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ETHNOBOTANICAL SURVEY AND PROPOSED RECIPES OF POTENTIAL WOUND-HEALING PLANTS IN PARTS OF SOUTH WEST NIGERIA.

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ABSTRACT

Ethnobotanical survey of medicinal plants remains a veritable source of information leading to discovery of new lead compounds of pharmaceutical importance thus, the need for continual search for medicinal plants via ethnobotanical surveys in Nigeria. Structured questionnaires were administered amongst traditional healers. A few other anecdotal claims about efficacy of herbs from people who at one time or the other have used the plants for wound healing were also sampled. The result of an ethnobotanical survey of plants used in the treatment of wound in Ijebu North Local Government area of Ogun State and Ibadan North Local Government area of Oyo state of Nigeria are reported. A total of 71 species of plants covering 43 families were identified; representing 51 recipes. Carica papaya Linn, Elaeis guineensis Jacq, Chromolaena odorata Meull. Arg, Gladiolus psittacinus Hook.f., Vetivera kotschyana (Benth.) Stapf, Securidaca longipedunculata Fresen and Euphorbia laterifolia Linn were prominent among the recipes. Among all the families identified in the recipes, Euphorbiaceae was most mentioned (7.0%) followed by Compositeae, Fabacceae, Malvaceae and Meliaceae families (4.0%), Amaryllidaceae, Annonaceae, Arecaceae, Asphodeloideae, Asteraceae, Cucurbitaceae, Leguminosae, Musaceae, Poaceae, Rubiaceae, Rutaceae, Solanaceae, Sterculiaceae, Zingiberaceae followed closely (3.0%) while Acanthaceae, Amaranthaceae, Anacardiaceae and others had 1.0%. Out of the recipes, 51.9% are either leaves only or in combination with other parts, while 21.5% are stem bark, 7.6% are seeds and 3.8% are roots, bulbs and fruits respectively. These plants could be investigated for potential leads for wound healing in animal subjects.

Keywords: Ethnobotanical survey, medicinal plants, wound healing, Nigeria.

INTRODUCTION

Various medicinal plants used in folk medicine have demonstrated wound healing property, and some of these species are currently used in commercial preparations (Frankova *et al*., 2021; Gould *et al*., 2015). Historically, almost all medicinal preparations were derived from plants, whether in the simple form of plant parts or in the more complex form of crude extracts, mixtures, etc. Medicinal plants formed the basis for either total development or templates upon which modern western medicines are based (Fabricant and Farnsworth, 2001). Globally, about 85% of all medications for primary health care are derived from plants (Farnsworth, 1988; Chizamy *et al.*, 2011). Majority of these involve the isolation of the active constituents found in a particular medicinal plant and its subsequent modification. In the developed countries 25 percent of the pharmaceuticals are based

on plants and their derivatives; this use of medicinal plants is well known and tolerated among the indigenous people in rural areas of many developing countries (Principe, 2005; Jorik, 2012). In this region, sophisticated care is often unaffordable, where many patients rely on familiar, readily accessible and in expensive traditional wound healing remedies (Gould *et al*., 2015) The World Health Organization (WHO) has emphasized the importance of the traditional indigenous medicines, since a large majority of rural people in the developing countries still use these medicines as the first defense in health care (Goleniowski *et al*., 2006). Traditional medicines are considered more effective, safe and inexpensive are gaining popularity among people in both rural and urban areas. There are several reported cases of successful treatment with traditional medicines where orthodox medication had failed. Cases of chronic sores which would have led to amputations (Kayani *et al.*, 2015; Soukand and Pieroni, 2016) have been successfully managed with traditional medicines.

Several studies have documented the wound healing potentials of herbs from different parts of the world (Villegas *et al.*, 1997; Gomez-Beloz*et al*., 2003; Kumar *et al*,. 2007; Dande and Khan, 2012; Saroja *et al*., 2012; Tepole, 2017; Biswas *et al.*, 2017; Na *et al*., 2017). Nevertheless, chronic wounds in southwestern Nigeria rarely lead to amputation because of the rich indigenous experience in handling such with herbal medicines. However, documentation of such herbs used in this area for wound healing. Therefore, this paper reports the medicinal plants commonly used in the indigenous management of chronic sores south-western Nigeria.

MATERIALS AND METHODS

The ethnobotanical survey of traditional plants used for wound healing treatment was carried out in Ibadan-North Local Government Area of Oyo State and Ijebu-North North Local Government Area of Ogun State with notable herbal practices in the rich Yoruba culture in Nigeria (Figure 1). Structured questionnaires were administered amongst traditional healer. A few other anecdotal claims about efficacy of herbs from people who at one time or the other have used the plants for wound healing were also used. Details of medicinal plants used, mode of treatment, methods of preparation, types of administration, precautions and possible side effects were documented. The collected plants were identified by the people with their vernacular names, photographed and samples were collected for the preparation of herbarium voucher specimens. Recipes were also purchased from herbal medicine sellers. Identification of all the plants was done at the Herbarium in the Forestry Research Institute of Nigeria (FRIN), Jericho Ibadan. The voucher specimens were also deposited in the herbarium at Olabisi Onabanjo University (ELIKAF Herbarium), Ago-Iwoye, Ogun State.

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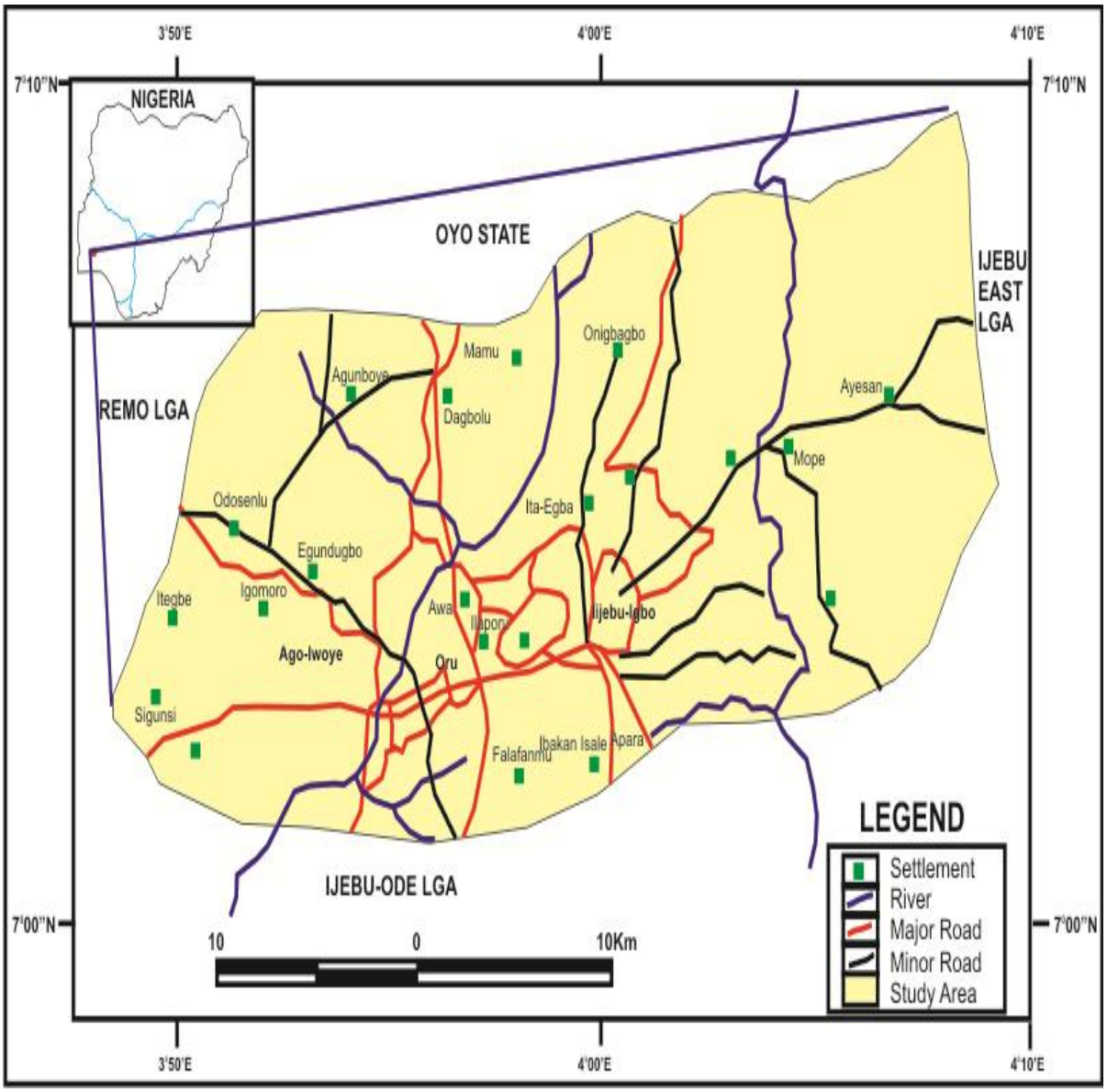

Figure 1: Ethnobotanical surveyed area of Ijebu North Local Government, Ogun state, Nigeria

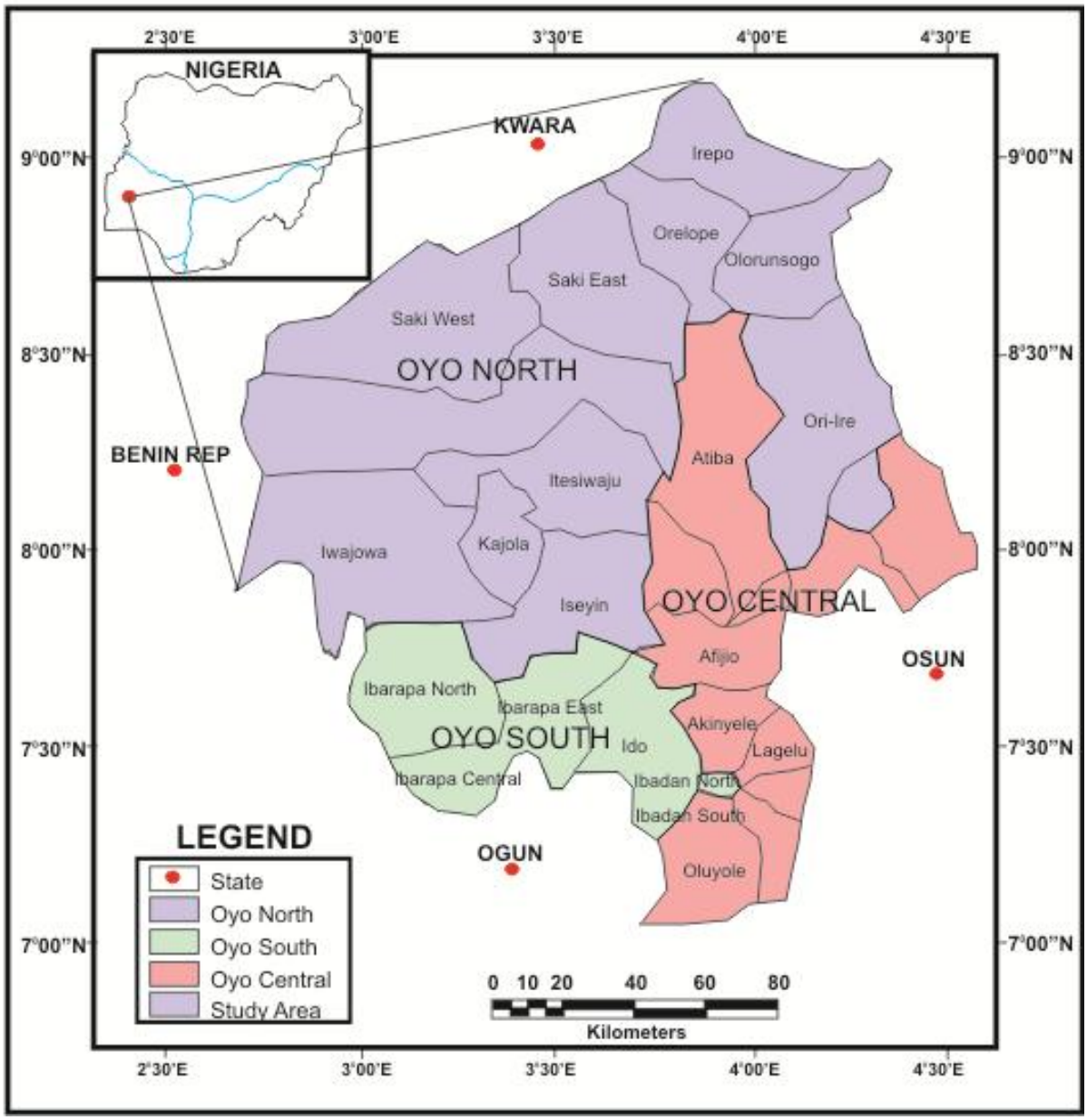

Figure 2: Ethnobotanical surveyed area of Ibadan North Local Goverment, Oyo state, Nigeria

RESULTS AND DISCUSSION

In all, a total of 71 species of plants covering 43 families were identified; representative of 51 herbal recipes. Table 1 shows the list of plants species identified, and their parts used with their Yoruba names.

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Table1- Nigerian Medicinal plants present in the recipes used in the treatment of wounds

SN	Botanical Names	Family	Voucher Number	Local Names (Yoruba)	Part used
1	*Acanthospernum hispidium*DC	Asteraceae	EH/2012/01001	Dagunro	Leaves
2	*Adansonia digitata* Linn.	Bombacaceae	EH/2012/02001	Eweeose	Leaves
3	*Aframomum melegueta* K. Schum	Zingiberaceae	EH/2012/26001	Atare	Seeds
4	*Ageratum conyzoides* Linn.	Asteraceae	EH/2012/01002	Emi-esu	Whole plant
5	*Albizia zygia* (DC)JF Macbr	Fabaceae	EH/2012/06001	Isaju	Leaves
6	*Alchornea laxiflora* (Benth.) Pax et & K Hoffin	Euphorbiaceae	EH/2012/05001	Apina	Leaves
7	*Allium cepa* Linn.	Liliaceae	EH/2012/12001	Alubosa	Bulbs
8	*Allium sativum* Linn.	Liliaceae	EH/2012/12002	Ayuu	Bulbs
9	*Aloe vera* Linn. Burm.f.	Liliaceae	EH/2012/12003	Ahonerin	Bulbs
10	*Alstonia congensis* Engl.	Apocynaceae	EH/2012/01003	Ahun	Stem bark
11	*Anacardium occidentale* Linn.	Anacardiaceae	EH/2012/01004	Kasu	Seeds
12	*Antiaris Africana* Lesch.	Moraceae	EH/2012/13001	Oro	Leaves
13	*Anthocleista djalonenesis* A Chev.	Loganiaceae	EH/2012/12004	Sapo	Stem bark
14	*Argemone mexicana* Linn.	Papaveraceae	EH/2012/16001	Ma-fowo-kan-omo-mi	Leaves
15	*Aristolochia albida*Duch.	Aristolochiaceae	EH/2012/01005	Paranfunfun	Stem bark
16	*Aristolochia ringens*Linn.	Aristolochiaceae	EH/2012/01006	Ako – Igun	Stem bark
17	*Azadiractha indica* A. Juss	Meliaceae	EH/2012/13001	Dongoyaro	Leaves
18	*Bryophyllum pinatum* (Lam.) Oken	Crassulaceae	EH/2012/03001	Odundun	Seeds
19	*Capsicum frutescens* Linn.	Solanaceae	EH/2012/19001	Ata-Ijosin	Leaves
20	*Carapa procera* DC.	Meliaceae	EH/2012/1003	Oganwo	Stem bark
21	*Carica papaya* Linn.	Caricaceae	EH/2012/03002	Ibepe	Fruits, Leaves
22	*Cassia obtusifolia* Linn.	Fabaceae	EH/2012/06002	Epa-ikun	Leaves
23	*Celosia argentea*Linn.	Amaranthaceae	EH/2012/01007	Olorun	Leaves
24	*Ceratonia siliqua* Linn.	Fabaceae	EH/2012/06003	Iru	Seeds
25	*Chasmanthera dependens* Hochst.	Menispermaceae	EH/2012/13004	Atooloriraun	Leaves
26	*Chromolaena odorata* Linn.	Asteraceae	EH/2012/01008	Akintola	Leaves
27	*Citrullus colocynthus* Linn.	Cucurbitaceae	EH/2012/03003	Egusi bara	Fruit, Leaves
28	*Citrus medica* Linn.	Rutaceae	EH/2012/18001	Osanweere	Fruits
29	*Clausena anisata* (Wild) Hook.f.ex Beth	Rutaceae	EH/2012/18002	Atari obuko	Leaves, Roots
30	*Cleome ciliata* Schumacher &Thonn	Capparidaceae	EH/2012/03003	Akuye-aja	Leaves

31	*Cola acuminata (*P. Beauv) Schott &Endl.	Sterculiaceae	EH/2012/19002	Obi abata	Bark, Leaves
32	*Cola milleni* K Schum	Sterculiaceae	EH/2012/19003	Obi edun	Stem bark, Leaves
33	*Colocasia esculenta* (Linn.) Schott	Araceae	EH/2012/01009	Isukoko	Leaves
34	*Croton lobatus* Linn.	Euphorbiaceae	EH/2012/05002	Eru	Stem bark, Leaves
35	*Croton zambesicus* Meull. Arg	Euphorbiaceae	EH/2012/05003	Ajekofole	Leaves
36	*Elaeis guineese*(Jacq.)	Arecaceae	EH/2012/01010	Ope	Seeds (Oil)
37	*Eclipta prostrata* Linn.	Asteraceae	EH/2012/01011	Abikoko	Whole plant
38	*Entandrophragma angolense* (Welw)c.b	Meliaceae	EH/2012/13005	Ijebo	Stem bark
39	*Erythrophleum suaveolens* Guill. &Perr.	Fabaceae	EH/2012/06004	Obo	Stem bark
40	*Eugenia aromatic* (L.) Merrill & Perry	Myrtaceae	EH/2012/13006	Kanafuru	Flower
41	*Euphorbia laterifolia* Linn.	Euphorbiaceae	EH/2012/05004	Oroadete	Leaves
42	*Fiscus thonningii* Blum.	Moraceae	EH/2012/13007	Ori – odan	Leaves
43	*Gladiolus psittacinus* Hook.	Iridaceae	EH/2012/09001	Isu – baka	Corm
44	*Gossypium barbadense* Linn.	Malvaceae	EH/2012/13008	OwuAkese	Leaves
45	*Gossypium hirsutum* Linn.	Malvaceae	EH/2012/13009	Ela-owu	Leaves
46	*Ipomoea batatas* Linn.	Convolvulaceae	EH/2012/03004	Ogbooro	Leaves
47	*Jatropha curcas* Linn.	Euphorbiaceae	EH/2012/05005	Lapalapa	Leaves, Root
48	*Lawsonia inermis* Linn.	Lythraceae	EH/2012/12004	Laali	Leaves
49	*Massularia acuminata* (G. Don) Bullock ex Hoyl.	Rubiaceae	EH/2012/18003	Pako-ijebu	Leaves, twig, bark
50	*Milicia excelsa* (Welw.) C.C. Berg	Moraceae	EH/2012/13010	Irolo	Stem bark
51	*Morinda morindoides* (Bak.) Milne-Redh	Rubiaceae	EH/2012/18004	Paran pupa	Stem bark
52	*Musa nana* Sensu Parham, non Lour	Musaceae	EH/2012/13011	Ogedeomini	Root
53	*Musa paradisiaca* Linn.	Musaceae	EH/2012/13012	Ogedeagbagba	Stem bark
54	*Newbouldia laevis (*P. Beauv) Seem. ex Bureau	Bignoniaceae	EH/2012/02002	Akokoo	Leaves
55	*Nicotiana tabacum* Linn.	Solanaceae	EH/2012/19004	Tabagidi	Leaves
56	*Ocimum basilicum* Linn.	Lamiaceae	EH/2012/12005	Efirin	Leaves
57	*Piper guineense* Schum. &Thonn.	Piperaceae	EH/2012/16002	Iyere	Leaves
58	*Phaulopsis falcisepala* C.B. Clarke.	Acanthaceae	EH/2012/01012	*Adikoko*	Leaves

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59	*Quassia undulata* (Gmill. & Perr.) F. Dictr.	Simaroubaceae	EH/2012/19004	Oriji	Leaves
60	*Rhaphiostylis beninensis* (Hook, f.) Planch.	Icacinaceae	EH/2012/09002	Itapara	Leaves
61	*Securidaca longipedunculata* Fresen	Polygalaceae	EH/2012/16003	*Epeta*	Stem bark
62	*Spondias mombin* Linn.	Anacardiaceae	EH/2012/01013	Iyeye, Olosan (Ijebu)	Leaves
63	*Strophanthus hispidus* DC.	Apocynaceae	EH/2012/01014	Sagere	Stem bark
64	*Platycerum alcicorne* (Willem) Oesv.	Polypodiaceae	EH/2012/16004	Afomo	Leaves
65	*Telfaria occidentalis* Hook.f.	Cucurbitaceae	EH/2012/03005	Ugu	Leaves
66	*Uraria picta* (Jacq.) DC.	Fabaceae	EH/2012/06005	Alaperedealupaida	Leaves
67	*Uvaria chamae* P.Beauv.	Annonaceae	EH/2012/01015	Eruju	Stem bark
68	*Vernonia amygdalina* Del	Compositeae	EH/2012/06006	Ewuro	Leaves
69	*Vetivera nigritana* (Benth.) Stapf	Poaceae	EH/2012/16005	Okofe	Stem bark
70	*Zea mays* Linn.	Poaceae	EH/2012/16006	Agbado	Seeds, Cob
71	*Zingiber officinale* Roscoe	Zingiberaceae	EH/2012/26002	Ajo, Ata-ile	Rhizomes

The study identified members of the family Euphorbiaceae to be most abundant species in the recipes for wound healing in the area. This has been supported by some *in vivo* studies on ointment made from *Jatropha curcas* extract, a member of the Euphorbiacea family, which demonstrated wound healing potential in both excision and incision models used (Sachdeva *et al*., 2011). Other studies confirm the use of extracts of plants in the family to be potentially active in management of wounds and inflammation arising from injuries (Hernandez-Hernandez *et al.*, 2017; Cavalcanti *et al*., 2012; Dickson *et al.*, 2010). *Carica papaya, Markhamia tomentosa, Elaei sguineensis, Chromolaena odorata, Gladiolus psittacinus, Vetivera kotschyana, Securidaca longipedunculata* and *Euphorbia laterifolia* are particularly most prominent in the recipes. Most of the plant species used involved the use of leaves, seeds, bark, and root alone except *Ageratum conyzoides* and *Massularia acuminate* in which the leaves, twig and the bark are in one of the recipes.

Some of the plants identified in this work have been experimentally verified, having natural products which are composed of active principles like triterpenes, alkaloids, flavonoids and other biomolecules (Sumitra *et al.*, 2005). Coumarin, furic acid, saponin and tannins from *Ageratum conyzoides* (Okujagu *et al.*, 2004), flavonoids and quercetin from *Allium cepa* (Nemeth and Piskula, 2007); β-sitosterol (Krishnan, 2006) and glycoprotein (Choi *et al*., 2001) from the gel of *Aloe vera*, phenolic acids (Phan *et al*., 2001) and Eupolin Ointment (Phan*et al.*, 2001) from *Chromolaena odorata*. Diallo *et al*. (2002) stated that polysaccharides are also partly responsible for the process of wound

healing; for example, arabinogalactans from the root of *Angelica acutiloba*, acidic heteroglycans from the leaves of *Panax ginseng*, acemannan from the gel of *Aloe vera* and general polysaccharides from the leaves of *Plantago major* are reported to have wound healing activity. Besides these, aromatic plants have a long history of use for treating wounds; especially essential oils obtained from the various parts of the plants are very effective in treating small to medium wounds, skin abrasions, excoriations, skin infections and other topical health problems provided an appropriate concentration of essential oil is used (Kerr, 2002).

Enumeration of Recipes

1 The leaves of *Ocimum basilicum*, *Telfaria occidentalis* and seeds of *Ceratonia siliqua* are boiled together with liver of cow. The concoction is eaten frequently.

2. The leaves of *Adansonia digitata* and houseflies are burnt together into ashes. The leaves of *Adansonia digitata*are boiled with water and the decoction thus obtained is used to wash wounds. The ashes are applied topically on the wound twice daily immediately after washing.

3. The leaves of *Croton zambesicus* are squashed with local black soap. The resulting soap is used for washing off the sore two times daily and likewise used as bathing soap till the sore/wound healed up.

4. The leaves of *Quassia undulata*, *Lawsonia innermis* and fruit juice of *Citrus medica* are ground into paste. The paste is applied topically on the affected places to heal the wound.

5. The leaves of *Albizia zygia* are burnt into ashes. The preparation is licked as frequently as desired and likewise applied topically on the affected places to heal wound.

6. The leaves of *Platycerum alcicorne* and *Phaulopsis falcisepala* are squashed with local black soap. The resulting soap is used for bathing and dressing of the wound three times daily.

7. The leaves of *Newbouldia leavis* are exposed to hot steam for several minutes. Otherwise raped inside abroad leaves of Cocoa yam and put on charcoal, or hot ash. After cooling for few minutes, an extract is obtained by squeezing out juice from the leaves. Wash the wound with warm water or little salt could be added. Add few drops of the extract on the wound four times daily. If the sore bleeds a lot, the leaves extract of *Newbouldia leaves* is given to the patient to eat likewise.

8. The rotten root parts of *Musa nana* are pounded with honey, small quantity of an alum and black soap are added. The preparation is use for washing the wound and for daily bathing also.

9. The bark of *Musa paradisiaca* is burnt into ashes. The resulting product (ash) is put in a beaker with coconut oil. The mixture is applied topically on the affected places to heal wound.

10. Cut a piece of unripe pawpaw fruit and tied directly to the wound. Do this four times daily. Continue till the wound has dried, which will be in a few days or weeks. To make the wound heal faster, eat lots of ripe pawpaw.

11. The leaves of *Cassia obtusifolia* and cow liver are boiled in fermented

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water got from raw pap after days of initial processing. Preparation is used to wash the wound three times per day.

12. The leaves, twig and bark of *Massularia acuminata* are ground into powder. The powder is mixes with honey. Two teaspoonfuls of the mixture is taken every morning and could be added topically on the wound three times daily.

13. The leaves of *Argemone mexicana* are boiled in large amount of water and later pounded with black soap. Wash the wound area with it twice daily.

14. The leaves of *Acanthospermum hispidium, Uraria picta*, *Antiaris africana* and feather of a pigeon are burnt together. Small portion of the mixture are soaked in alcohol (preferably dry gin). Wash the wound with the preparation, which must be done early in the morning before any conversation with anybody is made and before going to bed at night.

15. Slice or cut an unripe pawpaw fruit to allow the white milky sap to drop directly on the surface area of the wound.

16. The bark of *Aristolochia ringens* and *Anthocleista djalonenesis,* the leaves of *Nicotiana tabacum, Piper guineense* and *Ficus thonningii, corm* of *Gladiolus psittacinus,* flowers of *Eugenia aromatic* and the bulb of *Allium sativum* are cut into pieces and boiled with water. A full cup of aqueous extract from the decoction is taken twice daily, in the morning and at night. Few drops of the extract are applied topically on the wound.

17. The leaves of *Cleome ciliate, Chromolena odorata* and *Euphorbia laterifolia* are soaked in alcohol for three to four days. Same set of plants are ground with local black soap in equal proportion. The previously soaked part is sieved and the extraction is used to clean the wound. Add few drops of the extract immediately after cleansing. The resulting soap is used for bathing twice daily. There must be consistency to aid quick recovery of the wound.

18. The leaves of *Ipomea batatas, Spondias mombin, Lawsonia inermis,* and *Azadiractha indica* are boiled in fermented ground maize water extract for few minutes. The decoction is taken orally to heal the wound. 50ml of the decoction is taken twice per day and used to cleanse the wound thrice daily.

19. The bulb of *Aloe vera*, honey and Shea-butte are mashed into a paste and applied topically on the affected places to heal the wounds. Apply the mixture topically on the affected places to heal the wounds.

20. The leaves of *Celosia argentea* are boiled for 10-15 minutes. Use to mop the affected part with an interval of four hours per day till the wound get healed.

21. The powder of the leaves of *Chasmanthera dependens* is thoroughly mixed with Shea – butter to form a paste. The paste is applied topically on the affected places to heal the wounds.

22. The burnt leaves of *Rhaphiostylis beninensis* are added to palm kernel oil. Mop the wound with a barely soaked extract from the boiled leaves *R. beninensis* using clean white clothes. The mixture is topically applied on the affected places to heal the wound.

23. The residue got from the extraction of palm oil is applied on the wound early in the morning and later at night after washing.

24. The leaves of *Elictaprostrata, Argeratumconyzoides, Vernonia amygdalina and, Carica papaya* together with sliced fruit of *Citrus medica* are put in a beaker and water is added. The mixture is boiled for 5-10 minutes. Drops of the decoction are added on the wound after cleansing.

25. The leaves of *Ocimum basilicum* and *Chromolaena odorata* are squashed and later put in a beaker and water is added lasting for three days for extraction. Shea-butter and egg content of local chicken are mashed together. The extract is used to wash the wound using a local black soap. Cream made from Shea – butter and egg content of local chicken is used to rub the affected part in the morning and at night.

26. The leaves of *Euphorbia laterifolia, Chromolaena odorata* and the young leaves of *Newbouldia leavis* are dried and blended into powder, part of the powder is soaked in alcohol (dry gin) for at least five days. While the other remaining powder is soaked in the remnant water from a locally made palm oil to form a paste. The paste is topically applied on the wound after thorough cleansing of the wound using the supernatant decanted from the former mixture. This is applied in the morning and night.

27. The bark of *Entandrophragma angolense* is boiled in water. The decoction is used to mop the wound in the morning and night.

28. The leaves and root of *Clausena aniseta* are boiled together. The concoction is used to mop the wound frequently.

29. The stem bark of *Securidaca longipedunculata* and *Vetivera nigritana*, corm of *Gladiolus psittacinus*, rhizome of *Zingiber officinale*, and the bulb *Allium sativum* are either ground or burnt into powder. The mixture is thoroughly mixed with mixed powder of Camphor and Gun powder. Add black oil and Shea-butter to the mixture. Cleanse the surface of the wound using the honey, then apply the mixture topically on the wound.

30. The leaves of *Jatropha curcas* and Catfish are cooked for eating. The ground seeds of *Jatropha curcas* burnt into ashes and mix with Shea-butter. The mixture is applied on the wound after cleansing.

31. The squashed leaves of *Quassia undulata* are cooked with catfish. This helps to purify the blood, if it is hereditary. Eat the preparation frequently.

32. The leaves of *Capsicum frutescens* are boiled in water. The powdered leaves are ground with camphor. Mop up the wound with the leaf extracts, and then apply the mixture on the wound.

33. The seeds of *Aframomum melegueta* and corn cob are burnt to ashes and later ground into fine powder. The powder is dissolved in palm oil. Apply the mixture topically on the wound using a feather.

34. The seeds of *Aframomum melegueta* and skull of cow are ground into powder and mixed with Shea butter. Rub the mixture topically on the wound.

35. The bark of *Securidaca longipedunculata, Carapaprocera, Entandrophragma angolense, Uvaria chamae, Aristolochia albida* and *Morinda morindoides* are either ground or burnt into powder. One full tea spoon of the powder is taken daily with pap, palm oil or water.

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36. The leaves and wool of *Gossypium hirsutum*, the leaves of *G. barbadense* and the seeds of *Aframomum melegueta* are burnt together. The mixture is applied topically on the wound.

37. The roots of *Jatropha curcas*, leaves of *Alcohornea laxiflora* and seeds of *Aframomum melegueta* are burnt. The preparation is licked frequently as desired, and also applied directly on the wound.

38. The fruits of *Citrullus colocynthis* are cut into pieces and soaked in water for three days. The leaves are pounded with black soap. This preparation is for topical application only.

39. The bark of *Strophanthus hispidus*, *Securidaca longipedunculata*, *Entandrophragma cylindricum* and *Vetivera nigritana*, corm of *Gladiolus psittacinus* are cut into pieces, later boiled or soaked with water or dry gin (or any alcoholic drink). A cup of extract is taken twice daily, in the morning and at night, after dressing the wound using the same extract.

40. The bark and leaves of *Cola milleni* are boiled together in water. A cup of the decoction is taking three times daily.

41. The seeds of *Bryophyllum pinnatum* (Kalancho elancininata) are ground and cooked with poultry dung and Catfish. Eat the preparation as desired.

42. The powder of dog bone (any part of the bone) is mixed to palm oil into a paste. The paste is topically applied to the wound frequently.

43. The leaves of the *Jatropha curcas* and salt are squeezed together with a large quantity of water. The extract collected after squeezing out the debris is placed outside in the morning till evening. Ashes are spread around the bow or bucket containing the extract. Later in the evening, the water is used for bathing. This must be done frequently.

44. The bark of *Alstonia congensis* is put in a beaker and boiled with water. Palm oil of same quantity of the water used is added. The mixture is for mopping of the wound.

45. The bark *of Erythrophleum suaveolens* is burnt. The resultant fume is directed to the surface of the wound.

46. The whole plant of *Aloe vera*, rhizome of *Zingiber officinale* and Shea butter are pounded together into a paste. The paste is applied on the wound three times daily.

47. The bulbs of *Allium cepa* are squashed together with juice of *Citrus medica*. The leaves of *Azadiractha indica* are squashed separately too in order to extract the water content of the leaves. The fluids collected are mixed together. The mixture is used to mop up the wound frequently on daily basis.

48. The barks and leaves of *Cola acuminata*, leaves of *Croton lobatus*, rhizome of *Zingiber officinale* and camphor are pounded together in water. The extract is obtained by squeezing it out of the debris. A cup of the extract is taken twice daily, preferably in the morning and at night.

49. The fruit juice of *Citrus medica* is mashed with Shea – butter. The mixture thus obtained is topically applied frequently on the affected places to heal the wound.

50. The leaves of *Jatropha curcas* are boiled for bathing using local black soap. The concoction is later used for mopping the surface of the wound after bath.

51. The ground leaves of *Gossypium hirsutum* and Catfish are cooked for eating. The leaves of *G. hirsutum* are also pounded with camphor into a paste. The paste is applied topically on the wound with bandage.

Conclusion

There is urgent need for collaborative efforts between researchers in medicine (both orthodox and traditional) and pharmaceutical industries if our goal of attaining healthy society. However, it is important to develop standard proper preparation and packaging of the drugs for commercial use.

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