WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 13, 1583-1596. Review Article ISSN 2277–7105

REVIEW OF DIOSPYROS MALABARICA EXTRACT AND ITS POTENTIAL WOUND HEALING ACTIVITY IN MICE

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Article Received on
20 May 2024,

Revised on 10 June 2024,
Accepted on 30 June 2024

DOI: 10.20959/wjpr202413-33129

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ABSTRACT

The animal body weight, food, and water consumption did not alter when they were given 2000 mg/kg of body weight, according to the findings of this study. Even at the highest treatment level, 2000 mg/kg fresh plant material no mortality was observed, and no significant alterations in histological parameters were seen. This shows that *Diospyros malabarica* plant material has no significant harmful effect in male albino mice at dose levels up to 2000 mg/kg. It is mentioned that two bioactive flavonoids and phytosterols have been identified successfully from the ethanolic leaves extract of *Diospyros malabarica* under the present study. Based on the pre-phytochemical investigation, thin layer chromatography, and spectra data analysis, the compounds were identified as Flavanols, Luteolin, Quercetin, and β- Sitosterol. This study emphasizes the importance of further research to better define the roles of *Diospyros malabarica* consumption that may be responsible for the beneficial effects. An assessment of whether the cited effects in mice parallel those in humans would be no less difficult, but potentially beneficial for human health. To summarize the findings of this study, it was discovered that a methanolic extract of *Diospyros malabarica* converted into an ointment formulation has wound healing activity.

KEYWORDS: Diospyros Malabarica, Wound, Regeneration, Deserpidine & Tridax procumbens.

INTRODUCTION

1.1 Description About Wound

A misfortune or a breaking of cell and anatomical or practical coherence of living tissues can be described as an injury. Wound healing is a natural process that begins with an injury and ends with scarring. As a result, a correction is a long-term tool that refers to the attempt to maintain normal anatomical structure and function. The wound's mode of production can be used to make further division.

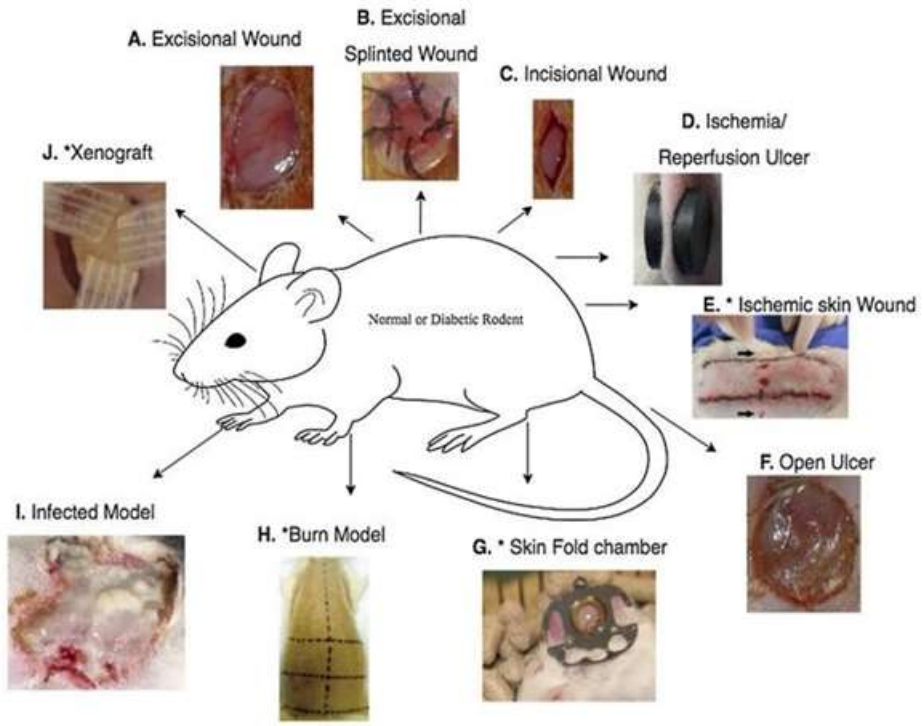


Figure 1.1: Wound Healing.

1.1.1 Closed Wounds

The force and direction of such a direct blow determine the degree of harm. When the force is increased, the number of damage increases. The influence of orientation is crucially significant, even if they are less well known. A “hammer hit to the side of the head, for example, may inflict significant scalp bruises or extensive damage to the base of the skull if applied with” similar force but aimed in a slightly different way. Biochemical and functional factors may have had an affected just on the intensity of the damage.

Bruising, or contusion, occurs when blood from ruptured tiny arteries infiltrates the tissues,

while swelling occurs when fluid passes through the walls of injured capillaries. When larger vessels are damaged, more blood leaks into the tissues, due to the formation of a hematoma. A direct, powerful hit could seriously harm capillary arteries, nerves, bones, joints, muscles, and internal organs. The direct impact of a blast on such cells, such as hammering a skull, or, more commonly, impact energy is transferred through the body to a relatively weak location, can cause damage to deeper tissues.

1.1.2 Open Wounds

When "the skin-or, in the case of injuries to the base of the skull or the sinuses, the mucous membrane-is ruptured, the tissues may be invaded by foreign material such as germs, dirt, and garment fragments, resulting in serious local or systemic consequences from infection". Furthermore, if the skin break is big, the wound tissues will be exposed to the drying and chilling effects of the air, which may exacerbate the damage induced by the wounding agents Skin is tough.

Figure 1.2: Wound in Mouse.

Supple, and abundant in blood, it can withstand injury and heal quickly. The fatty tissues beneath the skin are more sensitive and vulnerable to blood loss.

The whole handle of fibrin advancement, which causes the clot to contract, the entry of white blood cells and macrophages, which process the flotsam and jetsam within the wound, and the development of blood capillaries, taken after by the development internal of stringy tissue relocating from the cells on the wound's edge, can all be seen infinitesimally within the clot. The fibers emerging from these cells may be detected and shown to grow, eventually filling the wound space with a network of interlacing collagen threads that, affected by tension lines, eventually range themselves in rigid bands. Meanwhile, a handle of development and smoothing, as well as increase of preexisting skin cells close the wound's edge, is covering

the wound's surface. These covering cells, moreover known as epithelial cells.

In a normal state, the twist is recovered by a different cycle, which is in general a connective tissue reaction. The first phase of this cycle includes an intense provocative stage, which is followed by extracellular macromolecules an amalgamation of collagen, which is later redesigned to form a scar. This handle is characterized by unsurprising stages: “blood clotting (homeostasis), aggravation, tissue development (cell multiplication), and tissue remodeling (the development and cell separation); blood clotting may be considered” to be portion of the aggravation organize rather than a partitioned arrange.

Wound healing models in animals are important natural tools for understanding the basic cycle of tissue repair and developing and approving wound therapy strategies. There are few options for obtaining a system and a detailed treatment plan for wound healing, as well as antineoplastic and antimicrobial drugs, which can also affect the wound healing cycle. Despite the fact that animal wound healing models are a blemished reflection of wound healing procedures in humans and their clinical issues, these models continue to be important tools for the development of new techniques and approaches for the treatment of wound healing.

1.2 Steps Involved in Wound Healing or Regeneration

Platelets in the blood begin to bind to the injured location within the first few moments after injury, causing hemostasis (blood thickening). This results in the production of fibrin, which serves as a framework for platelet function and acts as a "stick" to connect them. This causes coagulation, which connects the vein's break and slows/stops further death.

Damaged and dead cells, as well as microscopic organisms and other pathogens or flotsam and jetsam, are flushed out during this phase of inflammation. White blood cells engulf and destroy trash through the process of phagocytosis.

“Collagen deposition, granulation tissue creation, epithelialization, Angiogenesis, and wound contraction all happen during the proliferation phase (the growth of new tissue); angiogenesis is the formation of new blood vessels by vascular endothelial cells”.

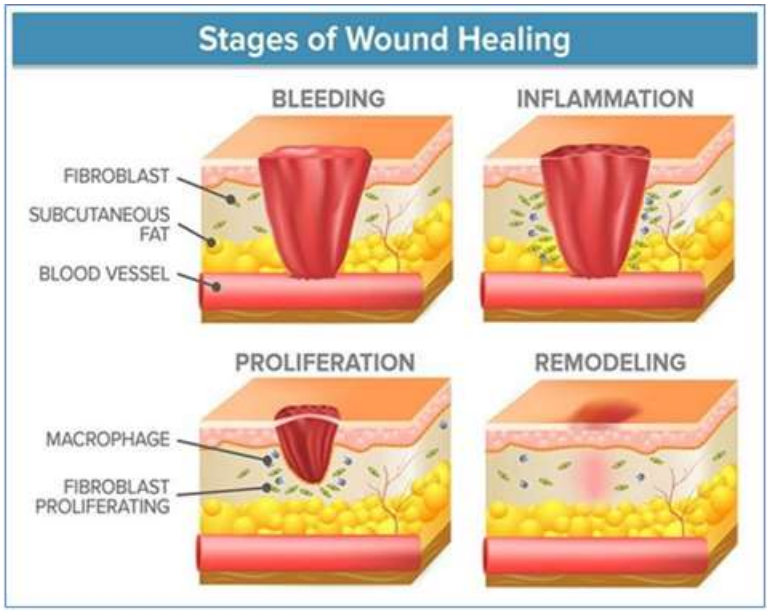


Figure 1.3: Stages of Wound Healing.

Maturation (remodeling): Collagen is fixed along pressure lines amid development and remodeling, and cells that are now not required are dispensed with through apoptosis (modified cell passing).

1.3 Betadine

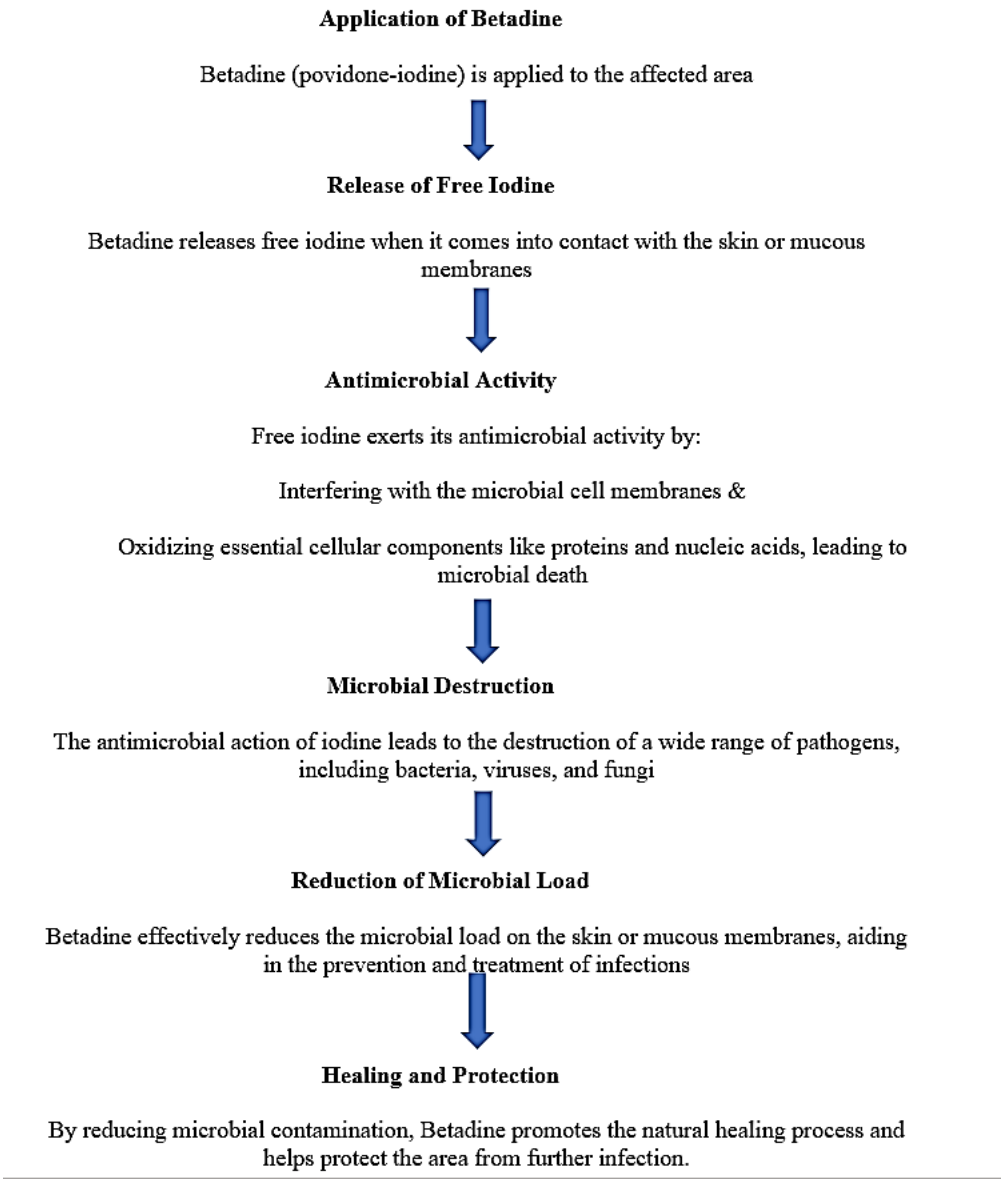
Herbal medicine refers to the ability to generate a wide range of chemical compounds that may be employed to perform critical biological tasks as well as guard against predators including insects, fungus, and herbivorous mammals. When ingested by humans, many of these phytochemicals offer long-term health benefits and can be used to treat human ailments efficiently. India is a country with a rich cultural heritage, traditional medicine, and natural beauty. For thousands of years, nature has provided medical agents, and a large number of modern medication shave been derived from natural resources. Because India is blessed with a diverse range of climates, from Himalayan to temperate to tropical, diverse flora can be found all year. Many plants exist in nature that we refer to as weeds because they are difficult to cultivate and have a low economic worth, but these weeds can have significant medical benefits. Traditional medicines, often known as folk remedies, are a rich source of potentially valuable novel chemicals for chemotherapeutic drug development.

Povidone-iodine

Iodine is primarily used in wound care as The detailing-, concentration-, and temperature-dependent balance of povidone-bound iodine to free iodine tends to diminish the security and

tolerability issues confronted by past basic iodine compositions and offers protection against wound contraction induction of apoptosis.

Mode of action



Iodine's microbicidal movement shows up to include the restraint of amazingly vital bacterial cellular components and structures, including the oxidative stress of nucleotides, fatty/amino acids, and periplasmic enzymatic activities in the mitochondrial membrane, causing them to become immobilized and decommissioned.

The antimicrobial effect occurs before independent human hepatocytes are affected. Recombinant research indicates that iodine does indeed have a broad bactericidal effect, but it also helps regulate caused by microorganisms and the development of resistance. These

generally pro impacts are likely to be multidimensional in nature and have been demonstrated for being useful for diagnosis. The range of activity Povidone-iodine is one of a few dermatologic antimicrobials which have been shown to be bacteriostatic, infectious agents, fungi, pollen, parasites, and plasmodium cysts. In traditional antibacterial agent testing, potassium iodide liquid is used to decapitate a range of bacteria strains that typically cause nosocomial infections, including as methicillin-resistant Staphylococci (MRSA) and other antibiotic-resistant strains.

1.4 Plant Description

Diospyros malabarica is commonly known as Gaub (Hindi) or Indian persimmon (English) and belongs to the family Ebenaceae which are widely distributed in both hemispheres. In Indian system of traditional medicines like Ayurveda and Unani, various Diospyros species are used medicinally to cure fever, diabetes, snake bite, diarrhoea, ulcer etc. It shows a number of pharmacological activities like diuretic, laxative, digestive, anti- inflammatory, antiviral, hypoglycemic, anthelmintic, antioxidant, wound healing activity which have been screened scientifically. The leaf juice has antiseptic, antiprotozoal, and scabicidal effects and are useful in dyspepsia, flatulence, burns, scabies, wound.

1.4.1 About Plant: *Diospyros malabarica* plant

- Botanical Name: *Diospyros malabarica*
- Plant Family: Ebenaceae

Occurrence: Decan, Assam, Bengal, North India chiefly along streams, river banks and ghats

I) Habit

A medium sized spreading evergreen tree.

II) Leaves

Simple, alternate, oblong, coriaceous, glabrous, bright red when young.

III) Inflorescence

Many flowered Cyme.

IV) Flowers

- White or green, tetramerous
- Pale yellow, solitary head, cluster

- Calyx, fulvous pubescent without and glabrous within
- Corolla is yellow,4 lobed
- Anther are hairy,8 celled ovary,4 styles

V) Fruits

Berry covered with rusty, powdery substance, pulp is glutinous and clear.

VI) Flowering and Fruiting Time

Flowering time-May-June

Fruit March- April.

VII) Significance

Everywhere, there is a common weed.

Table 1.1: Botanical and Scientific Classification of Diospyros malabarica.

Classification	Scientific name
Kingdom	Plantae
Phylum	Tracheophyte
Class	Magnoliopsida
Order	Ericales
Family	Ebenaceae
Genus	Diospyros
Species	Diospyros malabarica

Figure 1.4: *Diospyros malabarica* leaves & fruits.

Figure 1.5: ***Diospyros malabarica.***

1.4.2 Microscopy

1.4.2.1 T.S. of Leaf

Samples of leaf, stem, and petiole were prepared for histology. The thin sections were collected in a watch glass and then washed with water. Safranin-stained and glycerin-mounted for observation as follows

- Both the lower and upper layers of the leaves have anomocytic stomata.
- Trichrome are non-glandular with bulky stalk.
- That same epidermis is followed parenchyma at 5-7 cells.

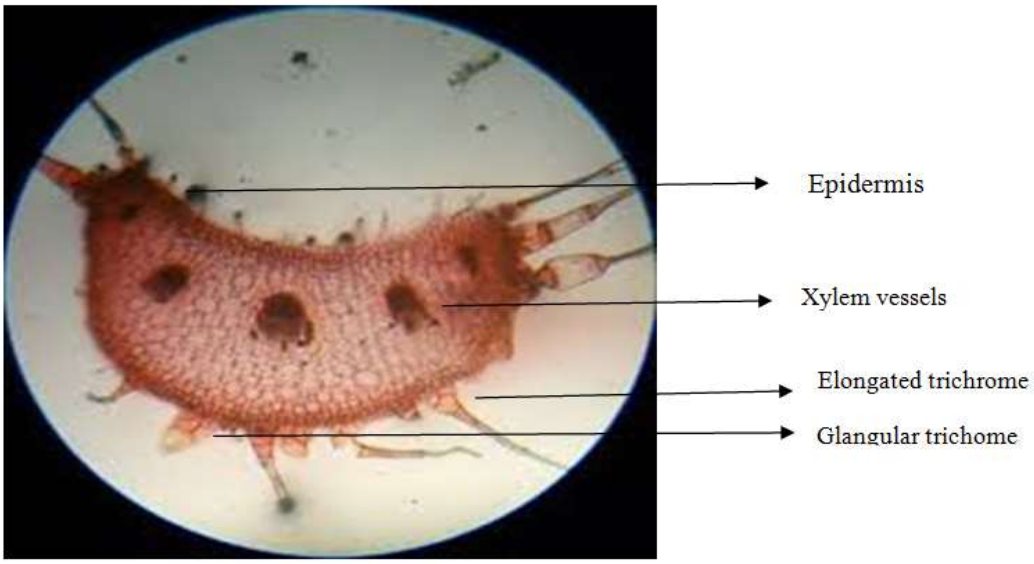


Figure 1.6: T. S. of leaf.

1.4.2.2 Powder microscopy

- Trichrome Base
- Fibers
- Stone Cells

- Vascular Bundles
- Xylem vessels are also present.

Figure 1.7: Fibers.

Figure 1.8: Xylem vessels.

Figure 1.9: Trichrome.

Figure 1.10: Cork cells.

1.4.3 Chemical Constituents

Leaf of *Diospyros malabarica* specifically includes a today's “flavonoid flavanols, isolated from the aerial additives of *Diospyros malabarica* has been characterized as 5,7,3,5- tetra hydroxyl-3- methoxy flavones, 4-O-a-L-rharmnopyranoside, on the premise of spectroscopic strategies and” with the aid of using chemical means. Additives that had formerly been isolated. Sterols, cyclic triterpenes, alkyl esters, fatty acids, and oleanolic acid, myricyl alcohol. It also contains triterpenes anthrocyanin. Its fruits contain sitosterol, gallic acid, peregrinol, beta sitosterol, betulin, methyl ester acetate.

1.5 Plants with wound healing activity

There many natural plants that possess wound healing activity. Despite the development of high-tech medicine many people still turn to plants with healing properties as home remedies.

Table 1.3: Different plants with their Wound Activity.

Plant name	Family	Plant part Used	Active constituents
Sarpgandha (*Rauwolfia serpentine)*	Apocynaceae	Root & leaves	serpentinine, deserpidine, ajmaline, ajmalicine, reserpiline, indobinine, ajmalimine, reserpine
Digitalis *(Digitalis purpurea)*	Scrophulariaceae	Leaves	it contains cardio active glycosides, digitoxin, gitoxin, digoxin, gitaloxin and digitalin
Cinchona (*Cinchona officinalis*)	Rubiaceae	Barks	alkaloids present in the extracts, including cinchonine, quinidine, quinine, and cinchonidine
Belladonna (*Atropa belladonna* L)	Solanaceae	Leaves	root contains tropane alkaloids, hyoscyamine, and hyoscine
Ephedra (*Ephedra gerardiana*)	Ephadreaceae	Dried aerial parts	Contains alkaloids Norpseudo-ephedrine (an analog of ephedrine) Ephedrine (water soluble salt of an alkaloid)
Onion (*Allium cepa*)	Alliaceae	Ripe bulb	It contains allin, essential oils, as well as zinc, fluoride, iodine, iron, copper, cobalt, nickel and other components
Aloe vera (*Aloe barbadensis*)	Liliaceae	Leaves	Contains Aloins (10-30%), Barbaloin, Î²-barboloin and Isobarbaloin, resin, emodin and Aloe-emodin.
Chirayta (*Andrographis paniculata*)	Gentianaceae	Entire herb	It contains chiritin, gentiopicrin and amarogentin, it also contains gentianine and Gentiocrucine.
Green tea (*Camellia sinensis*)	Theaceae	Leaves	Gallaogatechin, epigallocatechin, Catechin, Epicathecin, and epigallocatechin Gallate. Green tea also contains alkaloids Theobromine, theophylline and caffeine.
Asiatic pennywort (*Centella asiatica*)	Umbelliferae	Fresh or dried herb	It contains saponin glycoside, triterpenoid, brahmoside,indocentelloside, centellose, asiaticosides, quercetin, kaempferol and stigma sterol
Cinnamon (*Cinnamomum*	Lauraceae	Dried inner bark of the	It contains tannin, volatile oil, mucilage,

zeylanicum)		coppiced shoots	sugar and calcium oxalate.Cinnamic aldehyde accounts for 50 to 65% of volatile oil,
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CONCLUSION

One of the most extensively grown species of the Asteraceae family is *Tridax procumbens*, an essential medicinal plant. Human medication has been made from several components of the plant. As a result, the current study was carried out with the goals of methanolic extract of *Tridax procumbens* leaves, phytochemical analysis, and wound healing activity evaluation.

The plant's leaves were extracted with methanol and then exposed to phytochemical screening for the detection of various plant constituents; flavonoids and phenolic compounds were discovered to be the main active principles. TLC analysis of a methanolic extract of

Tridax procumbens leaves reveals eight spots of various colors, each with a different Rf value in the hexane solvent system: 0.5 percent vanillin in dilute sulphuric acid employing detecting reagents is ethyl acetate: formic acid (3:2: few drops). According to the HPTLC report, there are 14 spots with distinct Rf values, indicating that they inhabit different areas with different Rf values. It reveals that the compounds have around 14 components. To summarize, while plant-based traditional medicine has been practiced for generations, its success requires experimental support and scientific validation. Excision and incision wound models were used to assess the wound healing abilities of *Tridax procumbens*. As a result, the findings of this study clearly indicate that *Tridax procumbens* methanolic leaf extract has high wound healing activity. The presence of somewhat high levels of flavonoids, which act alone or in combination with other secondary metabolites, may explain the crude extract's impact on wound healing. As a result, the findings support the traditional use of plants for wound therapy.

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