Pakistan Journal of Pharmaceutical Research
Faculty of Pharmacy, Bahauddin Zakariya University Multan, Pakistan
ISSN: 2410-6275 June, 2015 Vol: 01 Issue: 02

Original Article

Phytochemical screening of different extracts of *Kalanchoe laciniata* (L).

Maria Manan[1], Liaqat Hussain[1*], Hira Ijaz[1], Bushra Nawaz[1], Muhammad Hanif[2]

[1]Faculty of Pharmaceutical sciences, Government College University, Faisalabad, Pakistan.
[2] Faculty of Pharmacy, Bahauddin Zakariya University Multan.

Received: Feb 2, 2015
Revised: May 27, 2015
Accepted:May 29, 2015
Online:June 01, 2015

Abstract

Alkaloids, tannins, saponins, steroids, terpenoids and flavonoids distribution in n-hexane and aqueous-methanolic extract of kalanchoe laciniata was assessed and compared. The present study was carried out to study the phytochemical constituents of Kalanchoe laciniata. Aqueous-methanol and n-hexane were the solvents used for the extraction of the plant. Phytochemical analysis was carried out on both extracts, indicated that n-hexane extract constitutes tannins, terpenoids while the aqueous methanolic extract contains saponins, tannins, terpenoids, flavonoids, glycosides and anthraquinones.

Keywords: Kalanchoe laciniata, n-hexane, aqueous-methanol, Phytochemical constituents

Introduction:

Medicinal plants are of great importance for the health of people. Natural products are being considered as beneficial sources of the drugs development for treating various diseases (Bashir *et al*., 2015). In developing countries 80% of individuals use traditional medicines, having compounds which are derived from the medicinal plants (Bashir *et al*., 2015). Medicinal value of these plants is due to the presence of chemical substances. A definite physiological action is produced by medicinal plants on human body. Alkaloids, terpenoids, flavonoids, glycosides, tannins, anthraquinones and phenolic compounds are the most active bioactive constituents. For searching novel drugs people have been exploring the nature specially plants since ancient times.

This resulted in the usage of many plants with characteristics to treat a variety of diseases (Verpoorte, 1998). For primary health care, mostly the world population depends upon the traditional remedies (Sandhya *et al.*, 2006).To establish various pharmaceutical industries, phytochemical components are the basic source. To identify the crude drugs, phytochemical constituents perform a very crucial role. Screening of the phytochemical constituents is very important to identify new therapeutically active substances.

Common names of *Kalanchoe laciniata*are Pathar chat, Christmas tree plant, Siempreviva and Zakham-e-hayat. This plant is distributed throughout Africa, Southern India, Burma, Pakistan, Burma, Thailand, China, Java and Brazil. Leaves are roasted and applied to relieve inflammation in traditional medicines.

It is used as emollient and to relieve headache and joint pain (Karuppuswamy, 2007). It is also used in lotions for treating the small pox (Deb and Dash, 2013). It contains emodines, flavonoids,

***Corresponding Author:** Liaqat *Hussain*, Faculty of Pharmaceutical Sciences, Govt. College University Faisalabad, Faisalabad, Pakistan
e-mail: *liaqathussaingsk@yahoo.com*.
Ph: +92 3336225131

lignins, triterpenoids, Anthraquinones, phenols and saponins. Leaves of this plant are medicinally important and there are many reports on this claim that they cure many diseases when used in folk system of medicines (Sandhya*et al*., 2011). All over Asia leaves are utilized for making counter irritant remedies. In the heart discomfort and gastric pain decoction of the plant is taken (Deb and Dash, 2013).

Externally juice is taken to treat burns and bruises and superficial ulcers. It is used to treat ulcer in Indo China. *Kalanchoe laciniata* possess a history of folk medicinal use. Traditionally, it was used for the treatment of cough, wound, cold, diabetes and inflammation. It also contains cardioactive glycosides. It is reported that it causes poisoning due to glycoside contents (Savithramma *et al.,* 2011). The signs were cardiovascular, neuromuscular and gastrointestinal were observed in both guinea pigs and sheep (Deb and Dash, 2013). The plant was not explored for its antimicrobial activities despite of its important ethno-pharmacological uses. Leaves are considered as antiseptic and astringent. Leaves are also applied to relieve ulcer. This species is used as ornamental and also as house plants.

The plant was investigated phytochemically. This study aimed to investigate further phytochemical constituents of *Kalanchoe laciniata* by extracting the active components from this.

MATERIALS AND METHODS

Collection and identification

Collection of *Kalanchoe laciniata* was done from Punjab. The plant was identified by Dr. Mansoor Hameed, an expert Taxonomist, Associate Professor, Botany department, Agriculture University Faisalabad and voucher (voucher number 516-1-13) was submitted in the Agriculture University Faisalabad herbarium.

Extraction

The powdered plant material was extracted with aqueous-methanol for 7-8 days. It was then evaporated to dry using a rotary evaporator under pressure 760 mm Hg and temperature 37^{o}C and vacuum was created by vacuum pump. The paste was poured in Petri-plate for further evaporation. Extract as weighted and subjected to phytochemical screening. Extract of *Kalanchoe laciniata* was then stored in an air tight bottle at room temperature until use. The above procedure was repeated with solvent n-hexane.

Preliminary phytochemical study

Phytochemical study gives important information about the chemical compound, which helps to decide, whether extract should be further isolated.The phytochemicals were determined using chemical methods (Tadesse *et al.,* 2012). To find the active constituents presence like saponins, glycosides, terpenoids, flavonoids and alkaloids different tests were done by adopting following procedure

Alkaloids Screening

Alkaloids are nitrogenous compounds with definite pharmacological and physiological activity. Each extract (0.2gm) was heated with NH_4Cl (5ml). It was cooled and filtered. Filtrate was divided into two parts. One part was treated with few Mayer's reagent drops and other one with the Dragendorff's reagent (few drops).Turbid precipitates in both reagents were taken as evidence of alkaloids presence.

Tannins screening

Each extract (0.2gm) mixed with the distilled water (10ml) then heated on the water bath. Mixture was then filtered. To each filtrate solution of the ferric chloride (5%) was then added. A dark color's solution formation indicated the tannin's presence (Mojab *et al.,* 2003).

Saponins screening

Distilled water (5ml) was mixed with each extract (0.2gm) in test tube then mixture was heated to boil. Stable and strong foam (1.7cm height) formed which indicated the presence of saponins (Tadesse *et al.,* 2012).

Terpenoid screening
Each extract (0.2gm) was mixed with chloroform (2ml) and concentrated H_2SO_4 (3ml) separately then added them. A reddish brown colored solution formed at the interface which indicated the terpene's presence.

Flavonoids screening
Each extract (0.2gm) dissolved in diluted NaOH,HCl(1M) was then added. A yellow colored solution which turned colorless indicated the presence of flavonoids.

Table 1: Phytochemicals of the tested plants.NE: n-hexane extract, AME: Aqueous-methanolic extract, (+): Present, (-): Absent

Secondary metabolites	NE	AME
Saponins	-	+
Tannins	+	+
Terpenoids	+	+
Flavonoids	-	+
Glycosides	-	+
Alkaloids	-	-
Anthraquinones	-	+

Anthraquinones screening
Each extract (0.5gm) was boiled with HCL 10% in water bath for few minutes then filtered. Filtrate was cooled and treated with CHCl3 (equal amount). Few NH3 drops were added to the mixture. Mixture was then heated. Rose pink colour formation indicated the presence of anthraquinones (Tadesse *et al.,* 2012).

Glycosides screening
These are the compounds which on hydrolysis give one or more sugar part (glycine) and a non sugar part (aglycone). Each extract (1.2mg) was hydrolyzed with 1% HCl(10ml) then it was neutralized with a solution of NaOH. Fehling's solution (Few drops) was added into it. Formation of red colored precipitates indicated glycosides presence.

RESULTS AND DISCUSSION

The phytochemical constituents of *Kalanachoe laciniata* are summarized in the Table1**.** n-hexane extract of *Kalanchoe laciniata* showed the terpenoids and tannins presence, while extract formed in aqueous-methanol showed the saponins, tannins, terpenoids, flavonoids, glycosides and anthraquinones presence.

Table 1 shows different phytochemicals found in *Kalanchoe laciniata* extract. Tannins and terpenoids were positive both in n-hexane and aqueous-methanol extracts. Aqueous methanolic extract was also found to contain saponins, glycosides, flavonoids and anthraquinones. Results from present investigation showed that *Kalanchoe laciniata* was rich in phytochemicals. Present work also showed that extract from plant of *Kalanchoe laciniata* possess good antimicrobial potential presumably due to its active constituents (Thabrew *et al.,* 1998;Halliwel and Gutteridge, 1992).

This study supports the claimed traditional system uses of *Kalanchoe laciniata t*o treat many infectious diseases caused by microorganisms (Dhawan *et al.,* 1977). This study also encourages the cultivation of valuable plants to meet the demands from folkloric medicinal system. Present investigation of *Kalanchoe laciniata* revealed its antimicrobial nature, suggesting that these might be exploited for the disease management caused by bacteria and fungi in humans. This study opens a new window for investigation against various types of pathogens. So the plant used in this study might be a source of interest for the development of new drugs. The use of this plant as antimicrobial can also be validated. It is necessary that maximum potential of plants in pharmaceutical sciences and medicinal fields might be explored for its proper applications.

Conclusion
Medicinal plants perform important role in the cure of various diseases. The literature survey from all the scientific sources showed very little scientific information regarding *Kalanchoe laciniata.* It is a source of secondary metabolites.

This plant is reported to contain glycosides, flavonoids, saponins, phenols, tannins, terpenoids and cardiac active glycosides. Folkloric applications of this plant might reveal the interesting results. Therefore there is a need of scientific research on this plant to find the possible pharmacological properties including the new molecule's discovery.

REFERENCES

Bashir M, Uzair Mand Chaudhry BA,(2015). A review of phytochemical and biological studies on Conocorpus erectus(Combretaceae). *Pakistan Journal of Pharmaceutical research,* 1(1): 1-8.

Deb Jand Dash GK (2013). *Kalanchoe laciniata* (L) DC: A lesser known Indian medicinal plant. *International journal of science inventions today*, 2: 158-162.

Dhawan BN, Patnik GR, Rastogy RAT, Singh KK and Tandol TS (1977).Screening of Indian plants for biological activity.*Y. L. Indiaian journal of Experimental Biology*, 15: 108.

Halliwell B and Gutteridge JMC (1992). Free radicals, antioxidants and human diseases: where are we now? *Journal of Laboratory and Clinical medicine*, 119: 598-620.

Karuppuswamy S (2007). Medicinal plants used by Paliyan tribes of Sirumalai hills of Southern India. *Natural Product Radiance*, 6: 436-442

Mojab F, Kamalinejad M, Ghaderi HR and Vahidipour (2003). Phytochemical Screening of Some Species of Iranian Plants *Iranian Journal of Pharmaceutical Research,* 4:77-82.

Nagarajan M, Rajasekaran S and Ganesh SK (2013). Antibacterial activity of *Lawsoniainermis* L. *International Journal of Modern Biology and Medicine,* 4: 169-175.

Sandhya B, Thomas S, Isabel W and Shenbagarathai (2006)Antimicrobial activity of some ethnomedicinal plants used by paliyar tribe from tamilp nedu India .*BMC. Complementary and Alternative medicine*, 3: 101-114.

Sandhya S, Kumar SP, Vinod KR, Kumar V, Banji Dand Kumar K (2011). Plants as Potent Anti diabetic and wound healing agents- A review, *Hygeia Journal for drugs and Medicine*, 3: 11-19.

Savithramma, Rao ML and Ankanna S (2011).Screening of traditional medicinal plants for secondary metabolites. *International Journal of Research in Pharmaceutical Sciences,*2: 643-647.

Tadesse G, Reneela P and Dekebo A (2012).Isolation and characterization of natural products from Helinusmystachnus (Rhamnaceae). *Journal of chemical and Pharmaceutical Research*, 4: 1756-1762.

Thabrew MI, Hughes RD and McFarlane IG (1998).Antioxidant activity of Osbeckiaaspera.*Phytotherapy Research.*, 12: 288-290.

Verpoorte R (1998). Chemodiversity and biological role opf secondary metabolites, some thoughts for selecting plant material for drug development.*Proc phytochemsoc.European Kluwer publishers*, 43: 11-24.