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Phytochemical Analysis of Seeds and Leaves of *Citrullus Colocynthis* (L.) Schard

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Abstract

Citrullus colocynthis (L.) Schard. is an important medicinal plant belonging to family Cucurbitaceae. The seeds of the plant are rich in oil which attracts many scientists to study the biofuel potential of the extracted oil. In the present research, considering the great medicinal value the seeds, the content of the non defatted seeds, extracted using methanol as solvent, were tested for various phytochemical analysis and yield of methanolic extraction was 21.15% for phytochemical screening. The extract of seeds, when analysed qualitatively for various phytochemical screening, showed positive response for alkaloids, flavonoids, saponins, tannins, terpenoids and quinones, whereas the leaf extract, on qualitative analysis for its phytochemical screening showed positive response for phenols, alkaloids, flavonoids and tannins. Oxalates and Glycosides were absent both in seed and leaf extracts.

Keywords: *Citrullus Colocynthis*, Cucurbitaceae, Phytochemical Screening, Alkaloids, Flavonoids, Saponins, Tannins, Terpenoids and Quinones, Phenols, Oxalates and Glycosides

Introduction

Medicinal plants are the rich sources for the discovery of new drugs. The medicinal plants are the backbone of the traditional medicine and millions of people in many developing countries utilise medicinal plants on regular basis (Dobrial and Narayana, 1998). Realising the importance of medicinal plants for public health care in developing nations, World Health Organisation has evolved guide lines to support the member states in the formulation of national policies on traditional medicine and study their potential usefulness including their evaluation, safety and efficacy (Yadav and Agarwala, 2012). India has one of the oldest, richest and most diverse cultural tradition for the use of medicinal plants (Mehta et al., 2013).

Citrullus colocynthis (L.) Schard. belongs to cucurbitaceae family is a desert plant with a rich history as an important medicinal plant and a good source of valuable oil (Dane et al., 2007). It is widely used in folk medicine for centuries and also is an energy source such as oilseed and biofuel (Uma and Sekar, 2014). It is traditionally used as an abortifacient and to treat constipation & oedema, bacterial infection, cancer and diabetic. *Citrullus colocynthis* (L.) Schard. commonly known as 'bitter apple' possess a wide range of pharmacological activity (Lakshmi et al., 2013). *C. colocynthis* (L.) Schard. having prominent free radical scavenging property, may be proved as a very good medicinal herb (Upadhyay, 2011). *Citrullus colocynthis* (L.) Schard. has many important primary and secondary metabolites (Abdelrahim et al., 2013). To determine the presence of crude secondary metabolites in medicinal plants, it is essential to study of the phytochemical constituents of these plants (Kumar et al., 2008).

Considering these facts, qualitative phytochemical analysis of methanolic extract of seeds and leaves of *Citrullus colocynthis* are done to study their physiochemical characters.

Materials and Methods

Citrullus colocynthis (L.) Schard. dry seeds were collected from Churu district of Rajasthan. The dry seeds were kept in an air tight glass container under refrigeration at -20°C to carry out the experiments. The husk of the seeds was removed and only the kernels were taken for quantification of lipid. Extraction of oil using hexane and methanolic

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extraction of seeds were carried out. The oil was extracted by soxhlet apparatus using methanol as solvent (Lakshmi et al., 2013).

The extracted samples were kept in vials, wrapped properly and stored at 4°C for oil characterisation and phytochemical analysis.

Thin layer chromatography of the extracted oil was taken by using TLC plates and the Rf values were calculated using Sawaya method (Sawaya et al., 1983).

Methanolic extracts of both the seeds and leaves were taken for preliminary phytochemical analysis. Qualitative analysis of phenols, alkaloids and flavonoids and glycosides were done using the methods as described by Uma and Sekar, 2014. Qualitative analysis for saponins, tannins, terpenoids, quinones and oxalates were done using the methods as described by Ugochukwu et al., 2013.

Results and Discussion

Qualitative analysis of various phytochemicals in the seeds and leaves of *Citrullus colocynthis* (L.) Schard.

The powdered seeds were taken for extraction in methanol by using Soxhlet apparatus and the yield was found to be 21.15%. Fresh, healthy and matured leaves of the plant was also used for methanolic extraction and both leaf and seed extracts were subjected for phytochemical analysis.

An investigation on primary phytochemical screening on hydro- methanolic extract of seed showed the presence of various phytochemicals. Tannins, flavonoids, triterpenoids were reported strongly on this methanolic extract in mean while alkaloids was absent. The secondary metabolites Quinones and antraquinones were reported to be absent in the seed extract (Benariba et al., 2013). The leaf of *Citrullus colocynthis* (L.) Schard. contain glycosides and alkaloids where as flavonoids and tannins are present in trace amount and saponins is absent (Abdelrahim et al., 2013).

In support of the above findings, the present investigation also confirmed the presence of phenols, alkaloids, flavonoids saponins, tannins and terpenoids in methanolic extracted of seeds and leaves. Oxalates and glycosides was found to be absent.

The important phytochemical **quinones** which show a great therapeutic effect on various types of diseases was present in seed extract where as absent in leaf extract of *Citrullus colocynthis* (L.) Schard. Flavonoids and tannins are major groups of compounds that act as primary antioxidant free radical scavenger and antioxidant activity (Polterait, 1997). Tannins have been reported to prevent the development of microorganisms by precipitating microbial protein and making nutritional proteins unavailable for them. The growth of many fungi, yeasts, bacteria, and viruses was inhibited by tannins (Chung et al., 1998). Present investigation showed the presence of both **flavonoids and tannins** in seed and leaf extracts of *Citrullus colocynthis* (L.) Schard.

The qualitative analysis of the samples confirmed the presence of **saponins** in the seeds of *Citrullus colocynthis* but absent in leaf. Many earlier

reports confirmed the presence of saponins in methanolic extract of seeds of this species. Saponins have the property of precipitating and coagulating red blood cells and plants containing this compound have responsible for stimulating activity (Sodipo et al., 2000). The plant extracts were also revealed to contain saponins, which are known to produce inhibitory effect on inflammation. Saponin is used in the medicinal uses for centuries and one of their common biological properties is their cytotoxicity (Nobori et al., 1994).

Plants containing alkaloids are used in medicine as aesthetic agent (Herourat et al, 1998). Alkaloids have been associated with antibacterial properties (Okwu, 2004). The presence of alkaloids in most of these samples supported the reports of various reports. Alkaloids are known to play some metabolic roles and control development in living systems. The compound has a protective role in animal and it is used in medicine, especially the steroidal alkaloids which constituents most of the valuable drugs (Edeoga et al., 2006). Present investigation confirmed the presence of **alkaloids** in the methanolic extracts of both leaves and seeds of *Citrullus colocynthis* (L.) Schard.

The presence of higher terpenoids that have carboxylic acid groups could also be responsible for the activity of organic extract. These classes of compounds are known to show curative activity against several bacteria and it is not surprising that the plant extract are used traditionally by herbalist to cure bacteria related diseases (Murugesan and Muthysamy, 2011). The qualitative tests on **terpenoids** in the methanolic extract of *Citrullus colocynthis* (L.) Schard. confirmed its presence in its seeds but absent in leaves.

Glycosides have been to lower blood pressure and attributed the cardiac action with antidiarrheal properties. It also inhibits release of autacoids and prostaglandins (Watt, 1984). **Glycosides** was found to be absent in both methanolic extract of leaves and seeds of our experimental plant.

Oxalates and glycosides was found to be absent in both seed and leaves extract.

Table 1 : Phytochemical screening of seed and leaf extracts of *Citrullus colocynthis* (L.) Schard.

phytochemicals	Plant parts	
	seed	Leaf
Phenols	--	++
Alkaloids	++	++
Flavonoids	++	++
Saponins	++	--
Tannins	++	++
Terpenoids	++	--
Quinones	++	--
Oxalates	--	--
glycosides	--	--

+ + indicate present, - - indicate absent.

Conclusion

In recent times, focus on plant research has increased over the entire world and evidence has collected to show immense potential of medicinal

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plants used in various traditional systems. *Citrullus colocynthis* (L.) Schard. has great economic and therapeutic importance due to the presence of various active ingredients in different parts of this herb. It produce high oil content seed for which it is economical and almost all parts of this plant have a lot of medicinal values. Dried melon seeds of *Citrullus colocynthis* (L.) Schrad. of the family Cucurbitaceae has high nutritional quality and the oil seed characteristics (Charment et al.,1998). *Citrullus colocynthis* (L.) Schrad. seeds contained protein which are rich in methionine and cystine ,oil rich in Oleic, Linoleic, Linolenic acid, ash, crude fiber, potassium, phosphorous and iron (Sawaya et al.,1986).

Sound scientific knowledge and a series of unit operations on the basis of that knowledge can convert the effective medicinal properties of various parts of *Citrullus colocynthis* (L.) Schard. into authenticated value added products. The potentialities and the therapeutic values of different chemical ingredients found in *Citrullus colocynthis* (L.) Schard. posses immeasurable value to cure different diseases. Proper analysis of these Phytochemicals in a scientific manner will definitely give these phytochemicals, proper Government approval and authentication for its medicinal uses.

References

1. Abdelrahim, A. A., Mohamed, A., Alian, H. and Elmahi, A. (2013) Phytochemical Analysis of some Chemical Metabolites of Colocynth Plant (*Citrullus colocynthis* L.) and its Activities as Antimicrobial and Antiplasmodial. **J. Basic. Appl. Sci. Res.**3:228-236.
2. Benariba, N., Djaziri, R., Bellakhdar, W., Belkacem, N., Kadiata, M., Malaisse, W. J., Sener, A. and Abdelkrim, C. (2013) Phytochemical screening and free radical scavenging activity of *Citrullus colocynthis* seeds extracts. **Asian Pac. J. Trop. Biomed.**3:35-40.
3. Chung, K. T., Wong, T.Y., Wei, C.I. Huang, Y.W. and Lin, T.Y. (1998) Tannins and human health: a review. **Crit. Rev. Food Sci. Nutr.**38:421-64.
4. Dane, F., Jiarong, L. and Cankui, Z. (2007) Sequence variation at cpDNA regions of watermelon and related wild species: implications for the evolution of *Citrullus* haplotypes. **Genet. Resour. and Crop Evol.**54:327-336.
5. Dobriyal, R. M. and Narayana, D. B. A. (1998) Ayurvedic herbal raw material. **The Eastern Pharmacist.**31-35.
6. Edogo, H.O., Okwu, D.E. and Mbaebie, B.O. (2006) Phytochemicals constituents of some Nigerian medicinal plants. **Afr. J. Biotechnol.**4:685-688.
7. Herourat, D., Sangwyn, R.S., Finiaux, M.A. and Sangwan-Norrell, B.S. (1988) Variations in leaf alkaloids content of androgenic diploids plants of *Datura innoxia*. **Plant medica .J. Med. Plant .Res.**54:14-20.
8. Kumar, S., Kumar, D., Manjusha., Saroha, K., Singh, N. and Vashishta, B. (2008) Antioxidant and free radical scavenging potential of *Citrullus colocynthis* (L.) Schrad. methanolic fruit extract. **Acta. Pharmaceutica.**58:215-221.
9. Lakshmi, B., Sendrayaperumal, V. and Subramanian, S. (2013) Beneficial Effects of *Citrullus Colocynthis* Seeds Extract Studied in Alloxan-induced Diabetic Rats. **Int. J. Pharm. Sci.**19:47-55.
10. Mehta, K., Patel, B.N. and Jain, B.K. (2013) Phytochemical analysis of leaf extract of *Phyllanthus fraternus*. **Res. J. of Recent Sci.**2:12-15.
11. Murugasen, S. and Muthusamy, M. (2011) Screening and quatitative estimation of Phytochemical constituents in *Citrullus colocynthis* (Linn.) schard. **Int. J. Res. Phytochem. Pharmacol.**1:176-179.
12. Nobori, T., Miurak, K., Wu, D.J., Takaboyashik, L.A. and Carson, D.A. (1994) Detection of cyclin dependent, Kinase-4 inhibition gene in multiple human cancers. **Nature.**46:753-756.
13. Okwu, D.E. (2004) Phytochemicals and vitamin content of indigenous species of southeastern Nigeria. **J. Sustain Agric. Environ.**6:30-37.
14. Oyenuga, A. O. (1998) Functional Properties of Camphor Seeds Oil: Camphor Seeds and Three Varieties of some Nigerian Oil Seeds. **J. of Food Chem.**32:822-825.
15. Pearson, D. (1976) Chemical Analysis of Food. **7th ed. London.**
16. Polterait, O. (1997) Antioxidant and free radical scavengers of natural origin. **Current Org. Chem.**1:415-440.
17. Sadasivum, S. and Manickum, A. (2008) Biochemical methods. **New Age international (P) Ltd., Publishers. New Delhi.**
18. Sari, D.C., Amrouche, A., Benmehdi, H., Malainine, H., Sari, C.N. and Necir, O. (2014) Spectral analysis and antifungal activity of fatty acids methyl ester isolated from Algerian *Citrullus colocynthis* L. Seeds. **Int. Res. J. Pharm.**5:50-56.
19. Sawaya, W. N., Dagher, N.J. and Khan, P. (1983) Chemical Characterization and Edibility of the Oil Extracted from *Citrullus colocynthis* Seeds. **J. of Food Sci.**48: 104-106.
20. Schinas, P., Karavalakis, G., Davaris, C., Anastopoulos, G., Karonis, D., Zannikos, F., Stournas, S. and Lois, E. (2009) Pumpkin (*Cucurbita pepo* L.) seed oil as an alternative feedstock for the production of biodiesel in Greece. **Biomass Bioenerg.**33:44-49.
21. Sodipo, O.A., Akiniyi, J.A. and Ogunbomosu, J.U. (2000) Studies on certain characteristics of extracts of bark of *Pausinystalia macroceras* (K Schemp) Picrre Exbeille. **Global J. Pure Appl. Sci.**6:83-87.
22. Ugochukwu, S.C., Arukwe, U. and Onuoha, I. (2013) Preliminary phytochemical screening of different solvent extracts of stem bark and roots of *Dennetia tripetala* G. Baker. **Asian J. of Plant Sci. and Res.**3:10-13.
23. Uma, C. and Sekar, K.G. (2014) Phytochemical analysis of a folklore medicinal plant *Citrullus*

- colocynthis* L. (bitter apple). **J. of Pharmacognosy and Phytochem.2:195-202.**
24. Upadhyay, S. (2011) Free radical scavenging activity screening of medicinal plants from Tripura, Northeast India. **Res. J. Chem. Sci.1:58-62.**
 25. Watt, J.M. and Brayer-Brandwy, K.M.G. (1984) Medicinal and Poisonous plants of Southern and Eastern Africa. **E. &S. livingstone Ltd., London.**
 26. Yadav, R.N.S. and Agarwala, M. (2011) Phytochemical analysis of some medicinal plants **J. of Phytology.3:10-14.**