

Asian Resonance

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 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. belonging 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' posses a wide range of pharmacological activity (Lakshmi et al., 2013). *Citrullus 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.

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 extraction of seeds were carried out. (data not shown) (Lakshmi et al., 2013).

Asian Resonance

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 were 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 (Polterait, 1997) and 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. 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). 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 terpenoids having carboxylic acid groups 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 known to lower blood pressure and attributed the cardiac action with antiarrheal 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 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 seeds of *Citrullus colocynthis* (L.) Schrad. Has high nutritional values and possess oil seed characteristics. *Citrullus colocynthis* (L.) Schrad. seeds contained protein which are rich in methionine and Cystine; oil which is rich in Oleic, Linoleic, Linolenic acid, ash, crude fiber, potassium, phosphorous and iron (Sawaya et al., 1983).

Asian Resonance

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. possess 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.

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