ABSTRACT

Lawsonia inermis L. Belongs to the Lythraceae family, generally known as Henna. It is tree species native to north Africa, L. inermis plant used all over world. It is a branched glabrous shrub or small tree, cultivated for its leaves although stem bark, roots, flowers and seeds have also been used in traditional medicine, the tree grown up to 25 feet. Henna has been used cosmetically and medicinally for over 9,000 years. Its use became popular in India because of its cooling effect in the hot Indian summer s. In the present study of anticonvulsant, anthelmintic and antibacterial activity of chloroform, ethanol and water extract of Lawsonia inermis has been carried out. Anticonvulsant activity was performed using electric shock method, anthelmintic assay using adult earth worms Eicinia fetida and antibacterial activity was determined by cup plate agar diffusion methods, antioxidant and anti diabetic activities were using albino mice. The phytochemical study of extracts shows the presence of flavonoids, tannins and coumarin. The activity may be due to these compounds; this study shows the anticonvulsant activity, anthelmintic activity and antibacterial activity anti diabetic and antioxidant activities, trypsin inhibitory activity, hepato protective activity, abortifacient activity of henna leaves. The present article summarizes review on the plant, its phytochemistry and its pharmacological activity which have been reported.

KEYWORDS: antibacterial activity, anthelmintic, anti diabetic and anticonvulsant activity.
INTRODUCTION
Lawsonia is monotypic genus, represented by *Lawsonia inermis*, native of North Africa and south-West Asia and belongs to the Lythraceae family widely cultivated as an ornamental and dye plant thorough India. Henna is a tall shrub or small tree standing 1.8 to 7.6m tall (6-25ft). it is multi branched.(fig.1) with spine - tipped branches. The leaves grow opposite each other on the stem (fig.2). flowers (fig.3) have four sepals and a 2mm calyx tube, with 3mm spread lobes its petals are obviate, with white or red stamens found in pairs on the rim of calyx tube. The ovary is four-celled, 5mm long and erect henna fruits (fig.4) are small brownish capsules 4-8 mm diameter, with 32-49 seeds per fruit and open irregularly into four splits. Whole plant of henna is used traditional medicine properties; every part of the tree is reported to be very useful. The tree is using for the reason that all parts like leaves, bark and fruits, seeds are used as medicines, it also has numerous health benefits which can be related to the presence of bioactive compounds such as triterpenes, sterols and aliphatic components that are isolated from its various parts.

(Fig.1-multi branches) (Fig.2-Leaves) (Fig.3-Flowers) (Fig.4-Fruits)
Common names
English: Henna, Samphire, Cypress shrub
Sanskrit: Mendi, Mendika, Timir
Telugu: Goranta, kormni

TAXONOMIC CLASSIFICATION
Botanical name: Lawsonia inermis
Family: Lythraceae
Kingdom: Plantae
Subkingdom: Tracheobionta-vascular plants
Division: Magnoliophyta
Class: Magnoliopsida
Order: Myrtales
Genus: Lawsonia
Species: L. inermis

PLANT CHEMICALS
*Lawsonia inermis* consist of the following constituents identified from various parts including triterpenes, sterols, phenolic derivatives, hennotonic acid, mannitol and Gallic acid. 2-hydroxy-1, 4-napthoquinone is the principle nature dye contained at 1.0-1.4% in the leaves of henna. And other related compounds present in the leaves are 1, 4 dihydroxynapthalene, 1, 4-napthoquinone, flavonoids (luteolins, apigenin and their glycosides) coumarin (esculetin, fraxetin, scopletin). Bark consist of isoplumbagin, aliphatics and flowers on steam distillation gave an essential oil (0.02%) rich in ionones (90%) Beta-ionones predominated.

PHYTOCHEMISTRY
The seeds of the plant have medicinal value and therefore have been the focus of chemical studies. They contain hennotonic acid and mannitol, gallic acid which are effective as immunomodulators and other allied agents. The leaves contain flavonoids, coumarin, steroids soluble matter tannin.

USES OF *LAWSONIA INERMIS* AND ITS PHARMACOLOGY
The various part of the plant (leaves, Bark, Fruit) are used to treat almost any disease but specific documented uses include the treatment of fever, headache, ulcers, diarrhea, leprosy,
cardiac disease, diabetes. The seed used as a deodorant and to regulate menstruation. Henna induce sleep cure headaches and bruises, leprosy has been treated by henna bark. As well as

By an extract of leaves, flowers and shoots. The bark is used to symptoms of jaundice and enlargement of the liver and spleen it can be applied to the skin to treat eczema, scabies, fungal infections and burns. The seed to cure fever, henna leaves have been used in India to treat wounds, ulcers, swellings, stomach pain caused by child birth, gonorrhea and obesity.

MATERIAL AND METHODS
Plant material
The leaves of Lawsonia inermis Linn. Were collected in January 2017 from Markapur town situated in prakasam district, Andhra Pradesh. The plant and plant material were identified and authenticated. The plant material was dried, powdered and used for further extraction.

Extraction of crude drug
The powerd leaves of Lawsonia inermis were extracted with chloroform, ethanol and water using soxhlet extractor. Extract obtained subjected to preliminary pharmacological investigation.

MEDICINAL PROPERTIES OF LAWSONIA INERMIS
Anticonvulsant activity
Adult, healthy, overnight fasted, male albino mice, weighing between 20-25 gm were used for the evaluation of anticonvulsant activity. The mice were in a group of six. All animals had free access to water and standard pelletized laboratory animal diet ad libitum.

The animals were divided with each group consisting of six animals. After 30 minutes of administration, animals were stimulated through corneal electrodes with 50 mA current at a pulse of 60 Hz alternating current for 0.2 sec. The abolition of hind limb tonic extensor spam was recorded as a measure of anticonvulsant activity. The above procedure was repeated after 60 and 90 minutes of administration. Statical analysis data obtained from pharmacological experiments are expressed as mean + S.E.M (standard error mean). At the end of experiments, test groups were compared with control and the data was analysed by ANOVA followed by dunnett’s test. Values of P < 0.05 or lower were regarded as significant.
Anthelmintic activity
All the extracts were used for anthelmintic assay using adult earthworm *Eicinia fetida*. Worms were collected and washed with normal saline solution. Test samples of all extracts were prepared at the concentrations, 10, 20, 50 and 100mg/ml by using Tween 80 as emulsifying agent and diluted to 10 ml with saline solution. Three worms of approximately equal size (same type) were placed in nine cm Petri dish containing above solution of extracts. Albendazole (10, 20, 50 and 100 mg/ml) was used as reference standard and normal saline as control.

Antibacterial activity
Antibacterial activity was determined by cup-plate agar diffusion method. The plates were inoculated by microorganisms such as *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli* and *Proteus vulgaris*, bores were made in the solidified agar plate by using a sterile borer. The test solutions and standards at 100, 200, 400 and 800μg/ml concentration was added in the bore and the plates were kept in freeze for 1 hour and then incubated. After 24 hours the plates were examined and zone of inhibition were recorded.

Antioxidant Activity
The effect of 200 and 400 mg/kg body weight of 80 % ethanolic extract of the fresh leaves of *Lawsonia inermis* were examined on drug metabolizing phase-I and Phase-II enzymes, antioxidant enzymes, glutathione content, lactate dehydrogenase and lipid peroxidation in the liver of 7 weeks old Swiss albino mice. With reference to antioxidant enzymes the investigated doses were effective in increasing the hepatic glutathione reductase (GR), superoxide dismutase (SOD) and catalase activities significantly (from p < 0.05 to p < 0.005) at both the dose levels. Among the extrahepatic organs examined (forestomach, kidney and lung) glutathione S- transferase and DT-diaphorase level were increased in a dose independent manner (from p < 0.05 to p < 0.005). There was a significant inhibition of tumor burden in both the tumor model system studied (from p < 0.01 to p < 0.001). Tumor incidence was also reduced by both the doses used in our experiment in both the model system19. Total phenolic compound was 2.56 and 1.45 mg tannic per mg of Henna dry matter as extracted with methanol and water respectively. In effect of different concentrations of methanolic extract of henna in comparison with synthetic antioxidant.
Antidiabetic activity
Ethanol (70 %) extract of \textit{L. inermis} showed significant hypoglycaemic and hypolipidaemic Activities in alloxan induced diabetic mice after oral administration. It’s decreased the concentration of glucose, cholesterol and triglycerides to normal. Methanol (95%) extract of leaves of \textit{L. inermis} showed significant \textit{in-vitro} antihyperglycemic effect.

Trypsin inhibitory activity
Soxhlet ethanolic extract of \textit{Lawsonia inermis} (yield: 18.5 dried weight). Preliminary phytochemical screening of the extract gave positive tests for Lawsone (naphtoquinone), sugars and tannis. \textit{Lawsonia inermis} alcoholic extract and lawsone have shown a significant Trypsin inhibitory effect.

Hepatoprotective activity
Alcoholic extract of the bark of \textit{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 extract of \textit{L. Alba} bark. Pretreatment of rats with the extract also inhibited the peroxidation of microsomal lip ids in a dose-dependent manner.

Abortifacient activity
Methanol extract of roots of \textit{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.

CONCLUSION
The \textit{lawsonia inermis} is a multipurpose tree species, widely used for non-food products and medicines. Every part of the \textit{L. inermis} tree is reported to be useful. The global demand for \textit{lawsonia inermis} has increased dramatically as more sectors such as the herbal product Industries. The plant oils have been useful for hair growth applicant, since ancient times. \textit{L. inermis} leaves, bark, roots and fruits are where found to be show interesting anthelmintic, antioxidant, anti diabetic, anticonvulsant activities and antibacterial activity, trypsin
inhibitory activity, abortifacient activities. It is hoped that this review will be a strong stimulus for research or development efforts towards better understanding and utilization of the plant *Lawsonia inermis*.

REFERENCES


