Some of Phytochemical, Pharmacological and Toxicological Properties of Henna (*Lawsonia inermis* L.): A Review of Recent Researches

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**Abstract:** Henna (*Lawsonia inermis*, Litheracae) is a medicinal plant that has been widely used as herbal medicines all over the world, since antiquity, Henna is widely used as antimicrobial and is sometimes applied directly to the affected area for dandruff, eczema, scabies, wounds, infectious diseases and helminthiasis. Currently, there is a renewed interest in henna, and several scientific investigations aimed at isolation and identification of active constituents of henna, scientific verification of its pharmacological actions and of its constituents, and verification of the basis of the use of henna in some of several diseases and conditions. 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. Henna is a strong anti-oxidant substance and was confirmed to mitigate or prevent generation of free radicals. It is considered a safe herbal medicine with only few and insignificant adverse/ side effects. Finally, more studies are required in animals and humans on the pharmacology and toxicology of henna and its

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constituents and on the effects of their utilization over a long period of time.

**Keywords:** Henna; Lawson; Anti-oxidant; Anti-tumorigenic; Anti-inflammatory.

1. **INTRODUCTION:**

Henna *Lawsonia inermis* L., belongs to lythraceae, also known as the loosestrife family. Henna is cultivated by many farmers for cosmetic and pharmaceutical purposes, it belongs to the group of plants that are popular in nature and all parts of the plant (root, stem, leaf, flower pod and seed) are of great medicinal important (Abdelraouf *et al.* 2011). The most important part of the plant is the leaf which contained a coloring compound called Lawson. The Lawson is a red orange dye molecule, also known as hennotannic acid (Gibbons *et al.* 2004, Awek and Tapapul 2005, Emin and Mehmet 2012).

Although henna is traditionally drawn only on the hands and feet, feel free to create your designs on arms, legs, around the belly button, and even behind the neck (Tattoo 2006). Several reviews have appeared in the literature about this plant, and this may reflect the popularity of the subject and its common use in cosmetic and as a medicinal plant (e.g. European 2013). Many reviews have been devoted to specific aspects of henna’s actions. For example, the review of Kamal & Jawaid 2010 was on phytochemicals in henna, Chaudhary *et al.* 2010 and Amit *et al.* 2011 on phytopharmacological, while Muhammad and Muhammad (2005) Chah *et al.* 2006 and Nayak *et al.* 2007 work on the use of henna in the wound healing, Babu and Subhasree 2009, and Habbal et al., 2011) was on the use of henna as antibacterial agent, however, Gupta *et al.* 1993 and Ali *et al.* 1995 work was on the use of henna as an anti-inflammatory agent, while that of Babil et al. (2013) and Endrini *et al.* 2007) dealt with the cancer prevention properties of the crude drug. In a nut shell, the aim was to summarize the

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more recent and common actions and therapeutic application of henna and its active constituents.

2. Phytochemicals:

The chemical constituents of henna are numerous and vary depending on the place of origin and whether the leaves are fresh or dry. It is not our intention in this review to cover all the many compounds reported for henna, but to summarize the major components that have been implicated in the pharmacological activities of the crude drug. Furthermore, the dyeing property of henna depends mainly on its principal colouring matter known as lawsone, 2-hydroxy-1:4 naphthaquinone (C_{10}H_{6}O_{3}, m.p.190° decomp.), the yield of which varies from 1% to 20%. However, much work is done in the field of phytochemical investigation of the plant. The chemical constituents isolated from *L. inermis* are naphthoquinone derivatives, phenolic compounds, terpenoids, sterols, aliphatic derivsivatives, xanthones, coumarin, fatty acids, amino acids and other constituents. However, in another research article, phytochemical investigation of henna leaf shows total ash (14.60 %), acid insoluble ash (4.50 %), and water soluble ash (3.0 %). Loss on drying was found to be (4.5 % w/w). Alcohol soluble extractive value and aqueous extractive value were 3.8 % w/w and 5.0 % w/w, respectively. The % practical yields of alcohol and aqueous extract were found to be 12.34 % and 15.50 % (Hema et al. 2010). Meanwhile, alcoholic extract and aqueous extract carbohydrate, glycosides, tannins, phenolic compounds, gums and mucilage were present in good quantity and saponins, alkaloids, phytosterols, fixed oils, fats, proteins, amino acids, volatile oils were absent (Jain et al. 2010).

However, six compounds were identified in *Lawsonia inermis* leaves by GC-MS analysis and the prevailing compounds were a-D-Glucopyranoside, methyl (51.73%) and 1, 4-Naphthalenedione, 2-hydroxy- [Synonyms: Henna] (19.19%) (Hema et al. 2010).

The principal colouring matter of henna is lawsone, 2-hydroxy-1:4 naphthaquinone (C_{10}H_{6}O_{3}, m.p.190°decomp.)

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besides lawsonone other constituents present are gallic acid, glucose, mannitol, fats, resin (2 %), mucilage and traces of an alkaloid. Leaves yield hennatannic acid and an olive oil green resin, soluble in ether and alcohol (Pratibha and Korwar 1999). Flowers yield an essential oil (0.01-0.02 %) with brown or dark brown colour, strong fragrance and consist mainly of α- and β-ionones; a nitrogenous compound and resin (Anita and Kaushal 1950). Seeds contain proteins (5.0 %), carbohydrates (33.62 %), fibers (33.5 %), fatty oils (10- 11 %) composed of behenic acid, arachidic acid, stearic acid, palmitic acid, oleic acid and linoleic acid (Aggarwal et al. 1959). The unsaponified matter of henna contains waxes and colouring matter and the root contains a red colouring matter too (Gupta et al. 1992). Leaf, flower and fruit extracts of L. inermis showed positive results for cardiac glycosides test and negative results tophlobatannins and steroids (Jeyaseelan et al., 2012). Phytochemical screening of the henna leaf extracts showed the presence of glycosides, phytosterol, steroids, saponins, tannins and flavonoids (Raja et al., 2013).

3. Pharmacological properties of L. inermis:

Several researchers have reported the different antibacterial actions of L. inermis in various in-vitro and in-vivo test models. Henna leaves, flower, seeds, stem bark, roots have been found to exhibit antioxidant, antidiabetic, hepatoprotective, hypoglycemic, antimicrobial, anticancer and wound healing properties.

3.1. Antibacterial studies of henna:

Ethanol extracts of 20 plants species used by Yemeni traditional healers to treat infectious diseases were screened for their antibacterial activity against both gram positive and gram negative bacteria. The ethyl acetate extract of L. inermis was found to be the most active against all the bacteria in the test system (Ali et al. 2001, Nadjib et al. 2013 and Abulyazid et al. 2013). Out of forty-five species of 29 plant families used in the traditional medicine by Iranian people showed antibacterial activities against eleven bacterial species, henna showed strong activity against Bordetella bronchiseptica. These findings
indicated that *L. inermis* can be used in the treatment of bacterial infections (Bonjar 2004). Crude extracts of fresh dry leaves and seeds of henna were investigated for their antimicrobial activity against three standard strains. Henna dry leaves demonstrated the best *in-vitro* antimicrobial activity and in particular against *Shigella sonnei* (Habbal et al. 2005). Genotoxic studies on main constituent of henna suggested that it was a weak bacterial mutagen for *Salmonella typhimurium* strain TA98 and was more mutagenic for strain TA2637. It suggested that hydroxyl napthaquinone have no genotoxic risk to the consumer (Kirkland and Marzin 2003). Primary invaders of burn wounds viz *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Candida albicans*, *Fusarium oxysporum* and *Aspergillus niger* were treated with aqueous and chloroform extract obtained from leaves of *L. inermis*, using *in-vitro* agar incorporation and well diffusion methods. Extract inhibit growth pattern of all microbes except *C. albicans*. Overall, study by Muhammad and Muhammad (2005) suggested that henna may be effective in the management of wound infections. The antibacterial activity of methanolic extract of *L. inermis* was investigated by agar well diffusion method using *S. aureus* (MTCC 087), *E. coli* (MTCC 729), *K. pneumonia* (MTCC 432), *P. aeruginosa* (MTCC 1688) and *P. mirabilis* (MTCC 425) by Arun et al. (2010). Antibacterial activity of aqueous, ethanol, methanol, ethyl acetate and chloroform extracts of *Lawsonia inermis* Linn leaves were tested against reference bacterial strains (*Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Salmonella typhi*, *Vibrio cholerae*, *Staphylococcus aureus*, *Methicillin Resistant Staphylococcus aureus*) and clinical isolates (*Staphylococcus aureus* and AmpC β-lactamases producing *Proteus mirabilis*). The solvent extracts of *L. inermis* leaves exhibited profound antibacterial activity against the bacterial pathogens tested (Ramesh et al., 2013). Henna samples from different regions of Oman demonstrated antibacterial activity against a wide range of different bacterial strains with the highest antibacterial activity being demonstrated against *P. aeruginosa* organisms.
Henna leaves extracts showed considerable antimicrobial activity almost on all of the tested microorganisms (S. aureus, Bacillus spp., K. pneumonia, Proteus spp., E. coli, P. aeruginosa, and Enterococcus spp. with the exception of aqueous extract which showed the least effect on most bacterial samples tested (Abdelraouf et al., 2011). In-vitro antibacterial activities of the aqueous extract, fractions of ethanol extract and fractionation residue of the leaves were investigated against Staphylococcus aureus, Proteus vulgaris, Streptococcus pneumoniae, Pseudomonas aeruginosa, Escherichia coli, Klebsiella pneumoniae, Streptococcus pyogenes, Salmonella typhi and Shigella dysenteriae using agar-disc diffusion method. The aqueous extract, the fractions and the fractionation residues all showed antibacterial activities against the test isolates (Kawo and Kwa 2011).

3.2. Antifungal studies of henna:

Mansour et al. (2012) and Abulyazid et al. (2013) reported in their research that L. inermis leaves extract have developed a fungicidal effect against Trichophyton mentagrophytes and Candida albicans. Among the fifty two plants screened, aqueous extract of Lawsonia inermis and 10 other plant species have recorded significant antifungal activity against one or the other Aspergillus species tested (Raveesha et al. 2007).

Sharma et al. (2011) reported that the sensitivity of dermatophytes toward henna was strong in Trichophyton mentagrophytes, T. rubrum, T. tonsurans, T. violaceum, T. verrucosum, T. schoenleinii, Epidermophyton floccosum, Microsporum ferrugineum, M. canis and sporotrichum schenckii. Meanwhile, ethanol, methanol and aqueous extract of leaves of L. inermis are involved in defensive mechanism against spore germination of Drechslera oryzae (Natarajan and Lalitha 1987). During screening of barks of 30 plant species for activity against Microsporum gypseum and Trichophyton mentagrophytes, only L. inermis extract exhibited absolute toxicity. The extract showed broad fungitoxic spectrum when tested against 13 other dermatophytes. Further the fungitoxicity of the extract remained unaltered at high temperature on

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autoclaving and after long storage (Singh and Pandey 1989). Aqueous extract of leaves of *L. inermis* was tested for the antifungal potential against eight important species of *Aspergillus* which isolated from sorghum, maize and paddy seed samples. *A. flavus* recorded high susceptibility and hence solvent extracts viz., petroleum ether, benzene, chloroform, methanol and ethanol extract of the plant showed significant antifungal activity (Raveesha *et al.* 2007). These finding suggested that henna extract could be used as alternative source of antifungal agents for protection of plants or crops against fungal infection.

In another research by Natarajan and Lalitha (1987), the activity of ethanol, ethyl acetate and hexane extracts of *L. inermis* were tested on 5 strains each of *Tinea rubrum* and *Tinea mentagrophytes*. 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).

### 3.3. Antiviral studies of henna:

Henna definitely has an anti-viral effect that became clear by its action on warts, whitlow and herpes simplex. Henna was tried traditionally in many times especially on the warts which are resistant to cryo (Nitrogen liquid) treatment and prove effective on giant wart measuring 1.5x1.5cm on a child thumb which was resistant to all forms of treatment, at last the child referred to the plastic surgeon for operation, “we tried Henna on it, applied every other day over night and in few weeks it disappeared completely”. Henna was found very useful especially on multiple wars. On warts Henna applied as 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 treatment for AIDS. It is natural,
cheap, and it looks to have no side effect even when taken by oral route (Hussain 2010).

The ethanol soluble fraction of *L. inermis* fruits displayed highly potent activity against Sembiki forest virus (SFV) in swiss mice and chick embryo models exhibiting 100 to 65 % activities after 10 to 25 days of virus challenge (Khan *et al.* 1991).

### 3.4. 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 apparently was dosage dependent. The results of the whole animal experiments support the methanol extract effectiveness as an abortant due to its maternal and foetal toxic effects (Chaudhary *et al.* 2010). However, the results of Bello *et al.*, (2010) support and confirm the use of *Lawsonia inermis* to induce first trimester abortions, prevent and treat postpartum haemorrhage in traditional medicine and suggest that uterotonic activity involving the beta-adrenergic pathway may be the mechanism.

### 3.5. Antioxidant activity of henna:

2-hydroxy-1,4-naphthoquinone (HNQ; Lawcone, CAS 83-72-7) is the main dye ingredient found in the natural plant of Henna (*Lawsonia inermis*). The percentages of superoxide anion (O$_2$. ) and hydrogen peroxide (H$_2$O$_2$. ) 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). The modulator effect of 80 % ethanol extract of leaves of *L. inermis* was studied on drug metabolizing phase-I and phase-II enzymes, antioxidant enzymes, glutathione content, lactate dehydrogenase and lipid peroxidation in the liver of swiss albino mice. The hepatic glutathione S-transferase and DT-diaphorase specific activities were elevated above basal level by *L. inermis* extract treatment (Dasgupta *et al.* 2003). Another study was carried out to assess the effect of aqueous and methanolic extracts of *L. inermis* extract on chromium (VI)–induced cellular and DNA toxicity.
The extracts showed significant potential in scavenging free radicals of 1,1-Diphenyl-2-picrylhydrazyl (DPPH), 3-ethylbenzothiazoline-6-sulfonic acid (ABTS), Fe$^{3+}$ and also in inhibition of lipid peroxidation. Extracts also showed significantly properties of DNA and cyto-protection (Guha et al. 2011). Different constituents isolated from the leaves of L. inermis were tested for their antioxidant activity using ABTS. The IC$_{50}$ value of henna constituents are p-coumaric acid (2.6 mM), cosmosiin (2.9 mM) apiin (1.6 mM) respectively. These fundings depicted that all isolated compounds exhibited antioxidant activity comparable to that of ascorbic acid (2.5 mM) (Mikhaeil et al. 2004).

3.6. Hepato-protective activity of henna:

The aqueous extract of Lawsonia inermis was administered orally to the rats with hepatotoxicity induced by paracetamol. Silymarin was given as reference standard. The plant aqueous extract was effective in protecting the liver against the injury induced by Paracetamol in rats. This was evident from significant reduction in serum enzymes alkaline aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), Acid Phosphatase (ACP), Protein and Bilirubin (Selvanayaki and Ananthi 2012). Alcoholic extract of the bark of L. inermis showed hepatoprotective effect against the CCl$_4$. Extract cause 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 (Anand et al. 1992 and Bhandarkar 2003). The hepatoprotective activity of the ethanolic extract of the dried leaves of L. inermis and its fractions (petroleum ether, ethyl acetate, butanol and butanone fractions) was evaluated against CCl$_4$ induced hepatotoxicity in mice. The ethanolic extract and its fractions significantly reduced the total bilirubin content and aspartate aminotransferase or serum glutamic oxaloacetic transaminase.
Serum Glutamic Oxaloacetic Transaminase (SGOT), Serum Glutamic Oxaloacetic Transaminase (SGPT) and Serum Alkaline (SAL) activities, and reduced liver weight compared to Liver Care (LIV-52) used as control (Hemalatha et al. 1997). The ABTS [2,2-azino-bis (3-ethyl benzthiazoline-6-sulfonic acid)], free radical scavenging assay depicted that all isolated compounds from henna exhibited antioxidant activity in an in vitro study comparable to that of ascorbic acid (Botros et al., 2004).

3.7. Antidiabetic activity of henna:

Ethanol (70 %) extract of L. inermis showed significant hypoglycemic and hypolipidemetic activities in alloxan induced diabetic mice after oral administration. The feeding of 0.8 g/kg of L. inermis extract decreased the concentration of glucose, cholesterol and triglycerides to normal (Syamsudin and Winarno 2008).

3.8. Protein glycation inhibitory activity of henna:

Ethanol extract of the plant tissues was evaluated in-vitro for protein glycation inhibitory activity using the model system of bovine serum albumin and glucose (Monique et al. 2005). The extract and its components showed significant effect on protein damage induced by a free radical generator during in-vitro assay system. It was found by Sultana et al. (2009) that the alcoholic extract, lawsone and gallic acid showed significant inhibition of Advanced Glycated End Products (AGEs) formation and exhibit 77.95 %, 79.10 % and 66.98 % inhibition at a concentration of 1500 μg/mL, 1000 μg/mL and 1000 μM respectively. L. inermis constituents were confirmed to be glycation inhibitors.

3.9. Wound healing activity of henna:

Ethanol extract of the plant (200 mg/kg) was used to evaluate the wound healing activity on rats using excision, incision and dead space wound models. Topical application was made in the case of excision wound model. Whereas, oral treatment was done with incision and dead space wound model.
Extract of *L. inermis* showed high rate of wound contraction, a decrease in the period of epithelialization, high skin breaking strength, a significant increase in the granulation tissue weight and hydroxyproline content (Hamdi *et al.* 1997). Histological studies of the tissue showed increased well organized bands of collagen, more fibroblasts and few inflammatory cells when compared with the controls which showed inflammatory cells, scanty collagen fibres and fibroblasts. These findings suggested the use of *L. inermis* in the management of wound healing (Nayak *et al.* 2007). Chloroform and aqueous extracts of leaves of the plant were capable of inhibiting the growth of microorganisms that are involved in causing burn wound infections (Muhammad and Muhammad 2005).

### 3.10. Anti-inflammatory activity of henna:

Isoplumbagin and lawsaritol, isolated from stem bark and root of *L. inermis* screened for anti-inflammatory activity against carrageenan induced paw edema in rats. The results showed that isoplumbagin exhibited significant activity, was compared to that of phenylbutazone (Gupta *et al.* 1993). Butanol and chloroform fractions showed potent anti-inflammatory, analgesic and antipyretic effects that aqueous fraction of crude ethanol extract of *L. inermis* in a dose dependent manner (Ali *et al.* 1995).

### 3.11. Tuberculostatic activity of henna:

The tuberculostatic activity of henna was tested *in-vitro* and *in-vivo* using Lowenstein Jensen medium, the growth of *Tubercle bacilli* from sputum of *Mycobacterium tuberculosis* was inhibited by 6μg/ml of the herb. *In-vivo* studies on guinea pigs and mice showed that the plant at a dose of 5 mg/kg body weight led to a significant resolution of experimental tuberculosis following infection with *M. tuberculosis* (Sharma 1990).

### 3.12. Anticancer activity:

The anticarcinogenic activity of chloroform extract *L. inermis* leaves was carried using microculture tetrazolium salt assay on
the human breast (MCF-7), colon (Caco-2), liver (HepG2) carcinoma cell lines and normal human liver cell lines (Chang Liver). The preliminary results showed that the henna extract displayed the cytotoxic effects against HepG2 and MCF-7 and IC-value of 0.3 and 24.85µg/ml respectively (Endrini et al. 2007). Isoplumbagin at a concentration of 10.5–10.8 M, the compound typically produced LC50 – level responses against a majority of the melanoma and colon cancer cell lines as well as against several of the non-small cell lungs, colon, Central Nervous System (CNS), and renal cell lines. Isoplumbagin showed an interesting profile of cytotoxic activity (Ali and Grever 1998).

The antitumour activity of *L. inermis* leaf extract was studied on 7,12-dimethylbenzantracene (DMBA) induced 2-stage skin carcinogenesis and B16F10 melanoma tumour model using swiss albino mice. Topical application of *L. inermis* leaf extract at a dose level of 1000 mg/kg body weight was found to be effective in reducing the number of the papillomas (Wasim et al. 2009).

3.13. Molluscidal activity:

The molluscicidal activity of leaf, bark and seed of henna against *Lymnaea acuminata* and *Indoplanorbis exustus* were studied. Seed powder was more toxic than leaf and bark against *L. exustus* (Ahmed et al. 2000). Binary combinations of henna seed with *Cedrus deodara* Roxh and *Azadirachta indica* A Juss oil, or powdered *Allium sativum*, or *Zingiber officinale* rhizome oleoresin was more toxic to snails *L. acuminata* and *I. exustus* than their single treatment. The highest increase in the toxicity was observed when henna seeds powder and *C. deodara* oil (1:1) were tested against both the snails. The combination with neem oil was also more toxic than their individual components and other combinations (Singh and Singh 2001).

3.14. Antitrypanasomal activity of henna:

Crude methanolic extract of leaf of *L. inermis* showed in-vitro activity against *Trypanosoma brucei* at concentration of
8.3 mg/ml of blood in mice but not in-vivo. The treatment tends to ameliorate the disease condition, but did not affect the level of parasitaemia and packed cell volume (Wurochekke et al. 2004).

3.15. Antifertility activity of henna:

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

3.16. Immunomodulatory activity of henna:

Methanol extract of henna leaves at 1 mg/ml concentration had displayed immunostimulant action as indicated by 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). Naphthoquinone fraction obtained from leaves L. inermis showed significant immunomodulatory effect (Dikshit et al. 2000).

3.17. Nootropic activity of henna:

The effect of acetone soluble fraction of petroleum ether extract of L. inermis leaves was investigated on memory, anxiety and behaviour 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).

4. Toxicology/Safety evaluation:

Henna is widely used as antimicrobial and is sometimes applied directly to the affected area for dandruff, eczema, scabies, infections, and wounds (Mansour et al. 2013). While in Sustainable Development of Natural Resources in the Nile Basin Countries, 14 – 15 April 2014
manufacturing, henna is used in cosmetics, hair dyes, and hair care products; and as a dye for body, nails, hands, and clothing. However, Catherine (2008) reported that the use of henna is widespread and has been used for centuries as generally considered harmless since prehistoric time to date. Opinion of The European Commission (EC) (2013) during the meeting of the Scientific Committee on Cosmetic Products and Non-Food Products (SCCNFP) intended for consumers concerning *Lawsonia Inermis* (henna) concluded that *Lawsonia inermis* is not irritant for the rabbit skin and eye and was considered not irritating on human skin after Repeated Insult-Patch Tests (RIPT). However, Nadjib et al. (2013) reported that most of the toxicological studies published in medical journals concerning the toxic effects, due to the use of herbal medicine, are associated with hepatotoxicity, mutagenecity and carcinogenicity. As such, numerous advance biological experimental techniques are needed to be used as standard safety test prior to the efficacy study. From the literature it has been noted that *L. inermis* L. exhibited significant hepatoprotective, antioxidant, antiinflammatory, antimicrobial, analgesic and adaptogenic effects, indicating that it is a safe substance to be used as a drug ordinarily (Chaudhary et al. 2010, Mansour et al. 2013 and Shahitha et al. 2013). Reports show that methanolic root extracts of *Lawsonia* is used in Nigeria for cosmetic purposes and antimalarial (Idowu et al. 2010). Users’ accounts few negative effects of natural henna paste, such as occasional allergic reactions in people with glucose 6 phosphate (G6PD) deficiency. Pre-mixed henna body art pastes may have ingredients added to darken stain, or to alter stain color. The health risks involved in pre-mixed paste not the natural henna, therefore consumers are advice to avoid henna with synthetic additives (Raupp et al. 2001 and Dron et al. 2007). Otherwise; some pastes have been noted to contained synthetic: silver nitrate, carmine, pyrogallol, disperse orange dye, and chromium. These have been found to cause allergic reactions, chronic inflammatory reactions, or late-onset allergic reactions to hairdressing products and textile dyes (Kang and
Lee 2006). In this case one has to be careful while buying henna from market.

5. Conclusion:

Medical plants such as henna are commonly used by local inhabitants for their antimicrobial activity. Use of a simple to complex methods for extraction and analysis of \textit{L. inermis} has proven to be successful in the estimation and confirmation of phytochemicals and antimicrobial activity against large number of bacteria and fungi which are responsible for various infections. The data confirmed the effective role of \textit{L. inermis} to cause high disturbances of protein, amylase and glycoprotein fractions of the microorganisms tested and a high effect of \textit{L. inermis} on microbial growth at both higher and lower concentrations. Henna has a wide spectrum of antimicrobial pathogens activity including antibacterial, antiviral, antimycotic and antiparasitic activities. With the ever increasing resistant strains of microorganisms to the already available and synthesized antibiotics, the naturally available \textit{Lawsonia inermis} (henna) could be a potential alternative.

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