

A Phytochemical Screening of the Ethanolic Extract of Aloe Vera Gel

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Abstract: *Aloe vera* a herbal medicine called as “the plant of immortality “ by Egyptians. It has various medicinal properties like it helps in diabetes, hypertension etc. Ethanolic extracts of plant *Aloe vera* gel extract was investigated. A small portion of the ethanolic extracts of *Aloe vera* was subjected to the phytochemical test to test for the presence of alkaloids, tannins, reducing sugars, saponins, terpenoids, phenols, flavonoids and Anthraquinones. The phytochemical analysis indicated the presence of alkaloids, saponins, tannins, flavonoids, terpenoids, coumarins, glycosides, Xanthoproteins, glycosides, steroids, phenols, etc. The present study provides facts that ethanolic extracts of *Aloe vera* contains medicinally important bioactive phytochemical compounds which justifies the use of plant species as conventional medicine for treatment of many diseases. Thus, from the present study the plant leaf extracts of *Aloe vera* showed an abundant Phytochemicals as secondary metabolites and they can be used in the pharmaceutical industries for producing a potent drug. The studies result of the above plant gives a basis of its use in traditional medicine to manage ailment and disorders.

Keywords: Aloe vera , Ethanolic extract, Phytochemical analysis, Alkaloids, Tannins

1. Introduction

World health organization (WHO) estimated that approximately 80% of the world’s population from developing countries mainly relies on traditional medicines for the primary healthcare. Numerous of medicinal plants contain large amounts of antioxidants such as polyphenols which has an important role in the prevention and limitation of free radicals. These phytochemicals have significant antioxidant potentials which are coupled with minor occurrence and lower mortality rates of several human diseases (Arunkumar and Muthuselvam, 2009).

Aloe vera is a species of *Aloe* that is popular for its medicinal properties. The name *Aloe vera* was derived from the Arabic word “Alloeh” which means shining bitter substance, while *vera* in Latin means true (Itrat and zarnigar, 2013). About 2000 years ago, the Greek scientists regarded *Aloe vera* as the universal panacea while Egyptians called *Aloe* “the plant of immortality.” It is also known as ‘lily of the desert. Today, the *Aloe vera* plant has been used for various purposes in dermatology, as antioxidants against heavy metals and many different disease like diabetes, cardiomyopathy etc. There are more than 550 species of *Aloe* grown-up around the world. However, species which are grown today are only two in numbers, with *Aloe barbadensis* Miller and *Aloe aborescens* Miller as they are commercially important.

Aloe vera L. (Liliaceae) is a semi tropical plant that has been used for the treatment of different types of human diseases (Mccouley, 1990; Shellon, 1996; Davis and Robson, 1999). *Aloe Vera* can be found in Mexico, the Pacific Rim countries, India, South America, Central America, the Caribbean, Australia and Africa (Wynn, 2005). It is related to other members of the Lily family such as onion and garlic. The *Aloe vera* plant is consist of fibrous roots, short stem and greenish leaves. The leaf is made of a gel, which is colourless, viscous liquid consisting primarily of water and

polysaccharides and has a bitter taste (Brinelon, 1995). Over 250 species of the genus *Aloe* are existing, with only two species grown on commercial basis (*Aloe barbadensis* and *Aloe arborescens*). Regarding chemical constituents, *Aloe vera* contains amino acids, lipids, sterols, tannins, enzymes chromones (flavonoids) and mannose –6–phosphate (Brinelon, 1995; Davis and Robson, 1999; Santrel International, 1998; Davis and Robson, 1999). Therefore, this plant had been found useful in the treatment of wound, burns, skin disorders and antiinflammatory activity (Mccouley, 1990; Shellon, 1996; Davis and Robson, 1999). The leaves of the *Aloe* plant grow from the base in the rosette pattern. Mature plants can grow as tall as 2 and a half inches to 4 feet with the average being around 28 to 36 inches in length. Each plant usually has 12 - 16 leaves that, when mature, may weigh up to three pounds. Each leaf is composed of three layers. An inner clear gel that contains 99% water and rest is made of glucomannans, amino acids, lipids, sterols and Vitamins. The middle layer of latex is the bitter yellow sap and contains anthraquinones and glycosides. The outer layer is thick and it is of 15 - 20 cells called as ring and has protective function which synthesizes carbohydrates and proteins.

This paper focuses on the Phytochemical screening of *Aloe vera* gel extract which was prepared in the ethanol.

Taxonomical Position of *Aloe vera*:

Kingdom : Plantae
Order : Asparagales
Division : Spermatophyta
Subdivision : Angiospermae
Class : Monocotyledoneae
Family : Liliaceae
Genus : *Aloe*
Species : *barbadensis* Miller

The aim of the study was to quantify the ethanolic extracts of *Aloe vera* leaves gel, and to identify their constituents of

bioactive compounds (viz., flavonoids, glycosides, antiquinones, phlobatannins, saponins, tannins, steroids, carbohydrates, alkaloids, terpenes) which is believed to be responsible for different medicinal purposes.

2. Methods Used

a) Sample Collection

The plant of aloe vera was obtained from Indian Agricultural Research Institute, New Delhi, India.

b) Procedures used for the extraction

Aloe vera gel was prepared by the method of Rajasekaran et al., 2005 with slight modifications. Healthy and fresh leaves were collected and was washed under running water after that it was washed with double distilled water. The upper layer of leaf was removed as it is the upper epidermis of the leaves and gel was collected and homogenized. It was centrifuged and then 95% ethanol was mixed in it after that it was left for 5 days for occasional shaking. After 5 days ethanol and aqueous portion was removed by incubating in incubator at 36°C. The filtrate was collected and evaporated to dryness under reduced pressure in a rotary evaporator. The phytochemical analysis of individual ethanolic extracts was qualitatively carried out thereafter.

c) Procedure for phytochemical test

Phytochemical screening for alkaloids, steroids, triterpenoids, glycosides, carbohydrates, flavonoids, tannins, phlobatannins, antiquinones and saponins were carried out as described below (Sofowora, 1993; Harborne, 1973; Ogbuewu, 2008).

Test for tannins

2 ml of the ethanolic extract was mixed with 2 ml of distilled water and few drops of FeCl₃ solution (5% w/v) were added. The formation of a green precipitate indicated the presence of tannins.

Test of saponins

5 ml of ethanolic extract was shaken vigorously with 5 ml of distilled water in a test tube and thereafter it was warmed. The formation of stable foam was taken as an indication for presence of saponins.

Test for phlobatannins

2 ml of ethanolic extract was added to 2 ml of 1% HCl and the mixture was boiled. Deposition of a red precipitate indicated the presence of phlobatannins.

Test for flavonoids

1 ml of ethanolic extract, 1 ml of 10% lead acetate solution was added. The formation of a yellow precipitate showed that it contains flavonoids.

Tests for anthraquinones

1) Borntrager's test: 3 ml of ethanolic extract was shaken with 3 ml of benzene, and after that it was filtered and 5 ml of 10% ammonia solution was added to the filtrate. The mixture was shaken and the presence of a pink, red or violet colour in the ammonical (lower) phase indicates the presence of free anthraquinones.

2) 3 ml of the ethanolic extract was boiled with 3ml of aqueous sulphuric acid and filtered while hot. 3 ml of benzene was added to the filtered and shaken. The benzene layer was separated and 3 ml of 10% NH₃ added. A pink, red or violet colouration in the ammonical (lower) phase indicates the presence of anthraquinone derivatives.

Test for terpenoids

2 ml of the extract was dissolved in 2 ml of chloroform and evaporated to dryness. 2 ml of concentrated sulphuric acid was then added and heated for about 2 min. A greyish colour indicates the presence of terpenoids.

Tests for steroids

1) A red colour produced in the lower chloroform layer when 2 ml of the extract dissolved in 2 ml of chloroform and 2 ml concentrate sulphuric acid added in test tube indicates the presence of steroids.
2) The development of a greenish colour when 2 ml of the extract was dissolved in 2 ml of chloroform and treated with sulphuric and acetic acids indicates the presence of steroids.

Test for alkaloids

3ml of ethanolic extract was stirred with 3 ml of 1% HCl on a steam bath. Mayer's and Wagner's reagents were then added to the mixture. Turbidity of the resulting precipitate was taken as evidence for the presence of alkaloids.

Tests for carbohydrates

Molisch's test: 3 ml of the ethanolic extract was added to 2 ml of Molisch's reagent and the resulting mixture shaken properly, then 2 ml of concentrated H₂SO₄ was added carefully to the test tube. A violet ring at the interphone indicates the presence of carbohydrate.

Tests for Glycosides

(a) Liebermann's test

2 ml of the extract was dissolved in 2 ml of chloroform, where 2 ml of acetic acid was added carefully. A color change from violet to blue to green indicates the presence of a steroidal nucleus (i.e. a glycone portion of glycoside.)

(b) Salkowski's test

2 ml of each extract was dissolved in 2 ml of chloroform. 2 ml of sulphuric acid was added carefully and shaken gently. A reddish brown colour indicates the presence of a steroidal ring (i.e., glycoside).

Table 1: Phytochemical Test and Result of Aloe Vera

S.No	Test name	Results
1.	Tannins	Present
2.	Saponins	Present
3.	Phlobatannins	Present
4.	flavonoids	Present
5.	anthraquinones	Present
6.	terpenoids	Present
7.	steroids	Present
8.	alkaloids	Present
9.	Carbohydrates	Present
10.	Glycosides	Present

3. Result and Discussion

The phytochemicals screening on extract was done for the presence or absence of alkaloids, saponins, reducing sugars, tannins, flavonoids, phenols, terpenoids and Anthraquinones. Mayer's reagents test confirmed the presence of alkaloids. Pale precipitate was formed that showed that the test for the presence of alkaloids was positive (Table 1). The presence of saponins was determined by froth test, stable persistent froth was formed indicating the presence of saponins and thus the test for saponins was positive. Lead acetate test formed yellow precipitate, indicating the presence of tannins in extract. No turbidity was formed by lead water test, indicating the absence of resins. The presence of phenols was carried out by ferric chloride test. Bluish color was formed, showing the presence of phenols. The presence of terpenoids was assessed by Salkowaski test. A reddish pink color was formed, showing that the test for the presence of terpenoids was positive. Appearance of yellow colors indicating the test for presence of flavonoids was positive. Fehling test was performed for the presence of reducing sugars, the formations of brick red precipitate was appeared showed the presence of reducing sugars. Anthraquinones presence was determined by Bontrager's test, in ammonia phase no pink or violet color was observed, indicating the absence of Anthraquinones.

4. Conclusion

The above result confirmed the presence of phytochemical constituents such as alkaloids, flavonoids, steroids, carbohydrates, saponins in the Aloe vera gel extract. Since this plant had been used in the treatment of different disease such as diabetes, skin burn, cardiomyopathy etc, the medicinal roles of this plant can be related to such bioactive compounds. Therefore we should approach this plant for different medicinal purposes on the basis of their bioactive compounds for their full utilization.

5. Conflict of Interest Statement

The authors of this paper have no conflict of interests.

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