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Comparative Phytochemical Screening of Leaves and Fruits of *Moringa oleifera* L.

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Abstract:
Plants have many phytochemical constituents including Primary and Secondary metabolites. *Moringa oleifera* L. plant belongs to Moringaceae family. The present study was focused on the Qualitative phytochemical analysis of leaves and fruits of Moringa oleifera L. We were used two solvents methanol and chloroform. These Screening of two solvents showed presence of Alkaloids, Flavonoids, 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.

Keywords: *Moringa oleifera* L., Phytochemicals, Secondary metabolites.

Introduction:

Some plants having different medicinal uses and pharmacological activities because of that reason we can put these plants in the category of medicinal plants. These different pharmacological activities are based on the phytochemicals present in the plant. Phytochemicals are naturally occurring in the medicinal plants leaves, stem bark, fruits and roots that have defence mechanism and protect from various diseases. The secondary metabolites are the end products which produced from primary metabolites. Moringa oleifera L. is a medicinal plant which also having lots of phytochemical constituents. Specially Alkaloids, Flavonoids, Terpenoids and Glycosides are dominantly seen in this plant.Here in this work we were screened the secondary metabolites present in the *Moringa oleifera* L. fruits and flowers.

Materials and Methodology:

Collection of Plant material:

The fresh flowers and fruits of *Moringa oliefera* L. were collected from Dashkroi, Ahmedabad, Gujarat, India. (December-2018). The plant materials were identified by Dhruv Pandya, Teaching Assistant, Department of Botany, Bio-informatics, Climate change and Impacts Management, School of Science, Gujarat University.

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Plant Extract Preparation method:

The flowers and fruits 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 andmethanol by dry crude extraction. 10gm weighed powdered material of each sample were treated with different solvents including methanol and chloroform 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.

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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 secondary metabolite analysis methanolic leaves extract showed the presence of Terpenoids alkaloids and glycosides and chloroformic extract of leaves showed presence of Alkaloids and terpenoids.

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As per secondary metabolite analysis methanolic fruits extract showed presence of flavonoids and chloroformic fruit extract showed the presence of alkaloids and glycosides.

Table-1 showing presence and absence of Secondary metabolite in different solvents and parts of *Moringa oleifera* L.

Phytochemicals	Tests	Parts of *Moringa oleifera*			
		Leaves		Fruit	
		Methanol	Chloroform	Methanol	Chloroform
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	-	-	+	+

Conclusion:

Moringa oleifera L. is a medicinal plant because of the presence of alkaloids, flavonoids, 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 *Moringa oleifera* L.

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