



Physico-chemical and phytochemical evaluation of *Aloe acutissima* leaves

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Abstract: *Aloe acutissima* is a fast growing shrub belonging to the family Xanthorrhoeaceae. This plant is a point of concern as it has profound importance in the field of pharmacology. The secondary metabolites obtained from this plant viz., alkaloids, flavonoids, steroids, quinines, glycosides, tannins, saponins, terpenoids, phenols, proteins, oils and free fatty acids serves as a medicinal tool to mankind. The study comprises of physico-chemical and phytochemical evaluation of leaves of *Aloe acutissima* by using standard methods. Physico-chemical parameters such as percentage of loss on drying (LOD), ash values, extractive values were determined. Phytochemical evaluation was carried out to detect the presence of alkaloids, carbohydrates, tannins, saponins, flavonoids, quinines, glycosides, terpenoids, phenols, coumarins, acids, proteins, oils and free fatty acids in different extracts of *Aloe acutissima* leaf powder. Estimation of Phenols, Tannin, flavonoids, Alkaloids, steroids and ascorbic acid content of *Aloe acutissima* leaves were also carried out. Thus the present study revealing the physico-chemical data and phytochemical analysis of leaves of *Aloe acutissima* is useful for further studies of pharmacological parameters which is helpful for the future at large.

Key words: *Aloe acutissima*; Physico-chemical; phytochemical; ash values; extractive values

Introduction

Plants have been used for nutritional and therapeutic purposes and their uses are as old as the history of man. World Health Organization (WHO) estimates that, even today up to 80% of people still rely on traditional remedies such as herbs for their medicine (Arunkumar and Muthuselvan, 2009). Plants and herbal extracts have formed important position in modern medicine, due to their chemical and medicinal contents found in natural form. Their secondary metabolites represent a large reservoir of structural moieties which work together exhibiting a wide range of biological activities. The science of application of these indigenous or local medicinal remedies including plants for treatment of diseases is currently called ethno pharmacology but the practice dates back since antiquity. Ethno pharmacology has been the mainstay of traditional medicines of the entire world and currently is being integrated into mainstream medicine.

Aloe acutissima is one such medicinal plant belonging to the family Xanthorrhoeaceae, a fast growing shrub up to 3 feet tall with numerous upright slender stems topped with 6 to 10-inch-wide rosettes of narrow pale blue green recurved leaves that have hints of pink purple, red and the margins bearing red brown teeth. Growth spreads out from the center and with time can form a wide, somewhat wildly branching shrub. The dull red orange flowers appearing in winter are on unbranched thin spikes that only arise about a foot above the foliage. *Aloe* species are known for its medicinal uses and these plants contains plenty of important chemical constituents which are used to treat many human diseases. The knowledge of chemical compounds

present in plant helps the scientists to understand the mode of action of drug (Joshi. M.C. and Sabnis. S.D, 1989). These phytochemicals are the natural bioactive compounds which work with nutrients and fibers to form an integrated part of defense system against various diseases and stress conditions (Koche D *et al.*, 2010). The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids, steroid, terpenoid, carbohydrate and phenolic compounds (Edeoga *et al.*, 2005, Pascaline J *et al.*, 2011) which are present in *Aloe acutissima* plant. Thus in the present study successful attempt has been made to reveal chemical constituents present in the plant *Aloe acutissima* which serves as a means of future tool for scientists to bring forward the mode of action of these constituents and also for the field of pharmacology to treat many human diseases at large.

Materials and Methods

The *Aloe acutissima* plants were collected from Bengaluru and maintained in the green house of Visvsewarapura College of Science, Bengaluru. The leaves were washed with tap water. The washed leaves were cut into small pieces and air-dried thoroughly under shade (at room temperature) for 4 weeks, to avoid direct loss of phytoconstituents from sunlight. The shade dried materials were then powdered using the pulverizer and sieved with 80 meshes sieve. It was then homogenized to fine powder and stored in air-tight container for further analysis.

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Preparation of Plant Extracts:**Petroleum ether extract**

The shade dried coarsely powdered plant part (30grams) was extracted with petroleum ether (60-80°C) till the extraction was completed. After the completion of the extraction, the solvent was removed by distillation. The residue obtained was then stored in a desiccator.

Chloroform extract

The marc left after petroleum ether extraction was dried and then extracted with chloroform (50-55°C) till the extraction was completed. After completion of extraction, the solvent was removed by distillation. The residue obtained was stored in desiccator.

Methanolic extract

The marc left after chloroform extraction was dried and then extracted with 99% methanol at a temperature of about 55-60°C till the extraction was completed. The solvent was removed by distillation. The residue obtained was stored in desiccator.

Aqueous extract

The marc left after methanol extraction was dried and then extracted with distilled water by cold maceration process for 7days. At the end of 7th day, it was filtered through muslin cloth and the filtrate was concentrated. The remaining solution was evaporated by heating on a water bath. The residue obtained was then stored in the desiccator.

Physico-chemical evaluation

(Indian Pharmacopoeia, 1996 and Wallis TE)

Loss on drying

About 3 grams powder was accurately weighed in a tarred dish and dried in an oven at 105°C for one hour. It was then cooled in a desiccator and again weighed. The loss on drying was calculated with reference to the amount of air dried extract and the values were recorded.

Ash values:**Total ash:**

Weigh accurately about 2 grams of the air dried extract in a tarred silica crucible and incinerate at a temperature not exceeding 450°C till it was free from carbon then cool and weigh. The procedure was repeated until a constant weight was observed. Calculate the percentage of ash with reference to the air dried drug using the formula

$$\% \text{ of total ash} = \frac{\text{weight of ash} \times 100}{\text{Weight of the sample taken}}$$

Water-soluble ash:

The ash obtained was boiled with 25ml of water for 5 minutes. The insoluble matter was collected in a filter paper and washed in hot water. The insoluble ash was then transferred into a tarred silica crucible and ignited for 15 minutes at a temperature not exceeding 450°C. The procedure was repeated to get

a constant weight. The weight of the insoluble matter was subtracted from the weight of the total ash. The difference in weight was considered as the water-soluble ash. The percentage of water soluble ash was calculated with reference to the air dried drug using the formula

$$\% \text{ of water soluble ash} = \frac{\text{weight of water soluble residue} \times 100}{\text{Weight of the sample taken}}$$

Acid insoluble ash:

The ash obtained as described in the determination of total ash was boiled with 25ml of HCl for 5 minutes. The insoluble ash was then collected on filter paper and washed in hot water, later the insoluble ash was then transferred into pre-weighed silica crucible. The percentage of acid insoluble ash is calculated with reference to the air dried drug using the formula

$$\% \text{ of acid insoluble ash} = \frac{\text{weight of acid insoluble residue} \times 100}{\text{Weight of the sample taken}}$$

Sulphated ash:

About 2 grams of the ground drug was taken in a silica crucible. Ignited gently at first until the substance was thoroughly charred. Later cooled, moistened residue with 1 ml of Sulfuric acid is heated gently until white fumes no longer evolved and ignited at 800°C±25°C until all black particles disappeared. Further, calculate the percentage of sulphated ash.

$$\% \text{ of sulphated ash} = \frac{\text{weight of insoluble residue} \times 100}{\text{Weight of the sample taken}}$$

Extractive values:**Alcohol soluble extractive** (Singhal AK *et al.*, 2010):

About 5 grams of the air dried coarse powder was macerated with 100 ml ethanol in a closed flask for 24 hours. The flask was shaken frequently during the first 6 hours, and was allowed to stand for 18 hours. There after it was filtered rapidly, taking precautions against loss of solvent. About 25ml of the filtrate was evaporated to dryness at 105°C in a tarred flat bottomed shallow dish and weighed. The percentage of ethanol soluble extractive was calculated with reference to the air dried drug.

Preliminary Phytochemical screening

(Farnsworth N.R, 1996, Kokate C.K *et al.*, 1995 and WHO, 1998):

1. Determination of Alkaloids:

The successive solvent residues were acidified with dil. HCl and filtered. The filtrates were treated carefully with different reagents for the presence of alkaloids.

Mayer's Test: 1ml portions of each extract was acidified with 2-3 drops of 1M HCl and treated with 4-5 drops of Mayer's reagent (Potassium Mercuric Iodide). Formation of a yellow or white colored precipitate or turbidity indicates the presence of alkaloids.

Dragendroff's Test: Filtrates were treated with Dragendroff's reagent (solution of Potassium Bismuth Iodide). Formation of reddish brown or orange precipitate indicates the presence of alkaloids.

Wagner's test: Filtrates were treated with Wagner's reagent (solution of Iodine in potassium iodide). Formation of reddish brown precipitate indicates the presence of alkaloids.

Hager's test: Filtrates were treated with Hager's reagent (saturated picric acid solution). An yellow colored precipitate is an indication of presence of alkaloids.

2. Detection of carbohydrates:

The extracts were dissolved individually in 5ml distilled water and filtered. The filtrates were used to test for the presence of carbohydrates.

Molisch's test: Filtrates were treated with 2 drops of alcoholic α -naphthol solution in a test tube. Formation of violet colored ring at the junction indicates the presence of carbohydrates.

Benedict's test: Filtrates were treated with Benedict's reagent and heated gently. Orange red precipitate indicates the presence of reducing sugars.

Fehling's test: Filtrates were hydrolyzed with dil. HCl, neutralized with alkali and heated with Fehling's A and B solutions. Formation of red precipitate indicates the presence of reducing sugars.

3. Determination of Tannins:

Ferric chloride test: A small quantity of the extract was boiled with water and filtered. Two drops of ferric chloride was added to the filtrate, formation of a blue-black, or green blackish color in the presence of ferric chloride precipitate was taken as evidence for the presence of tannins.

4. Detection of Phlobatannins:

2 ml extract was boiled with 2ml of 1% aqueous HCl. Formation of red precipitate is the indication of presence of Phlobatannins.

5. Detection of Anthraquinones:

Borntreger's test: Add 1ml of 10% ammonia to 2ml of the plant extract. Formation of blood red color in the ammoniacal layer indicates the presence of Anthraquinones.

6. Determination Saponins:

Foam Test- 0.5 gm of extract was shaken with 2 ml of water. If foam produced persists for ten minutes it indicates the presence of saponins.

7. Test for flavonoids:

NaOH test: 1 gm of the powdered dried leaves of each specimen was boiled with 10 ml of distilled water for 5 minutes and filtered while hot. Few drops of 20 % sodium hydroxide solution was added to 1 ml of the cooled filtrate. A change of yellow color which on addition of acid changes to colorless solution depicted the presence of flavonoids.

Shinoda test: The extract was dissolved in methanol (50%, 1-2 ml) by heating. To an alcoholic solution of each of the extract, three pieces of magnesium chips were added followed by a few drops of concentrated hydrochloric acid. Appearance of an orange, pink or red to purple color indicates the presence of flavonoids.

8. Detection of anthocyanin & β cyanins:

To 2ml of the plant extract, 1ml of 2N NaOH was added and heated at 100°C for 5 minutes. Formation of yellow color indicates the presence of anthocyanins and β cyanins.

9. Detection of quinones:

To the test sample, sodium hydroxide is added. Formation of blue, green, or red color indicates the presence of quinones.

10. Detection of glycosides:

The extracts were hydrolyzed with dil. HCl and then subjected to test for glycosides.

Modified Borntreger's test: The extracts were treated with FeCl₃ solution and immersed in boiling water bath for about 5 minutes. The mixture was then cooled and extracted with equal volume of benzene. The benzene layer was separated and treated with ammonia solution. Formation of rose pink color in the ammoniacal layer indicates the presence of anthranol glycosides.

11. Detection of cardiac glycosides:

Legal's test: The extracts were treated with sodium nitroprusside in pyridine and NaOH. Formation of pink to blood red color indicates the presence of cardiac glycosides.

Keller- kiliani test: To 2 ml filtrate, add 1ml glacial acetic acid, 1ml ferric chloride and 1ml concentrated sulphuric acid. Green blue coloration of the solution indicates the presence of cardiac glycosides.

12. Determination of Steroid glycosides:

To 1ml of the extract, 2ml of acetic anhydride and 2ml of sulphuric acid was added and the formation of blue or green color indicates the presence of steroid glycosides.

13. Detection of Terpenoids:

Liebermann- Buchardt test: To 1ml of the plant extract, add 1ml of chloroform, 2-3ml of acetic anhydride and 1-2drops of concentrated sulphuric acid. Formation of pink or red coloration indicates presence of Terpenoids.

Salkowski's test: 5ml extract was treated with 2ml of chloroform and 3ml of sulphuric acid. Reddish brown coloration at the inter phase indicated the presence of Terpenoids.

14. Detection of Triterpenoids:

To 1.5ml of extract, 1ml of chloroform, 2-3ml of acetic anhydride and 2 drops of sulphuric acid were

added. The formation of blue green color indicates the presence of Triterpenoids.

15. Determination of Phenolic compounds:

Two to three drops of 1% ferric chloride (FeCl_3) solution were added in to 2 ml portions (1%) of each extract. Phenolic compounds produce a deep violet color with ferric ions.

16. Determination Coumarins:

Coumarins form a yellow color with 1% KOH in absolute ethanol. 1 ml of portions of 1% solutions of each in test tubes was treated with 3-4 drops of 1% KOH in absolute ethanol.

17. Detection of acids:

2ml of sodium bicarbonate was added to 1ml of the plant extract. Formation of effervescence indicates the presence of acids.

18. Detection of Proteins:

Xanthoproteic Test: The extracts were treated with few drops of conc. Nitric acid. Formation of yellow color indicates the presence of proteins.

Ninhydrin test: To 2ml of sample, add 2ml of Ninhydrin reagent and keep in water bath for 20 minutes. Appearance of blue or purple color indicates the presence of amino acids the sample.

19. Detection of oils and fatty acids:

Spot test: A drop of concentrated extract was pressed in between two filter papers and kept undisturbed. Oil stain on the paper indicates the presence of oils and fats.

20. Detection of volatile oils:

2ml of plant extracts were treated with 0.1ml of dilute NaOH and small quantity of dilute HCl. Shake the solution. Formation of white precipitate indicates the presence of volatile oils.

Estimation of total Flavonoids:

(Bohm & Kocipai- Abyazan 1994)

10 grams of the plant sample was extracted in 100ml of 80% aqueous methanol at room temperature for 24- 48 hours. Filter the extract through Whatmann filter paper. Dry the filtrate and weigh.

Estimation of Total Tannins:

(Peri C, Pompei C, 1971)

Tannin – Phenolics were determined by the method of Peri and Pompei. 1ml of sample extracts of concentrations (1mg/ml) was taken in test tubes. The volume was made up to 1ml with distilled water and 1ml of water serves as a blank. To this 0.5ml of folins phenol reagent (1:2) followed by 5ml of 35% sodium carbonate was added and kept at room temperature for 5 minutes. Blue color appears. The color intensity was read at 640nm. A standard graph of tannins (gallic acid conc. - 1mg/ml) was plotted, from which the tannin content of the extract was

determined. The total tannin content is expressed in mg/ml.

Estimation of Alkaloids: (Harborne method 1973)

5 gm of the sample was taken in a 250ml beaker and treated with 10% of acetic acid in ethanol. It was allowed to stand for 4 hours. It was then filtered and the extract was concentrated in water bath to 1/4th the original volume. NH_4OH was added drop wise till the precipitation was complete and it was allowed to settle. The precipitate was collected, filtered with dilute NH_4OH , dried and weighed.

Estimation of Steroids: (Evans WC, 2002)

1ml of Methanolic extract of steroid solution was transferred into 10 ml volumetric flasks. Sulphuric acid (4N, 2ml) and iron (III) chloride (0.5% w/v, 2 ml), were added, followed by potassium hexa cyanoferrate (III) solution (0.5% w/v, 0.5 ml). The mixture was heated in a water-bath maintained at $70 \pm 2^\circ \text{C}$ for 30 minutes with occasional shaking and diluted to the mark with distilled water. The absorbance was measured at 780 nm against the reagent blank.

Estimation of ascorbic acid: (Sadasivam S and Theymoli Balasubramian, 1987)

5ml of the working standard solution of ascorbic acid (100 $\mu\text{g}/\text{ml}$) was pipetted into a conical flask. Then 10ml of 4% oxalic acid solution was titrated against the dye solution containing 42mg sodium bicarbonate, 52mg of 2,6-Dichlorphenol indophenols in 200ml distilled water. End point is the appearance of pink color which persists for few minutes. The amount of dye consumed ($V_1\text{ml}$) is equivalent to the amount of ascorbic acid. The sample was extracted with 4% oxalic acid (0.5 – 5 g depending on the sample) in 100ml and centrifuged. 5ml of the supernatant and 10ml of 4% oxalic acid was taken and titrated against the dye ($V_2 \text{ ml}$). Amount of ascorbic acid mg/100gm of sample is calculated using the formula

$$\frac{0.5\text{mg} \times V_2 \text{ ml} \times 100\text{ml} \times 100}{V_1 \text{ ml} \times 5\text{ml} \times \text{wt. Of sample}}$$

Results

The plant materials were subjected to various physico-chemical and phytochemical evaluation. Results of different physico-chemical parameters that were carried out with the leaf powder of *Aloe acutissima* is shown in the Table 1. The % of total ash reported was comparatively high (11.6%) while the % of sulphated ash was the least (2.4%) according to the present study. The qualitative phytochemical screening for various chemical constituents with different extracts is shown in Table 2. The table gives authentic information with respect to presence or absence of various constituents with respect to different extracts. The constituent's flavonoids and quinines showed their presence in all extracts while

the carbohydrates, anthraquinones, showed their presence only in aqueous extract on the other hand cardiac glycosides, acids and oils and free fatty acids showed their presence only in petroleum ether extract. The quantitative phytochemical estimation of *Aloe acutissima* is shown in Table-3. The quantitative analysis gives us a clear picture of various constituents present in the leaf of *Aloe acutissima*.

Table 1: Physico-chemical evaluation of *A.acutissima*.

S. No	Parameters	Results (% w/w)
1	Loss on drying	8.3
2	Total ash	11.66
3	Water soluble ash	5.4
4	Acid insoluble ash	3.4
5	Sulphated ash	2.4
6	Alcohol soluble extractive	7.1

Table 2: Qualitative Phytochemical screening with different extracts.

S.No.	Constituents	Petroleum ether	Chloroform	Methanol	Aqueous
1	Alkaloids	-	-	+	+
2	Carbohydrates	-	-	-	+
3	Tannins	-	+	+	+
4	Phlobatannins	-	-	+	+
5	Anthraquinones	-	-	-	+
6	Saponins	-	-	-	-
7	Flavonoids	+	+	+	+
8	Anthrocyanin & β cyanin	-	+	+	-
9	Quinines	+	+	+	+
10	Glycosides	-	-	+	+
11	Cardiac glycosides	+	-	-	-
12	Steroid glycosides	-	+	+	+
13	Terpenoids	+	+	+	+
14	Triterpenoids	+	+	-	-
15	Phenols	+	+	-	-
16	Couramins	+	+	+	-
17	Acids	+	-	-	-
18	Proteins	-	-	+	+
19	Oils & free fatty acids	+	-	-	-
20	Volatile oils	+	+	+	-

(+) present, (-) absent.

Table 3: The qualitative phytochemical screening

Plant part	phenols mg/ml	Tannins mg/ml	Flavonoids mg/gm	Alkaloids mg/gm	Steroids mg/ml	Ascorbic acid mg/gm
Leaf	0.17	0.13	80	60	0.19	1.12

Discussions

The phytochemical screening of the extracts of *Aloe acutissima* indicated the presence of alkaloids, carbohydrates, tannin, phlobatannin, anthraquinones, saponins, flavonoids, anthracyanin, betacyanin, quinines, glycosides, cardiac glycosides, steroid glycosides, terpenoids, triterpenoids, phenols, couramins, acids, proteins, oils and free fatty acids. Therefore, it is imperative that the most important chemically active (bioactive) constituents present in the extract were alkaloids, tannin, flavonoid and phenolic compounds. These constituents are known to exhibit medicinal as well as physiological activities [Sofowra, A. 1993]. Alkaloids, saponins, anthraquinones, glycosides, phenolics, terpenoids and flavonoids has been well known for many years to exhibit biological activity, such as its effects on the central nervous system, antibacterial, antitumour, and anthelmintic activity [Harborne, 1973].

In the present work the alkaloid content of *A. acutissima* powder was found to be 60 mg/gm. These alkaloids have been associated with medicinal uses for centuries and one of their common biological properties is their cytotoxicity [Nobori, *et al.*, 1994.].

Several workers have also reported the analgesic [Antherden, L.M. 1969 and Harborne, J.B. 1973.], antispasmodic and antibacterial properties [Stray, F. 1998. And Okwu, D.E., and Okwu, M.E. 2004.]. The properties of alkaloids are well known to protect against chronic diseases. As a whole the presence of alkaloids, saponins and tannins in various antibiotics are used in treating common pathogenic strains as reported by Kubmarawa *et al.*, 2007; Mensah *et al.*, 2008, Ayitey and Addae, 1977 and earlier reports recorded that bitter leaf contains an alkaloid which is capable of reducing headache associated with hypertension. Analgesia is another property of many alkaloids-containing plants used in traditional medicine. Degenerative disorders, such as gout and rheumatism, have also been traditionally treated with alkaloid-containing plants (Harborne, 1973). Alkaloids have also been observed in the extract of *Aloe barbadensis* (A.O. Adesuyi *et al.*, 2012) and it has been widely studied for their potential use in the elimination and reduction of human cancer cell lines (Nobori *et al.*, 1994). Alkaloids which are one of the largest groups of phytochemicals in plants have tremendous effect on humans and this has led to the development of powerful pain killer medications

(Kam and Liew, 2002). Additionally, some alkaloids have antiparasitic property also.

Further, flavonoids content of leaf powder was found to be 80 mg/gm. These flavonoids are hydroxylated phenolic substances known to be synthesized by plants in response to microbial infection and they have been found to be antimicrobial substances against wide array of microorganisms in vitro. Their activity is probably due to their ability to form complex with extracellular and soluble proteins and to form complex with bacterial cell wall [Kim HP, *et al.*, 2004.]. Flavonoids are also an effective antioxidant and show strong anticancer activities (Salah, N., *et al.*, 1995. Del-Rio, *et al.*, 1997. And Okwu, D.E. 2004). Flavonoids has been proved to exhibit a wide range of biological activities like anti-inflammatory, antiangiogenic, analgesic, anti-allergic and cytostatic properties (Hodek *et al.*, 2002).

The phenolic compounds are one of the largest and most ubiquitous groups of plant metabolites [Singh, R. *et al.*, 2007]. Even in *A.acutissima* comparatively more amount (0.17mg/ml) of phenols are present. They possess biological properties such as antiapoptosis, antiaging, anticarcinogenic, antiinflammatory, antiatherosclerosis, cardiovascular protection and improvement of endothelial function, as well as inhibition of angiogenesis and cell proliferation activities [Han, X., Shen, T., Lou, H. 2007]. Several studies have described the antioxidant properties of medicinal plants which are rich in phenolic compounds [Brown, and J.E., Rice-Evans, C.A. 1998 and Krings, U., and Berger, R.G. 2001]. Phenolic compounds, such as anthraquinones have been used as purgatives (Harborne, 1973).

The highest quantity of chemical constituent present in the present plant is steroid (0.19 mg/ml). Steroids have been reported to have antibacterial properties [Raquel, F.E. 2007.) and they are very important compounds especially due to their relationship with compounds present in sex hormones [Okwu, D.E. 2001].

Additionally, the other chemical constituents reported in the present investigations were: 1. Quinine which is widely used against *Plasmodium falciparum*. 2. Glycosides which are known to lower the blood pressure according to many reports [Nyarkoand A.A., Addy, M.E. 1990). 3. Triterpenoids show the analgesic properties. 4. Anthraquinones isolated from the exudate of *A. vera* have shown wide antimicrobial activity. Many anthraquinones have shown antiviral and/or virucidal effects on enveloped viruses (Alves *et al.* 2004). 5. Saponin (5.651 gm/100 gm) found to be present in *Aloe barbadensis* extracts and it is not found in *A.acutissima* plant and has supported the usefulness for plant in managing inflammation. Just *et al.* (1998) has revealed the inhibitory effect of saponins on inflamed cells. 6.

Carbohydrates provide readily accessible fuel for physical performance and regulate nerve tissue (Whitney and Rolfes, 2005). 7. Proteins would serve as enzymatic catalyst, mediate cell responses, control growth and cell differentiation (Whitney and Rolfes, 2005).

Conclusions

From the results of present investigations, we can clearly conclude that *Aloe acutissima* is a potential source containing various medicinally important chemical constituents which is helpful for the mankind at large. Moreover, earlier studies confirmed that these phytochemicals contribute medicinal as well as physiological properties of the plant and are extensively used in the treatment of various diseases. Therefore, extracts from these plants could be used as a good source for useful drugs. Thus, our attempt in the present investigation is successful/ fruitful in bringing/elucidating out the various chemical constituents and its medicinal use to mankind for the present as well as for the future. Nonetheless our investigations also holds a firm foot in upholding relevant data for the scientists to bring forward the mode of action of these constituents and also for the field of pharmacology to treat many human diseases at large.

Thus, our investigation emphasizes mainly, on the phytochemical constituents present in *Aloe acutissima* plant. Hence, it can be suggested that further detailed investigation is required on this plant in order to isolate, identify, characterize and elucidate the structure of the bioactive compounds for the need of the future.

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