Biological Reports

Phytochemical Analysis of Lawsonia Inemis for Medicinal and Therapeutic Estimations

Adoga Patience, Ugo Dorris Dooshima and Achubu Mbafan

Department of Medical Laboratory Science, Benue State School of Health Technology, Agasha, Nigeria.

RESEARCH ARTICLE

How to cite this article
Adoga,P.,Ugo, D.D.,and Achubu, M.(2019),Phytochemical Analysis of Lawsonia Inemis for Medicinal and Therapeutic Estimations , ***Biological Rep.*, 4** (8), Pp 6.

Received: May 31, 2019

Accepted: June 21, 2019

Published: August 13, 2019

Corresponding author
Adoga Patience
pateadoga@gmail.com

ABSTRACT

This study we investigate the phytochemicals present in Lawsonia inermis (Henna) that engenders their medicinal and therapeutic properties. Experimental design was used for the preparation and collection of plant samples, aqueous extraction and phytochemical screening of the plant extract. Various instruments and reagents were used for the test. Aqueous extract of Lawsonia inermis was used for the various phytochemical screening to obtain the compounds present in the plant. The following phytochemicals were found as a result of the tests carried out on the aqueous extract of Lawsonia inermis: Carbohydrate (reducing sugar), Glycosides, Tannins, Flavonoids, Steroids, and Terpernoids. The result of the study revealed that Henna plant or Lawsonia inermis contain phytochemicals which have medicinal value and play essential role(s) in traditional and modern medicine.

Keywords: Lawsonia inermis, phytochemicals, therapeutic properties.

INTRODUCTION

Medicinal plants are useful for healing as well as for curing of human diseases because of the presence of phytochemicals. They are naturally occurring chemicals in the medicinal plant leaves, seeds, back and roots that have defense mechanism and protect from various diseases. Many of today's modern drugs have their origin in traditional plant medicine. Plant derived substances have recently become of great interest owing to their versatile application in the manufacturing of drugs.

Medicinal plants besides therapeutic agents are also a big source of information for a wide variety of chemical constituents which could be developed as drugs with precise selectivity. These are the reservoirs of potentially useful chemical compounds which could serve as newer leads and clues for modern drug discovery. Phytochemicals include primary and secondary compounds; chlorophyll, proteins and common sugars which are primary constituents while terpenoids, saponins, alkaloids, glycosides, tannins, phenolic compounds etc are classified as secondary constituents. These secondary constituents exhibit various important pharmacological activities such as anti-inflamation, anticancer, anti-malaria, inhibition of cholesterol, anti-viral, antibacterial activities and antibiotics.

Alkaloids are use as anesthetic agents. For example, Hippocrates may have prescribed willow tree leaves to abate fever, salicin, having anti-inflammatory and pain relieving properties was originally extracted from the back of the white willow tree and later synthetically produced to become the staple over the counter drug aspirin. Two major categories of phytochemicals are alkaloids and glycosides. Others include: essential oils, steroids, fats and oil, reducing sugars, tannins, resins, anthraquionone, glycosides, flavonoids, etc.

Alkaloids include nicotine, conine, atopine, cocaine, quinone, morphene etc. These plant extracts are very important in curing of certain ailments and their pharmacological and toxicological nature is not considered by the uses [1-2].

A number of plants have been used for traditional medicine for many years, some of which seem to work. Although there may not be sufficient scientific data to confirm efficiency, a number of them have been used over the years; also such plants could be classified and hence qualified as medicinal plants [3].

Medicinal plants could include plants used for the extraction of pure substances for direct medicinal use or for the hemi synthesis of medicinal compounds is use for pure drugs especially antibiotics. Food spices and perfuming plants are use for medicine before the advent of orthodox medicine, health of the entire populace was in the hands of herbalists who used medicinal plants in curing ailments [4]

The important contribution of herbalist was based on medicinal plants they collected from the environment they lived. Despite the influence of modern medicine, they still enjoy wide patronage and support from people. Majority of rural dwellers prefer taking medicinal herbs to orthodox medicine, this may be due to poverty, traditional customary believes and in some cases the distance between them and the city where medicine centers are sited and the village are very far apart [5].

The prevalence of cancer is speedily growing worldwide and rank second after cardiovascular diseases targeting both developed and developing countries. Limited supply of anticancer drugs, unaffordable cost of treatments and fatal adverse effect of several available drugs has shown the way to adopt Complementary and Alternative Medicine (CAM) for the treatment and/or prevention of cancer. Preliminary screening of phytochemicals is a valuable step in the detection of bioactive principles present in the medicinal Plants *Lawsonia inermis* popularly known as Mehndi or Henna which may lead to cancer drug discovery and treatment and also the discovery of anti-inflammatory and antibacterial drugs [6]. To this end, this study aims to analyze the phytochemicals in Lawsonia inemis for medicinal and therapeutic estimations.

MATERIALS AND METHODS

The design for this study was experimental methods; these include collection and preparation of plant samples, aqueous extraction and phytochemical screening of plant extracts.

Area of study

The plant material used for this study which is *lawsonia inermis* was collected from Mr. Aga Amos of Guma local government area of Benue state.

The local government area of research is Guma local government located in Benue State, North-central Nigeria (zone B geopolitical zone). Guma local government share boundaries with two states in Nigeria. These states are Taraba and Nassarawa states. The local villages in the local government sharing boundaries with these local governments are Saghev and Daudu respectively.

Guma local government was created on 3rd May, 1973. This local government was created alongside the state. The first capital of Benue state was Abinsi which presently is a council ward in Guma. The council ward in Guma local government under this research is Kaambe (Raav district). However, the council wards of Guma local government are: Abinsi, Kaambe, Saghev, Mzorugh, Mbawa, Mbadwem, Mbayev/Yandev, Mbabai, Uvir and Nyev.

Data collection

The plant material that was used for this study (*Lawsonia inermis*) was collected in August, 2016 and was identified botanically in the medical laboratory department, Benue State School of Health Technology Agasha.

Fresh and tender leaves of the plant were selected and washed with clean running water to remove dust on it. The plant sample was then air – dried in a room for one month. The plant

material was dried without being turned neither was it mishandled unnecessarily; all this was to ensure the prevention of needless crumbling and poor appearance of the product.

The best quality drugs obtained by natural drying could be with good air circulation. This is particularly important in the case of plants containing essential oils that easily evaporate. Drying time depends on the plants water content and the temperature at which the drying is taking place. Roots, rhizomes, tubers and fleshy fruits take longer time to dry. Drying must be as rapid as possible if the plant breaks easily.

The appearance of the end product was the indication of whether the plant material has been properly dried or not. As much as possible it should be related to the colour of the living plant per herb only with a slight difference in the shade due to lose of water. Leaves must retain this green colour and in the case of root, there must be a well pronounced darkening in colour or change.

The leaves were crushed using mortar and pestle and stored in a polythene bag in the cupboard of the medical laboratory department, School of Health Technology, Agasha until it was needed for extraction and phytochemical screening.

Experimental procedure

20.0g of *Lawsonia inermis* powder was poured into a beaker and 400ml of distilled water was added to the sample in the beaker. The beaker was then heated using flame from the Bunsen burner to boiling. This continued for 20 minutes with constant stirring. Thereafter, it was removed from the flame and allowed to cool for 24 hours before filtration. A fluted filter paper and plastic tunnel were used for the filtration. The extract obtained was then used to carry out the preliminary phytochemical screening using the procedures in the table below.

RESULTS AND DISCUSSION

Phytochemical screening of the aqueous leave extract of *Lawsonia inermis* revealed the presence of the following phytochemicals and include reducing sugar (carbohydrate), flavonoids, glycosides, tannins, terpenoids and steroids. Due to the presence of these secondary metabolites of plant origin exact and the market physiological and pharmacological effects on human system hence, they can be used to manufacture drugs.

. Regarding the already existing knowledge of scientists over the subject matter (phytochemical analysis of medicinal plants), each of the above mentioned phytochemicals serve or play essential role (s) in traditional and pharmacological drugs. Generally, most traditional uses of these plants are done without regards to the side effects or efficient dosages, nevertheless, with

the result obtained, the plant henna is a medicinal plant considering the phytochemicals reviewed in it.

Table 1: Phytochemical analysis of *Lawsonia inermis*

TEST	OBSERVATION	INFERENCE
Test for Carbohydrate 3ml of crude extract of *Lawsonia inermis* was added to 2ml of Benedict solution and heated for 5 minutes.	Bright brick red precipitate formed.	Presence of reducing sugar or carbohydrate confirmed.
Test for Flavonoid 5ml of ammonia (NH_4) was added to 3ml of crude extract of *Lawsonia inermis*; it was shaken thoroughly and tetraoxosulphate (vi) acid (H_2SO_4) was later added. Confirming the presence of Flavonoids.	Violet colour precipitate formed.	Flavonoid present.
Test for Glycoside 5ml of crude extract of *Lawsonia inermis* was added to 2ml of acetic acid + 1 drop of ferric chloride + 2ml of concentrated suphuric acid (H_2SO_4).	When acetic acid, the crude became light colour, the colour changed to dark- green after the addition of ferric chloride	Glycoside was confirmed present
Test for Steroid 2ml of acetic acid was added to 0.5ml of crude and later 2mls of concentrated H_2SO_4 was added.	When ferric chloride was added to the crude extract, it became light; sulpuric acid (H_2SO_4) was later added which made it lighter at the top of the solution and dark-green precipitate at the bottom.	Steroid was confirmed present.
Test for Tannins 2ml of crude extract was added to 5ml of distilled water + 3 drops Of olive oil	Addition of distilled water changed the crude to lighter colour and the addition of olive oil instigated foaming in the mixture.	Tannin was confirmed present

CONCLUSION

Phytochemical analysis of Lawsonia inemis for medicinal and therapeutic estimations is presented. The findings of the phytochemical screening of *Lawsonia inermis* reveals that the plant extract could be explored for its highest therapeutic efficacy by pharmaceutical companies in order to develop safe drugs for various ailments including treatment for cancer. Efforts should

be geared up to exploit the biomedical applications of this screened plant due to the presence of these class of phytochemicals found in them for their full utilization.

REFERENCES

[1]. Sofowora, A. (2011). Medicinal Plants and Traditional Medicine in Africa'. 3rd Edn. Spectrum Books Ltd. Ibadan, Nigeria.

[2]. Sofowora, A. (2010). Medicinal Plants and Traditional Medicine in Africa. 2nd Edn. Spectrum Books Ltd. Ibadan, Nigeria, ISBN 13.

[3]. Meyer eta, (2010). Natural Alkaloids: Basic Aspects, Biological Roles and Future Perspectives". Journal of Natural Medicine 12.

[4]. Odebiyi, O.O. (2011). "Western Trained Nurses Assessment of the Different Categories of Traditional Healers in South Western Nigeria' International Journal of Nursing Studies. 27(4), 333–342.

[5]. Katic. S., Milic, D., Karagic D., Vasiljevic, S., Glamocic, D. & Jajic, I. (2006). Variation of Protein Cellulose and Mineral Contents of Lucerne as Influenced by cultivar and Cut. Biotechnol Anin Husbandary 25: 1189 – 1176.

[6]. Rafflat, U.J. (2010). Impact of Cultivation and Gathering of Medicical Plants on Biodiversity: Global Trends and Issues. Inter-depsrtmental working groups on Biological Diversity for food and Agriculture.