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# Palm Art to therapeutic Properties: Henna-A Potential Medicinal Plant

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**Abstract**

*Henna (Lawsonia inermis, Litheracae) has been used cosmetically and medicinally from ancient times. Henna is a medicinal plant that has been widely used as an antioxidant, and antimicrobial. Sometimes it is applied directly to the affected area for itching, eczema, scabies, wounds, and burning of the skin. Currently, several scientific investigations are aimed at the isolation and identification of active constituents of Henna. This article indicates the most salient pharmacological actions of Henna. The main pharmacological actions of henna and compounds isolated therefrom include anti-microbial, anti-inflammatory, anti-apoptotic, anti-hyperglycemic, and anti-lipidemic. Henna is considered a safe herbal medicine with only a few insignificant adverse/ side effects. So this article aims at reviewing the most salient recent reports on these investigations. The main pharmacological actions of henna and compounds isolated therefrom include lawsone, coumarine, anti-microbial, anti-tumorigenic, anti-inflammatory, anti-apoptotic, anti-hyperglycemic, and anti-lipidemic.*

**Keywords- *Henna; Antifertility; Immunomodulator; Anti-apoptotic*;**

## INTRODUCTION

The family of plants known as Lythraceae, or the loosestrife family, includes the henna plant Lawsonia inermis L. Since all of the plant's parts—root, stem, leaf, flower pod, and seed—have significant medical value, many farmers grow henna for cosmetic and pharmaceutical uses. (Nasir Hassan Wagini et al. 2014) It is one of the more well-known plant species. In Africa



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(tropical Savannah and tropical desert zones), south Asia, and northern Australia, it is primarily found in tropic, sub-tropical, and semi-arid regions. It is a dye made from the Lawsonia inermis plant; it is often referred to as henna, henna tree, mignonette tree, etc. (Donkor Sarkodie *et al*.) Although henna is traditionally used only on the hands and feet, feel free to create your designs on arms, legs, around the belly button, and even behind the neck. (Tatto 2006). Apart from the dying property of Henna, it has many medicinal uses. It has been used as an antimicrobial, antidiarrheal, anti-inflammatory, and analgesic; it has antipyretic effects. In this review, the author summarizes the therapeutic effects of henna and its pharmacological properties. (Fahad Al Saif 2016).



Fig 1, Seeds, Flowers and Seeds of Henna Plant

**Phytochemical Review**

Henna has a wide range of chemical components that change depending on where it



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was grown and whether the leaves were fresh or dried. The henna plant's various parts, including the leaves, stem, bark, flowers, root, seeds, etc., all contain different chemical components. Lawsone, Esculetin, Fraxetin, Isoplumbagin, Scopoletin, Betulin,Betulinic acid, Hennadiol, Lupeol, Lacoumarin, Laxanthone, Flavone glycosides, and two pentacyclic triterpenes are said to be present in the plant (Chaudhary et al. 2010). A phytochemical analysis of the henna leaf, however, in another study paper reveals that it contains a variety of components, including terpenoids, sterols, xanthones, coumarin, fatty acids, amino acids, and derivatives of naphthoquinones.

**Pharmacological activities of Henna**

Several researchers have reported the different Pharmacological actions of Henna plant in various in-vitro and in-vivo studies. Henna leaves, flowers, seeds, stem bark, and roots have been found to exhibit antioxidant, antidiabetic, hepatoprotective, hypoglycemic, antimicrobial, Immunomodulator, anti-inflammatory, anticancer, and wound-healing properties. Henna is also used as a cooling agent.

**Anti-microbial studies of Henna**

Different extracts of *Lawsonia inermis* leaves (ethanol, ethyl acetate and n-hexane) were evaluated for their antibacterial potential. (1000 µg/ml) against Gram-negative and Gram-positive bacterial strains (*Proteus mirabilis, Pseudomonas aeruginosa, Staphylococcus epidermidisand Enterococcus faecalis*) using the disc diffusion assay method. All extracts possessed antibacterial activity against all the tested bacteria. Ethanol the extract showed the highest antibacterial effects followed by ethyl acetate and n-hexane extracts. **(**Yusuf M. *et al*. 2004).

Anti-bacterial activity of *Lawsonia inermis* extracts was studied against Salmonella typhi (MTCC-733).Methanol extract showed the highest inhibition zone (13.74±1.52 mm) at 20mg/disc, followed by ethyl acetate fraction. (12.5±1.32mm) and hexane fraction (11.66±1.5mm) at the same concentration. Quinone content of the extracts was responsible for the antityphoid activity of *Lawsonia inermis* extracts. (Sharma *et al* 2016). The Lawsonia bark extracts possessed fungi static against Micros Porum gypseumand Trichophyton mentagrophytes at concentration of 1:30 (W/V), however, it became fungicidal at 1:10 (W/V) concentration. Furthermore, the extract showed broad fungi toxic spectrum when tested against 13 ringworm fungi. Fungi toxicity of the extract remained unaltered at high temperatures, on autoclaving and after storage, (Mudi SY, Ibrahim *et al*. 2011).



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The aqueous extract, the fractions, and the fractionation residues all showed antibacterial activities against the test isolates (Kawo and Kwa *et al*. 2011).

**Antiviral studies of henna**

Henna has an anti-viral effect that became clear by its action on warts, whitlow, and herpes simplex. Henna was tried traditionally many times, especially on warts and itchy skin. Henna was found very useful, especially on multiple wars. On warts, Henna is applied as a paste. The second proven and successful effect of henna on viral infections was after its application to herpes it was noticed that; it dried the vesicles at the site early, prevent ulceration and crust formation and it prevents secondary infection. This anti-viral effect of Henna is very promising and should be explored further; it could be used as a treatment for AIDS. It is natural, cheap, and it looks to have no side effects even when taken by oral route (Hussain 2010).

**Abortifacient activity of henna**

Methanol extract of roots of L.*inermis* was most effective in inducing abortion in mice, rats, and guinea pig. The effect was dosage dependent. The results of the whole animal experiments support the methanol extract's effectiveness as an abortant due to its maternal and foetal toxic effects. (Chaudhary *et al.*2010).

However, the results (Bello *et.al* 2010) support and confirm the use of *Lawsonia inermis* to induce first-trimester abortions, prevent and treat postpartum hemorrhage in traditional medicine and suggest that uterotonic activity involving the beta-adrenergic pathway may be the mechanism.

**Antifungal studies of henna**

Leaves extract of L.inermis have developed a fungicidal effect against *Trichophyton mentagrophytes* and *Candida albicans*. (Mansour *et al*.2012). Sharma *et al.* (2011) reported that the sensitivity of dermatophytes toward henna was strong in *Trichophyton mentagrophytes, T. rubrum, T. tonsurans, T. violaceum, T. verrocosum, T. schoenleinii, Epidermophyton floccosum, Microsporum ferrugineum, M. canis, and sporotrichum schenckii.*

All these extracts showed significant antidermatophytic properties in-vitro. The effect of aqueous and methanolic extract of henna using 25 µl of the extracts against *C. albicans* and *Microsporum* was examined and confirmed (Abdelraouf *et al.* 2011)

**Anti-inflammatory studies of henna**

Isoplumbagin and lawsaritol, isolated from stem bark and root of L. *sinermi* L. showed



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anti-inflammatory activity against Carrageenan-induced paw oedema in rats. The compounds phenylbutazone, isoplumbagin, and lawsaritol at the oral dose of 100 mg/kg exhibited 61, 60, and 40 percent inhibition in comparison with controls. Isoplumbagin showed significant anti-inflammatory activity similar to that of phenylbutazone (Gupta *et al.*2007).

**Antiparasitic activity of henna**

During an ethnopharmacological survey of antiparasitic medicinal plants used in the Ivory Coast, 17 plants were identified and collected. Polar, non-polar, and alkaloidal extracts of various parts of these species were evaluated in vitro in an antiparasitic drug screening. Antimalarial, leishmanicidal, trypanocidal, anti-helminthiasis, and anti-scabies activities were determined. Among the selected plants, *L. inermis* showed interesting trypanocidal activities (Okpekon T *et al.* 2004).

**Antioxidant activity of henna**

2-hydroxy-1,4-naphthoquinone (HNQ; Lawsone, CAS 83- 72-7) is the main dye ingredient found in the natural plant of Henna (*Lawsonia inermis*). The percentages of superoxide anion (O2.) and hydrogen peroxide (H2O2,) formation during the oxidation of 100 µM phenanthridine by guinea pig aldehyde oxidase have been measured and found to be 6-10% and 85- 90%, respectively (Omar 2005).

**Hepatoprotective activity 0h henna**

Alcoholic extract of the bark of L.inermis showed hepatoprotective effect against the carbon tetrachloride-induced elevation in serum marker enzymes (GOT and GPT), serum bilirubin, liver lipid peroxidation and reduction in total serum protein, liver glutathione, glutathione peroxidase, glutathione-s-transferase, glycogen, superoxide dismutase, and catalase activity. The results suggest hepatoprotective and antioxidant activity of the extract of L. *alba* bark. Pretreatment of rats with the extract also inhibited the peroxidation of microsomal lipids in a dose-dependent manner. (Ahmad S,*et a*l.2000 & Bhandarkar M, *et al*. 2003).

**Antifertility activity of henna**

Ethanol extract prepared from the powdered seeds of L. inermis L. failed to show any antifertility activity. However, in subsequent studies, it was observed that the powdered leaves when administered as suspension or incorporated into the diet inhibited the fertility of rats. The fertility induced appeared to be permanent. (Munshi SR *et al.* 1977).



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**Nootropic activity of henna**

The effect of acetone soluble fraction of petroleum ether extract of L. *inermis* leaves was investigated on memory, anxiety, and behavior mediated via monoamine neurotransmitters using elevated plus maze and passive shock avoidance paradigms. The extract exhibited prominent nootropic activity, potentiated clonidine-induced hypothermia, and decreased lithium-induced head twitches. However, the haloperidol-induced catalepsy was not modified (Iyer *et al*. 1998)

**Immunomodulatory activity of henna**

Methanol extract of henna leaves at 1 mg/ml concentration displayed immunostimulant action as indicated by the promotion of T-lymphocyte proliferative responses. Seven compounds were isolated adopting the lymphocyte transformation assay (LTA)-guided fractionation of the total methanolic extract of henna leaves (Mikhaeil *et al.* 2004).

**Safety Evaluation**

The majority of toxicological investigations claim that hepatotoxicity is connected to harmful effects brought on by the use of herbal medication. Medical publications have also reported on mutagenicity and carcinogenicity, as well as other toxic effects on the kidney, neurological system, blood, and cardiovascular system. As a result, before the efficacy investigation, various cutting-edge biological experimental procedures were utilised as standard safety tests. According to the literature, L.*inermis* L. has been shown to have considerable hepatoprotective, antioxidant, anti-inflammatory, antibacterial, analgesic, and adaptogenic actions, proving that it is a product that may be used as a medicine regularly without causing any harm.

**CONCLUSION**

For dandruff, eczema, scabies, infections, and wounds, henna is frequently administered directly to the affected region as an antibacterial. The henna plant is well known for its usage as a cosmetic and for therapeutic purposes. This adaptable medicinal plant is a rare source of different kinds of chemical compounds, which are in charge of the plant's numerous actions. Therefore, in-depth research is required to maximise their therapeutic utility in the treatment of illnesses. Antibacterial, antiviral, antimycotic, and antiparasitic properties are only a few of the diverse antimicrobial pathogens that henna can inhibit. L. inermis L. needs to undergo additional testing in order to investigate the untapped potential and practical clinical uses that



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could benefit humanity.

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