the topical application of hydroalcoholic leaf extract of Oncidium flexuosum Sims. (orchidaceae) and microcurrent on the healing of wounds surgically induced in wistar rats. Evidence-Based Complementary and Alternative Medicine., 2011; 1-9.
175. Kumar N, Gupta AK. Wound healing activity of Onosma hispidum (Ratanjot) in normal and diabetic rats. J Herbs Species Med Plants., 2009; 15(1): 342-51.
176. SB. Ramane, VN. Syed and KR. Biyani: Evaluation of Wound Healing Activity of Polyherbal Gel – A Novel Herbal Formulation;international journal of research in pharmaceutical and biomedical sciences.
177. Mohammed Haneefa K.P1*, Guru Prasad Mohanta2, Chandini NayarFormulation and Evaluation of Herbal Gel of Basella alba for wound healing activity; Journal of Pharmaceutical Science & Research., 2012; 4(1): 1642-1648.
178. JR Krishnamoorthy, Sumitira S, Ranjith MS,Gokulshankar S, Ranganathan S, Mohanty BK Prabhakaran G: An in vitro study of wound healing effect of a poly-herbal formulation as evidenced by enhanced cell proliferation and cell migration; Egyptian Dermatology Online Journal Vol. 8 No 1: 1, June 2012.
179. Shikha Srivastava, Nidhi Mishra,Evaluation of Polyherbal formulation for wound healing activity; Der Pharmacia Lettre., 2009; 1(1):157-161.
180. Jain Sachin*, Jain Neetesh, Tiwari A, Balekar N and Jain D KSimple Evaluation of Wound Healing Activity of Polyherbal Formulation of Roots of Ageratum conyzoides;Linn Asian J. Research Chem. April.-June, 2009; 2(2).

181. ESIMONE. C, IBEZIM, E. C. AND CHAH, K. F:the wound healing effect of herbal ointments formulated with napoleona imperialis ; Journal of Pharmaceutical and Allied Sciences., 2005; 3(1): 294 -299.
182. Devender Rao Kodati*, Shashidher Burra and Kumar Goud P:Evaluation of wound healing activity of methanolic root extract ofPlumbago zeylanica L. in wistar albino rats; Asian Journal of Plant Science and Research, 2011; 1(2): 26-34.
183. N.K.Mishra,M. Pallavi,Geethanjali Mishra; Poly herbal therapy in ointment base for wound healing activity in rats;journal of engineering computers and applied sciences,volume 04,no 02,feb 2015.
184. Rajput Rekha T, Gohil Kashmira J, Singh Poonam and Singh Surendra:Development of wound healing herbal formulation "herbal wound guard"; International Journal of Scientific and Research Publications, March 2015; 5(3).
185. Dinesh, JS; Anupama, B and Sunil, K, "Anticonvulsant effect of ethanol extract of Caesalpinia pulcherrima leaves", Bra J Pharmacog, 2010; 20(5): 1410.
186. Raja shree, PH; Vidya,V; Merin, C; Jincy, E and Ranjith, S, "Formulation and evaluation of antiseptic polyherbal ointment", Int J Pharm Life Sci, 2012; 3(10).
187. Archana A.Bele, Dr Varsha M.Jadhav, Dr V.J.Kadam: Wound healing activity of herbal formulation ; Journal of pharmacy research, march 2009; 2(3).
188. M S Charde*, A T Hemke, S V Fulzele, P M Satturwar, A V Kasture and A K Dorle:Investigation on the wound healing activity of Tilvadi ghrita : a herbal formulation; Indian Journal of Traditional Knowledge.
189. H.Prasad,H.G Shivakumar,Preparation and evaluation of herbal topical formulations for wound healing properties.
190. Nayak BS. Cecropia peltata L. (Cecropiaceae) has wound-healing potential: A preclinical study in a sprague dawley rat model. Int J Low Extrem Wounds., 2006; 5:20-26.
191. Tranallin A D &Kuppast I J:Study of wound healing activity of seeds of Trigonella foenum graecum in rats; indian journal of pharmaceutical science