



EVALUATION OF PHYSICOCHEMICAL AND PHYTOCHEMICAL PARAMETERS OF VARIOUS PARTS OF *SOLANUM MELONGENA*

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ABSTRACT

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Phytochemical studies play a considerable role in the new drug discovery and finding of plant parts of therapeutic significance from wild resource. Furthermore the process is helpful for exposure of substitution or spurious material in raw drugs as well as in organized formulation. *Solanum* species are commonly used in various therapies for a variety of ailments. Fruits of brinjal is used as vegetable and considered as good source of iron. The roots, leaves, stem, fruit of *Solanum melongena* were collected from local source of Moradabad. It was shade dried, extracted and percentage yield was calculated. Phytochemical screening of the all the plant parts were examined. Pet ether, ethyl acetate, chloroform, ethanolic and aqueous extracts of various parts showed the presence of alkaloids, saponins, flavonoids, tannins/ phenolic, steroids, proteins and carbohydrates. It was concluded that the extracts of all parts contains important constituents for pharmacological activities.

INTRODUCTION

*Solanum melongena* (Eggplant) family Solanaceae is commonly used vegetable fruit found all over world and recognized as a variety of name as garden egg, badnekai, brinjal, aubergine, melanzana, [1] and is one of the chief crops cultivated on over 1.6 million ha all over world. The name eggplant represents its color i.e. white and shape like chicken egg for few varieties. *Solanum melongena* are found in various sizes, shapes and color depend upon the various factors effecting cultivation. Its bitter taste is due to presence of glycoalkaloids. *Solanum melongena* is identified to have good therapeutic properties for diabetic patients. It has also been suggested as a brilliant therapy for liver complaints [3]. It is a herbaceous plant and seed contain large endosperm. A variety of part of plant is used in cholera, cardiotoxic, neuralgias, ulcer of nose, asthma and bronchitis[4]-[7]. In folk medicine leaves are used for piles, boiled root in syphilis. The

Plant's property is due to the flavonoids. The terpenes (steroids) make it useful for bronchitis. Besides, having many traditional uses, *Solanum melongena* is reported to exhibit many important pharmacological actions like antiasthmatic, analgesic and it is also used as astringent[8]-[10]. *S. melongena* is a good source of calcium, phosphorus, iron, carbohydrates and fiber. The juice of leaves used for throat and stomach troubles. It is observed that most of the people do not eat that crown part of the fruit. Therefore the objective of present study was to evaluate several types of phytochemical constituents that are present in the various part of eggplant.

MATERIAL AND METHODS

**Collection, Identification and powdering**

The plant *Solanum melongena* (250 g) was collected from the native of moradabad in the month of October. The root, stem, leaf, aerial part, fruit of *Solanum melongena* were washed;

shade dried, coarsely powdered and kept in airtight container for further studies.

#### **Extraction**

Powdered plant parts of *Solanum melongena* (250 g) were successively extracted with petroleum ether, chloroform, ethyl acetate, ethanol and water separately with the help of soxhlet apparatus. Extracts were dried and percent yield was calculated. Same procedure was repeated with 250 g of powdered plant material.

#### **Determination of Extractive values**

The weighed (20gm) amount of the powdered drug was macerated with the several solvents like petroleum ether, chloroform, ethyl acetate, ethanol and water separately for 24 hours and filtered. The solvent was removed under reduced pressure and percent extractive values in different solvent were calculated as w/w with reference to the air dried drug.

#### **Determination of Ash value Total Ash**

Accurately weighed powdered drug (5gm) was taken in a silicon dish previously ignited & weighed. The powdered drug scattered in a fine even layer on the bottoms of the dish, incinerated by gradually increasing the heat, not exceeding dull red that until free from carbon, kept in desiccator for cooling and weighed.

#### **Acid insoluble and acid soluble Ash**

Ash obtained by above was boiled with 25ml of 2M hydrochloric acid for 5 minutes. Insoluble matter was collected in gooch crucible, washed with hot water ignited and weighed. Percentage of acid insoluble ash and acid soluble ash was calculated with reference to the air dried drug.

#### **Moisture Content**

Air dried powdered drug (5gm) was kept in I.R. moisture balance and dried upto two constant reading. Percent moisture content was calculated by following formula-  
Percentage Moisture= $\frac{t1-t2}{t1} \times 100$

t1=initial weight

t2=weight after removal of moisture

#### **Qualitative Chemical Tests**

Extracts obtained using various solvents were subjected to qualitative chemical tests including test for alkaloids, reducing sugars, sterols, Flavonoids, glycosides, tannins, volatile oils and resins as per Indian pharmacopeia 2018.

## **RESULTS AND DISCUSSION**

### **Preliminary Phytochemical studies**

In present study an attempt was made to study the phytochemical, and Pharmacological activities of different extracts and isolated compounds of *Solanum melongena*. The proximate values such as moisture content, ash value, extractive value, were carried out. The dried root, stem, leaf aerial part and fruits were powdered and successively extracted by different solvents like pet ether, chloroform, ethyl acetate, ethanol and water starting from non-polar to polar solvent. All the successive extracts were subjected to phytochemical screening. The various extracts were subjected for the isolation of phytoconstituents by TLC, general partition and column chromatography respectively. Qualitative chemical test for different extracts of *Solanum melongena* were carried out and the tests have shown the presence of alkaloids, sterols, sugars, flavonoids and phenols in different fractions of root, leaf, stem, aerial part and fruits. (Table 1) Pet ether extract of root shown presence of alkaloids, sterols and reducing suger; ethyl acetate extract shown presence of Flavonoids; chloroform extract shown presence of alkaloids, sterols and reducing sugar; ethanol and aqueous extract showed presence of sterols, reducing sugar, glycosides, Flavonoids and tannins; Pet ether extract of Leaf shown presence of alkaloids and sterols; ethyl acetate extract shown presence of Flavonoids; chloroform extract shown presence of sterols and glycosides; ethanol extract showed presence of sterols, glycosides, and Flavonoids; and aqueous extract showed sterols, reducing sugars and tannins. Pet ether extract of stem shown presence of reducing suger; ethyl acetate extract shown presence of reducing sugar and Flavonoids; chloroform extract shown presence of reducing sugar and glycosides; ethanolic extract showed presence of sterols, reducing sugar, glycosides, Flavonoids and; Aqueous extract showed sterols, reducing sugar, glycosides, Flavonoids and phenolic compound. Pet ether extract of aerial part shown presence of alkaloids, sterols and reducing suger; ethyl acetate extract shown presence of Flavonoids; chloroform extract shown presence of alkaloids, sterols and reducing sugar; ethanol and aqueous extract

showed presence of sterols, reducing sugar, glycosides, Flavonoids and tannins; Pet ether extract of fruit shown presence of alkaloids, sterols and reducing suger; ethyl acetate extract shown presence of Flavonoids; chloroform extract shown presence of alkaloids, sterols, reducing sugar; ethanol and aqueous extract showed presence of sterols, reducing sugar, glycosides, Flavonoids and tannins.(Table 1) Moisture content were 3.04, 3.27, 2.43, 3.27,9.91; total ash were 2.13, 19, 9.5, 7.9, 6.6; water soluble ash were 9.64, 10.58,6.1, 3.3 and 3.2; water soluble extractive value 12.3, 19.1,

8.24, 7.36, 7.48; Alcohol soluble extractive value 9.34, 9.72,4.79, 8.6, 6.9; loss on drying 7, 8, 6, 8, 6 for root, leaf, stem, aerial parts, fruits respectively.

**Extractive values**

Extractive values for Pet ether extracts were 3.74, 4.6, 5.6, 6.1and 2.1; Chloroform were 4.64, 3.5, 4.2, 2.7 and 6.2; Ethyl acetate were 6.53, 9.0,7.9, 3.8, and 8.4; ethanol were 8.86, 7.3, 9.1, 1.8, and 4.0; Aqueous were 5.53, 7.2, 6.3, 7.9 and 3.3 for fruit, leaf, aerial part and stem respectively. (Table 2)

**Table 1 : Phytochemical screening of different extracts of *Solanum melongena*.**

S.N 0	Plant part	Extracts	Alkaloid s	Sterol s	Reducing sugar	Glycoside	Flavonoids	Tannins
1	Root	Pet.ether	+	+	+	-	-	-
		Ethyl acetate	-	-	-	-	+	-
		Chloroform	+	+	+	-	-	-
		Ethanol	-	+	+	+	+	+
		Aqueous	-	+	+	+	+	+
2	Leaf	Pet.ether	+	+	-	-	-	-
		Ethyl acetate	-	-	-	-	+	-
		Chloroform	-	+	+	+	-	-
		Ethanol	-	+	+	+	+	-
		Aqueous	-	+	+	-	-	+
3	Stem	Pet.ether	-	-	+	-	-	-
		Ethyl acetate	-	-	+	-	+	-
		Chloroform	-	-	+	+	-	-
		Ethanol	-	+	+	+	+	-
		Aqueous	-	+	+	+	-	+
4	Aerial parts	Pet.ether	+	+	+	-	-	-
		Ethyl acetate	-	-	+	-	+	-
		Chloroform	-	+	-	-	-	-
		Ethanol	-	+	-	+	+	-
		Aqueous	-	+	+	+	-	+
5.	Fruits	Pet.ether	+	+	+	-	-	-
		Chloroform	+	+	+	-	-	-
		Ethyl acetate	-	+	+	-	+	+
		Ethanol	-	+	+	+	+	+
		Aqueous	-	+	+	+	+	+

**Table 2: Physicochemical parameters of Different part of *Solanum melongena*.**

S.NO	Parameter	Root	Leaf	Stem	Aerial parts	Fruits
1	Moisture content %	3.04	3.27	2.43	3.27	9.91
2	Total ash %	2.13	19	9.5	7.9	6.6
3	Acid insoluble ash %	0.7	6.2	3.3	4.3	0.9
4	Water soluble ash %	9.64	10.58	6.1	3.3	3.2
5	Water soluble extractive value %	12.3	19.1	8.24	7.36	7.48
6.	Alcohol Soluble Extractive value %	9.34	9.72	4.79	8.6	6.9
7.	Loss on drying	7	8	6	8	6

**Table 3: Extractive Values of the different part of *Solanum melongena*.**

S.NO	Solvent	Fruit	Root	Leaf	Aerial parts	Stem
1	Pet. ether	3.74	4.6	5.3	6.1	2.1
2	Ethyl acetate	6.53	9.0	7.9	3.8	8.4
3	Chloroform	4.64	3.5	4.2	2.7	6.2
4	Ethanol	8.86	7.3	9.1	1.8	4.0
5	Aqueous	5.53	7.2	6.3	7.9	3.3

## DISCUSSION

Today's scenario requires that we have to use all the flora and fauna around us. In this epidemic era it is necessary to research all parts of plants for any powerful compound that can cure new pathogens. This is a warning that we may have to suffer from more viruses or environmental problems. In order of this, new nutraceuticals are being searched like Wheat, Brinjal, Paan, [11][12] etc. Present research work is a link to this. Even now many chemical constituents of *Solanum melongena* have not been touched yet.

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