Comparative Phytochemical Screening of Leaves and Bulb of *Allium sativum* L.

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Abstract:

Plants derived bioactive compounds have been the focus of recent research due to their health promoting effects. *Allium sativum* L. plant belongs to Liliaceae family. The present investigation was carried out to assess the qualitative phytochemical analysis of leaves and Bulbs of *Allium sativum* L. In the study three different solvents were used for the phytochemical screening named Methanol, Chloroform and Aqueous. Different solvent screening shoed the presence of Saponins Terpenoids and Glycosides. Since the plant contain high quantities of these new bioactive potential compounds, it is reliable to possess large number of pharmacological values like antioxidants, antifungal, antibacterial, anti-inflammatory, antiulcer, diuretics activities and are being employed for the treatment of different ailments in the indigenous system of medicine.

Key words: *Allium sativum* L, Phytochemicals, Secondary metabolites

Introduction:

The medicinal plants are useful for healing as well as for curing of human diseases because of the presence of phytochemical constituents. Phytochemicals are naturally occurring in the medicinal plants leaves, stem bark, fruits and roots that have defence mechanism and protect from various diseases. Natural products from plants called secondary metabolites are the end products of primary metabolites such as carbohydrates, amino acid, and chlorophyll lipid so on. They are synthesis large variety of chemical substances known as secondary metabolites which include alkaloids, steroids, flavonoids, terpenoids, glycoside, saponia, tannins, phenolic compounds etc. *Allium sativum* L. plant is famous medicinal plant, it having different phytochemicals like saponins, glycosides, terpenoids etc. The study was focused on the screening of leaves and bulbs of *Allium sativum* L. in methanolic, chloroformic and aqueous solvents.

Material and Methodology:

Collection of Plant material:

The fresh leaves and Bulbs of *Allium sativum* L. were collected from Dashkroi, Ahmedabad, Gujarat, India. (December-2018). The plant material was identified by Dhruv Pandya, Teaching Assistant, Department of Botany, Bio-informatics, Climate change and Impacts Management, School of Science, Gujarat University.

Plant Extract Preparation method:

The Bulbs and leaves were air dried for 15 days and crushed to form powder of dried plant material. The powdered samples were obtained after pulverisation then they were subjected to successive extraction with organic solvents such as chloroform, methanol and aqueous by dry crude extraction. 10gm weighed powdered material of each sample were treated with different solvents including methanol, chloroform and distilled water and incubated for 24 hrs on shaker. After one day all the samples were filtered with the help of whatman filter paper no.1. The filtered extracts were kept at room temperature for evaporation of solvents. After 2 days we got the crude extract of each sample.

Qualitative Analysis of Secondary metabolites:

Test for Alkaloids:

3 mg extract were dissolved individually in 3 ml ethanol and 1 N HCL was added then filtered it with whatmann filter no. 1. The filtrates were used to test the presence of Alkaloids.

Mayer's test: 1 ml filtrate was treated with 2 ml Mayer's reagent; cream colour precipitation indicates the presence of alkaloids.

Wagner's test: 1 ml filtrate was treated with Wagner's reagent; reddish brown colour indicates the presence of alkaloids.

Dragendroff's test: 1ml filtrate was treated with 2 ml Dragendroff's regent; orange red colour precipitation indicates the presence of alkaloids.

Test for Flavonoids:

Lead acetate test: 1 ml liquid extracted was treated with 10 % lead acetate solution; formation of yellow precipitation indicates the presence of flavonoids.

H_2SO_4 test: 1 ml extract was treated with few drops of H_2SO_4; orange colour precipitation indicates the presence of flavonoids.

Alkaline reagent test: 1 ml extract was treated with few drops of dil. NaOH and few drops of dil. HCL; yellow colour turns in to colour less soln. indicates the presence of flavonoids.

Zinc hydrochloride reduction test: 1 ml extract was treated with zinc dust and conc. HCL; formation of red colour indicates the presence of flavonoids

Pew test: 1 ml of extract was treated with pieces of metallic magnesium and 2-3 drops conc. HCl were added; formation of brownish colour indicates the presence of flavonoids.

Test for Phenols:

Ferric chloride test: 1 ml extract was treated with few drops of 5% ferric chloride solution; formation of bluish black colour indicates the presence of phenols.

Lead acetate test: 1 ml extract was treated with 2-4 ml 10 % acetic acid; formation of yellow colour precipitation indicates the presence of phenols.

Test for Saponins:

Frothing test: About 0.5 mg of extract was shaken with 5 ml of distilled water; formation of froth (appearance of creamy small bubbles) show the presence of saponins.

Test for Tannins:

Lead acetate test: 1 ml of extract was treated with 1 ml 10% lead acetate solution; white colour precipitation indicates the presence of tannins.

Ferric chloride test: Small quantity of extract was mixed with water and heated in water bath, the mixture was filtered and 0.1% ferric chloride soln. was added to filtrates; dark green colour indicates the presence of tannins.

Test for Terpenoids:

Salkowski's test: Few mg of extract mixed with 2 ml of chloroform and 3 ml of conc. H_2SO_4 was carefully added to form a layer; an appearance of reddish-brown colour ring indicates the presence of terpenoids.

Copper acetate test: extract was dissolved in water and treated it with 5% copper acetate solution; formation of emerald green precipitation indicates the presence of terpenoids.

Test for Glycosides:

Bromine H_2O test: 1 ml of test solution was dissolved in bromine H_2O; formation of yellow colour precipitation indicates the presence of glycosides.

Keller-Kiliani test: 2 ml of test solution was treated with few drops of glacial acetic acid and 1% ferric chloride solution mixed, concentrated Sulphuric acid was added and observed for the formation of two layers; lower reddish brown and upper acetic acid layer which turns bluish green indicates a positive test for glycosides.

Results and Discussion:

As per results of Secondary metabolites analysis of bulb Methanolic extract showed presence of terpenoids, Chloroformic extract showed presence of glycosides and aqueous extract showed presence of saponins, terpenoids and glycosides.

As per results of secondary metabolites analysis of leaves Methanolic extract showed presence of terpenoids, Chloroformic extract showed presence of Glycosides and Aqueous extract showed presence of saponins, terpenoids and glycosides.

Phytochemicals	Tests	Parts of *Allium sativum*					
		Leaves			Bulb		
		Methanol	Chloroform	Aqueous	Methanol	Chloroform	Aqueous
Alkaloids	1)Dragendroff's Test	-	-	-	-	-	-
	2)Mayer's Test	-	-	-	-	-	-
	3)Wagner's Test	-	-	-	-	-	-
Flavonoids	1)Lead acetate Test	-	-	-	-	-	-
	2)H_2SO_4 Test	-	-	-	-	-	-
	3)Alkaline Reagent Test	-	-	-	-	-	-
	4)Zinc Hydrochloride Reduction Test	-	-	-	-	-	-
	5)Pew Test	-	-	-	-	-	-
Phenols	1)Ferric Chloride Test	-	-	-	-	-	-
	2)Lead acetate Test	-	-	-	-	-	-
Saponins	1)Frothing Test	-	-	-	-	-	+
Tannins	1)Ferric Chloride Test	-	-	-	-	-	-
	2)Lead acetate Test	-	-	-	-	-	-
Terpenoids	1)Salkowski's Test	-	-	+	-	-	+
	2)Copper Acetate Test	+	-	-	+	-	-
Glycosides	1)Bromine H_2O Test	-	+	-	-	+	-
	2)Keller-Killiani Test	-	-	+	-	-	+

Table-1 Showed Qualitative Analysis of Secondary metabolites of Allium sativum L. Leaves and Bulbs

Conclusion:

Allium sativum L is a medicinal plant because of the presence of Saponins, Terpenoids and Glycosides. May these secondary metabolites show the pharmacological activities. In future we can also quantify the secondary metabolites and check the different activities of different solvent extracts of *Allium sativum* L.

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