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PHYTOCHEMICAL ANALYSIS OF ALLIUM CEPA, ALLIUM SATIVUM AND ALOE VERA

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ABSTRACT
Herbal drugs fully Metabolized to harmless compound within the body or rapidly break down in waterways. The bulb and leaves of *Allium sativum, Allium cepa and Aloe vera* has been shown to be a nutritionally and medicinally useful. It has most important medicinal properties such as antibiotic, anticancer, blood thinning, antiviral and antifungal. This plant shown to help in fighting against high blood pressure cholesterol, aids, arthritis, diabetes, influenza leprosy and tuberculosis. *Allium sativum, Allium cepa and Aloe vera* belongs to family liliaceae. The present study deals with the phytochemical analysis of. *Allium sativum, Allium cepa and Aloe vera* extract. The ethanolic and aqueous extracts where prepared from these. The qualitative analysis revealed the presence of alkaloids, carbohydrates saponin, flavonoid, polyphenols, protein and steroids.

KEYWORDS: Liliaceae, Ethanolic, Phytochemical etc.

INTRODUCTION
Nature has provided a rich storehouse of herbal remedies to cure all mankind ailments. A number of important medicinal and aromatic plants prescribed by the Vaidya and Hakims have been carefully investigated from every point of view. People have utilized thousands of different plants and plant products for human aliments. Some of them are widely cultivated.

Herbal medicine is the chief support of about 75-80% of the world population for primary health care because of better cultural acceptability, better compatibility with the human body and lesser side effects. The chemical constituents present in them are a part of the physiological functions of living flora and hence they are believed to have better compatibility with the human body (Doughari *et al.*, 2009).

Allium cepa have been shown to possess antibacterial and antifungal properties. Volatile oil of onion has been shown to be highly effective against gram positive bacteria (Bison and Verma, 1994). Onion has been shown to decrease fasting blood glucose levels, improve glucose tolerance, lower insulin levels, and help lower triglyceride and cholesterol levels in the blood stream (Estes, 2000).

Allium sativum (Garlic) belongs to family *Liliaceae*. Garlic is world famous from centuries for its contribution to human health. Allicin and other sulfur compounds are major compounds responsible for the antimicrobial effect of garlic. Garlic is effective against a number of gram-negative, gram- positive and acid-fast bacteria (Tariq *et al.*, 1988). Allicin (diallyl-ditiosulfinate) which is produced by the garlic enzyme allinase from the alliin. Alliin has been seen to have wide-range of antifungal activity. An *in vivo* study showed that antibody alliinase conjugates and alliin are effective against murine pulmonary *aspergillosis* (Appel *et al.*, 2010). It is effective against some major human intestinal protozoan parasites such as *Entamoeba histolytica*[*] and *Giardia lamblia* (Ankri *et al.*, 1999). One study indicated that increased intake of garlic has been associated with reduced mortality in cardiovascular patients or reduced incidence of myocardial infarction, stroke and hypertension (Yang *et al.*, 2011). Diallyl sulfide (DAS), diallyl disulfide (DADS) and diallyl trisulfide (DATS) derived from garlic have been shown to exhibit anticancer activities (Choi *et al.*, 2012).

Aloe vera has 400 species but just two species*; A. barbadensis* and *A. aborescens* are used for trade in the world. An increased synthesis of hyaluronic acid and dermatan sulfate in the granulation tissue of a healing wound following oral or topical treatment has been

reported. (Chithra, 1998) *Aloe vera* contains antiseptic agents like lupeol, salicyclic acid, urea nitrogen, cinnamonic acid, phenols and sulfur. They all have inhibitory action on fungi, bacteria and viruses. (Kahlon *et al*., 1991). In a study of 27 adults with partial thickness burns, those treated with aloe healed an average of six days faster than those treated with vaseline gauze (Visuthikosol *et al.,* 1996). In a study on streptozotocin- induced diabetic rats oral administration of *Aloe vera* gel significantly reduced the fasting blood glucose, transminases, cholesterol, triglicerides and phospholipids. (Rajasekaran *et al.,* 2006).

MATERIAL AND METHODS

Collection and identification of plant material

The plant materials were purchased from the local market of Bhopal (MP) India and were authenticated by Dr. Shaukat Sayeed Khan (retire professor of Botany). The plant materials were shade dried, reduced to coarse powder and stored in airtight container till further use.

Preliminary phytochemical studies

The plant may be considered as a biosynthetic laboratory, not only for the chemical compounds such as carbohydrates, Protein and Lipids that are utilized as food by men, but also for a multitude of compounds like glycosides, alkaloids, volatile oils, tannins etc., that exerts a physiologic effect. The compounds that are responsible for therapeutic effect are usually the secondary metabolites. A systemic study of a crude drug embraces through consideration of both primary and secondary metabolites derived as a result of plant metabolism. The plant material may be subjected to preliminary phytochemical screening for the detection of various plant constituents (Lederer *et al*., 1957).

Preparation of extracts

One Kilogram of powdered drug of *Allium cepa*, *Allium sativum* and *Aloe vera* were packed in soxhlet apparatus separately and extracted with different polarity of solvent. The coarsely powdered of plant material were packed well in soxhlet apparatus and extracted with ethanol, aqueous until the completion of the extraction. The extract was filtered while hot and the solvents were removed by distillation. The extracts were stored in refrigerator for further experimental work.

Qualitative chemical tests

Qualitative chemical tests were performed to determine the presence of alkaloids, carbohydrates, cardiac glycosides, polyphenols, saponins, tannins and terpenoids (Harbone *et al*., 2005; Kokate *et al.,* 2000).

Test for alkaloids

To 1 ml of the extract, add 1 ml of mayer's reagent (Potassium mercuric iodide solution). Whitish yellow or cream coloured precipitate indicates the presence of alkaloids.

Test for Proteins

Added 1ml of 40% sodium hydroxide solution and 2 drops of 1% $CuSO_4$ solution till a blue color was produced, and then added to the 1ml of the extract. Formation of pinkish or purple violet color indicated the presence of proteins.

Saponins

20 ml of distilled water was added to small quantity of alcoholic and aqueous extract separately. After that the graduated cylinder was shake for 15 minutes. A 1cm layer of foam exhibits the existence of saponins.

Test for carbohydrates

To 2ml of the extract, add 1ml of napthol solution, add concentrated sulphuric acid through the side of the test tube. Purple or reddish violet colour at the junction of the two liquids reveals the presence of Carbohydrates.

Test for tannins and phenolic compounds

Take the little quantity of test solution and mixed with basic lead acetate solution. Formation of white precipitates indicates the presence of tannins.

Test for flavonoids

Little quantity of extract is treated with amyl alcohol, sodium acetate and ferric chloride. A yellow colour solution formed, disappears on addition of an acid indicates the presence of flavonoids.

Test for steroids

1gm of the test substance was dissolved in a few drops of chloroform, 3ml of acetic anhydride, 3ml of glacial acetic acid were added, warmed and cooled under the tap and drops of concentrated sulphuric acid were added along the sides of the test tube. Appearance of bluish-green colour shows the presence of sterols.

RESULTS

The study revealed that the leaves and bulb of ***Allium cepa, Allium sativum*** **and** ***Aloe vera*** contain higher amount of semi polar and polar secondary metabolites. The pharmacological activity of plant material varies according to its polarity or nature of phytoconstituents. Looking this further we performed phytochemical screening of all the extracts obtained from ***Allium cepa, Allium sativum*** **and** ***Aloe vera.***

Table 1: Extraction value and Physical appearance of extract.

Plant material	Yield (% w/w of powdered drug)		Physical appearance	
	Ethanol	Aqueous	Ethanol	Aqueous
Allium cepa	16.2	25.4	Solid	Solid
Allium sativum	18.5	22.3	Solid	Solid
Aloe vera	20.1	28.8	Solid	Solid

Table 2: Phytochemical screening of *A.cepa, A. sativum, Aloe vera* extract.

Test for	*A.cepa* (et)	*A.sativum* (et)	*Aloe vera* (et)	*A.cepa* (aq)	*A.sativum* (aq)	*Aloe vera* (aq)
Alkaloids	+	+	+	+	+	+
Carbohydrates	+	+	+	+	+	+
Saponin	+	+	+	+	+	-
Flavonoid	+	-	-	-	+	-
Polyphenols	+	+	+	+	+	+
Protein	-	+	+	-	+	+
Steroids	+	+	_	+	+	-
Tannins	+	+	+	+	+	+

(+) Present, (-) Absent, (et) ethanol and (aq) aqueous

DISCUSSION

Phytochemical of *Allium sativum* bulb extract

The result of the phytochemical screening of garlic ethanol extract indicated the presence of alkaloid, steroids, carbohydrates, saponin, polyphenols, protein, tannins. The above phytochemical are also present in aqueous extract but flavonoid is excessively present.

Presence of chemical compound such as steroids, glycosides, carbohydrates saponin, polyphenols, protein, tannins as well as absence of alkaloids, flavonoid, anthraquinone. This result is supported (Mikail 2010; Ameh 2013). Quantitative analysis showed the highest yield of tannin and the lowest yield of flavonoid (Huzaifa 2014). Little amount of flavonoid present in the bulb of *Allium sativum*. This is the reason flavonoid is absent in ethanol extract.

Phytochemical of *Allium cepa* bulb extract

Phytochemical screening of *Allium cepa* bulb in ethanol solvent show the presence of tannins, phenolic compounds, alkaloids, saponin, steroids and carbohydrates. Consequently proteins, tannins, phenolic compounds, alkaloids, saponin, steroids and carbohydrates were present in aqueous extracts of ***Allium cepa***. Maximum phytocostituents were observed in ethanol extracts of ***Allium cepa.*** This result is supported (Gazuwa *et al*., 2013; Ponnulakshmi and Ezhilarasi Balasubramanian, 2013; Boukeria *et al.*, 2016).

Phytochemical of *Aloe vera* leaf extract

The result of the phytochemical screening of *Aloe vera* ethanol extract indicated the presence of alkaloid, saponin, carbohydrates, polyphenols, protein, tannins. In aqueous extract alkaloid, carbohydrates, saponin, polyphenols, protein, tannins are present.

The phytochemical reported like alkaloid, steroids, carbohydrates saponin, polyphenols, protein, tannins is present in the extract. (Dinesh Patil *et* al,. 2012; Thu *et al*., 2013). The phytochemicaly active compounds are present like tannin, saponin, alkaloids, carbohydrate present but steroids is absent. The similar observation were showed by (Arunkumar and Muthuselvam, 2009; Ejoba Raphael 2012; Kedarnath *et al*., 2012).

CONCLUSION

It is necessary to explore the phytochemical constituents of any medicinal plant to establish a relation between pharmacology and chemistry of the plant. The results obtained in the present study revealed the presence of various types of secondary metabolites. The ethanol solvent extracted more phytochemicals fom *Allium cepa* and *Aloe vera* indicating differences in the extracting capacity of the two solvents. Due to the presence of various compounds that are essential for good health, it can also be used to improve the health status of society.

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