



UNIQUE JOURNAL OF AYURVEDIC AND HERBAL MEDICINES

Available online: www.ujconline.net

Research Article

PRELIMINARY PHYTOCHEMICAL SCREENING OF *CALOTROPIS GIGANTIA* (VERN:ARKA) ALKALINE POWDER (KSHARA) IN AYURVEDA

Solohokara SMNJ¹. Jayasundera ACA². Karunathilake LPA³

¹(MD)Ayu. Scholar, Institute of Indigenous Medicine, University of Colombo, Medical Officer, D.B.Welagedara Ayurveda Hospital, Kurunegala, Sri Lanka

²Ph.D (U.K) Senior lecturer, Department of Chemistry, Faculty of Science University of Peradeniya, Sri Lanka

³MD (Ayu. Shalya), Ph.D (Ayu.Shalya) India, Senior lecturer, Department of Shalya Shalakyas, Institute of Indigenous medicine, University of Colombo, Sri Lanka

Received 17-08-2015; Revised 15-09-2015; Accepted 13-10-2015

*Corresponding Author: Solohokara S.M.N.J.

(MD)Ayu. Scholar, Institute of Indigenous Medicine, University of Colombo Medical Officer, D.B.Welagedara Ayurveda Hospital, Kurunegala, Sri Lanka.

ABSTRACT

Arsha or its closed modern counterpart disease hemorrhoids is one of the commonly prevailing diseases which is affecting nationally and internationally. Over 23 million incidents had been reported in the world in 2005. Ayurveda also mentioned **Arsha** as a very harmful, very painful disease, creating disturbances and complications to the patient. According to Ayurveda there are four types of treatment for **Arsha**. Among them Ayurveda **Kshara (Alkaline powder)** treatments are very successful, highly efficacious treatment for **Arsha** or Hemorrhoids. The objective of the present study was to screening of preliminary phytochemicals of *Calotropis gigantea* **Kshara (CGK)**. (vern: **ArkaKshara**). **CGK** was prepared according to the Susruta Samhitha which is the main surgical text book in Ayurveda and it was analyzed. Five grams portions of powdered **CGK** were each separately dispersed in 50ml of each Five solvents viz; water, 70%, ethanol, acetone, methanol and hexane were used to obtain extracts from **CGK**. The extracts were subjected to qualitative phytochemical screening using standard procedures. Qualitative phytochemical screening of **CGK** was studied. Alkaloids by Wagner's reagent test, Carbohydrate by Molisch's test, Protein by Ninhydrin test, Saponine by Foam test, Cardiac glycoside by Keller Kellani's test, Terpenoids by Salkowki's test, Tannins by Braymer's test, Sterols by Liebermann-Burchard test, quinone by HCL test and Phlobatannins by Precipitate test, Flavonoids by Alkaline reagent test, Phenols by Ferric chloride test and also Anthraquinone, Coumarins and Oxalates were also tested by standard procedures. Results show that ten of fifteen phytochemicals screened were present. They are; Carbohydrate, Protein, Alkaloids, Cardiac glycosides, Oxalates, Terpinoids, Tanin, Phenolic compounds, Sterols and saponins. Further studies will be planned for develop standard drug in experimental level.

Keywords: Phytochemical Screening, Herbal Alkaline Preparation, Hemorrhoids, Arsha, Kshara, Arka, *Calotropis gigantea*.

INTRODUCTION

In the world over 23 million people reported incident of Hemorrhoids and 36 million people reported ever having hemorrhoids in their life Ayurveda also mentioned Arsha as a very harmful, very painful disease, creating disturbances and complications to the patient. According to the signs and symptoms of Arsha, patient gets much worried and thoroughly inactive (Ash/Ni/7/2). Therefore patient badly suffers mentally, physically and socially. In modern medicine the diseases piles (Hemorrhoids) can be correlated with Arsha to some extent. Although prevalence of the Hemorrhoids are high, the success rate of cure of the disease in modern medicine is not satisfactory. As people are continuously affected with this disease and there is lack of successful treatment in allopathic medicine system, mortality and morbidity rate considered to

be high due to complications of Hemorrhoids. There are various treatment modalities for hemorrhoids available in modern medical system in present. But they almost all are associated with symptomatic relief and which are not fully curative and presence complications due to surgeries. Hence present need is to find out effective, successful treatment to cure this disease completely. Ayurveda having about 3000 years medical history treated successfully these diseases. According to Ayurveda there are four types of treatments for Arsha as; Bhesaja (medical treatments), Kshara treatments (caustics), Agni treatments (fire cauterization) and surgery. Among them one of the Ayurveda **Kshara** treatments/**Pratisaraneeya Kshara** (external application of caustics) is very successful, highly efficacious and cost instrumental effective treatment for **Arsha** or hemorrhoids and it cures diseases completely. It gives many benefits to the

patient such as quick action, less side effects, less toxic, less ambulatory time, cost (include the coma) effectiveness, highly efficacious, simply and with free availability of the ingredients etc. Sushruta Samhitha which is the main surgical text book in Ayurveda describes about **Kshara** in detail and it indicates many suitable plants for Kshara preparation. *Calotropis gigantea* (Arka) is one of such plants described in Susruta Samhita. Because of the above mentioned benefits of Kshara it was planned to develop this authentic, clinical tested Ayurvedic preparation (*Calotropis gigantea* Kshara (CGK) (vern: **ArkaKshara**) on this research study. Arka is easily available in Sri Lanka and easy to handle in Kshara preparation. The aim of this research work was to analysis of qualitative preliminary phytochemicals of CGK. Results show that ten of fifteen phytochemicals screened were present. They are; Carbohydrate, Protein, Alkaloids, Cardiac glycosides, Oxalates, Terpenoids, Tanin, Phenolic compounds, Steroles and saponins. This may be further helped in studies to develop standard CGK drug in experimental level.

MATERIALS AND METHODS

Collection of Plant Materials

Calotropis gigantea was obtained from natural habitat in Sri Lanka. The Whole plant was taken for the herbal Kshara (Caustic powder) preparation. The plant materials were transported in polythene bags to the Department of Shalya Shalakya laboratory, Institute of Indigenous medicine, University of Colombo.

Processing of Plant Materials

The whole plants (stems, roots, leaves, flowers and seeds) of *Calotropis gigantea* (Arka) were washed in running water and cut into small bits to facilitate drying. Pieces of plant material were dried completely for 5 days from the sun shine. Five Kilograms of dried Arka plant materials were burnt with lime (CaO) completely and collected the final 500 grams ash. 500 grams of ash dissolved into 3 liters of water and kept it 24 hours. That solution filtered many (21) times. Final Filtrate is collected, residual ash is discarded. Final Clear yellowish fluid is poured into iron pan. and boiled 2/3rd fluid is evaporated (Mridukshara). After then add red-hot lime stone 1/10th (50 gms) in to the boiled Arka filtration solution and mild heating continuously and evaporated until become a dry powder. The *Calotropis gigant* Kshara (CGK) powdered samples were stored in a clean glassware container until needed for analysis.

Solvent Extraction

Five grams portions of CGK powdered materials were each separately dispersed in 50ml of each water, 70% ethanol, acetone, methanol and hexane. The solution was left to stand at room temperature for 24hrs and was filtered with Whatman No. 1 filter paper. The filtrate was used for the phytochemical screening using the following tests.

Phytochemical Screening

Test for Alkaloids (Wagner's reagent)

A fraction of extract was treated with 3-5 drops of Wagner's reagent [1.27g of iodine and 2.00 g of potassium iodide in 100 cm³ of water] and observed for the formation of reddish brown precipitate (or coloration).

Test for Carbohydrates (Molisch's test)

Few drops of Molisch's reagent were added to 2.00cm³ portion of the various extracts. This was followed by addition of 2cm³ of conc. H₂SO₄ down the side of the test tube. The mixture was then allowed to stand for two-three minutes.

Formation of a red or dull violet colour at the interphase of the two layers was a positive test.

Test for Cardiac glycosides (Keller Kelliani's test)

5cm³ of each extract was treated with 2cm³ of glacial acetic acid in a test tube and a drop of ferric chloride solution was added to it. This was carefully undelayed with 1cm³ concentrated sulphuric acid. A brown ring at the interface indicated the presence of deoxysugar characteristic of cardenolides. A violet ring may appear below the ring while in the acetic acid layer, a greenish ring may form.

Test for Flavonoids (Alkaline reagent test)

2cm³ of extracts was treated with few drops of 20% sodium hydroxide solution. Formation of intense yellow colour, which becomes colourless on addition of dilute hydrochloric acid, indicates the presence of flavonoids.

Test for Phenols (Ferric chloride test)

A fraction of the extracts was treated with aqueous 5% ferric chloride and observed for formation of deep blue or black colour.

Test for Phlobatannins (Precipitate test)

Deposition of a red precipitate when 2cm³ of extract was boiled with 1ml of 1% aqueous hydrochloric acid wastaken as evidence for the presence of phlobatannins.

Test for Amino acids and Proteins (1% ninhydrin solution in acetone).

2cm³ of filtrate was treated with 2-5 drops of ninhydrin solution placed in a boiling water bath for 1-2 minutes and observed for the formation of purple colour.

Test for Saponins (Foam test)

To 2cm³ of extract was added 6cm³ of water in a test tube. The mixture was shaken vigorously and observed for the formation of persistent foam that confirms the presence of saponins.

Test for Sterols (Liebermann-Burchard test)

1cm³ of extract was treated with drops of chloroform, acetic anhydride and conc. H₂SO₄ and observed for the formation of dark pink or red colour.

Test for Tannins (Braymer's test)

2mls of extract was treated with 10% alcoholic ferric chloride solution and observed for formation of blue or greenish colour solution.

Test for Terpenoids (Salkowki's test)

1cm³ of chloroform was added to 2ml of each extract followed by a few drops of concentrated sulphuric acid. Areddish brown precipitate produced immediately indicated the presence of terpenoids.

Test for Quinones

A small amount of extract was treated with concentrated HCL and observed for the formation of yellow precipitate (or colouration).

Test for Oxalate

To 3cm³ portion of extracts were added a few drops of ethanoic acid glacial. A greenish black colouration indicates presence of oxalates.

RESULTS AND DISCUSSION

Results

- Results obtained for qualitative screening of phytochemicals in CGK are presented as follows.
- Out Of the fifteen phytochemicals screened, ten were found present in the extract. They are Carbohydrate, Protein, Alkaloids, Cardiac glycosides, Oxalates, Terpinoids, Tanin, Phenolic compounds, Sterols and saponins
- According to Tiwari et al., the factors affecting the choice of solvent are; quantity of phytochemicals to be extracted, rate of extraction, diversity of different compounds extracted, diversity of inhibitory compounds extracted, ease of subsequent handling of the extracts, toxicity
- The CGK extract had the presence ,Carbohydrate, Protein, Alkaloids, Cardiac glycosides, Oxalates, Terpinoids, Tanin, Phenolic compounds, Sterols and saponins

The result indicates CGK water extract hold promises as source of pharmaceutically important phytochemicals. Alkaloids generally present in CGK, play some metabolic role and control development in living system . They are also involved in protective function in animals and are used as medicine especially the steroidal alkaloid anti-inflammatory, anti-carcinogenic etc. They are also involved in protective function in animals and are used as medicine especially the Steroidal alkaloids. Tannins are known to inhibit pathogenic fungi .The flavonoids and phenolic compounds in plant have been reported to exert multiple biological effects including antioxidant, free radical scavenging abilities, anti-inflammatory, anti-carcinogenic etc.

CONCLUSION

Phytochemicals found present in CGK in water extracts indicates their potential as a source of Principles that may supply novel medicines. Further studies are therefore suggested to use different solvents and to ascertain their antimicrobial, proteolytic and on healing mechanism, body defense mechanism, antispasmodic and anthelmintic activities. Furthermore, isolation purification and characterization of the phytochemicals found present will make interesting studies.

REFERENCES

1. Charles S, Ugochukwu SC, Uche A., Feaneyi O. Preliminary phytochemical screening of different solvent extracts of stem bark and roots of *Denntia tripetala*, 2013 3(3) 10-13.
2. Tiwari P, Kumar B, Kaur, Kaur G, Kaur H, Int. Pharm. Scientia, 2011, 1, 98-106.
3. Lahlou M, Phytother. Res., 2004, 18, 435-445.
4. Lalitha TP., Jayanth P., Asian J. Plant Sci. Res., 2012, 2(2), 115-122.
5. Das K, Tiwari RKS, . Shrivastava D.K., J. Med. Plant Res., 2010, 4(2), 104-111.
6. Adebayo BC., Oboh G, Akindahunsi A.A., Afr. J. Food Sci., 2010, 4(6) 403-409.
7. Agbogidi OM, Onosode OM, Okonta B.C., J.Food Agri. Env., 2006, 4(2) 350-352.
8. Gill LS, Ethno Medicinal Uses of Plants in Nigeria. Uniben Press, Benin-city, Nigeria.
9. Misra CS, Pratyush K, Lipin MS., James J, Veettil A. K. T. , Thankamani V. A. , 2011
10. Hosking SW, Johnson AG, Smart HL, Triger DR. Anorectal varices, haemorrhoids and portal hypertension. Lancet 1989; i: 349-52.
11. Thomsom WHF. The nature of hemorrhoids.Br J Surg 62: 542-552., 1975.
12. Hiltunen KM, Matikainen M. Anal manometric findings in symptomatic hemorrhoids. Dis Colon Rectum 1985; 28: 807-809.
13. Johnson K, Bardin J, Orloff MJ. Massive bleeding from hemorrhoidal varices in portal hypertension. JAMA 1980; 244: 2084-5.
14. Charaka, Charaka Samhita, Chikithsasthana, 14/9 Vaidya Yadavji Trikamji Acharya, editor, Reprint edition. Chowkhamba Surbharati Prakashana, Varanasi, 2008 Sushrut,
15. Sushrut Samhita, Sutra sthana, 11/11, VaidyaYadavji Trikamji Acharya, editor, Reprint edition. Chowkhamba Krishnadas Academy, Varanasi, 2008.
16. Sushrut, Sushrut Samhita, Sutra sthana, 11/7, Vaidya Yadavji Trikamji Acharya, editor, Reprint edition. Chowkhamba Krishnadas Academy, Varanasi, 2008.

Source of support: Nil, Conflict of interest: None Declared