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Physico-chemical analysis of *Sauromatum guttatum* (Wall.) Schott tubers and leaves extracts

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Abstract

The present study consists of physico-chemical analysis of *Sauromatum guttatum* (Wall.) Schott tubers and leaves. In physico-chemical analysis, ash values (total ash, acid insoluble ash and water soluble ash), moisture content, swelling index, foreign organic matters, Water soluble extractive values and alcohol soluble extractive values were determined as per standard procedures. Total ash, water soluble ash, acid insoluble ash, moisture content, swelling index, foreign organic matters, water soluble extractive value, alcohol soluble extractive value of *Sauromatum guttatum* (Wall.) Schott tubers were found to be 7.25% w/w, 3.50% w/w, 1.13% w/w, 1.29% w/w, 3.16% w/w, 1.89% w/w, 19.86% w/w, 12.27 % w/w respectively and total ash, water soluble ash, acid insoluble ash, moisture content, swelling index, foreign organic matters, water soluble extractive value, alcohol soluble extractive value of *Sauromatum guttatum* (Wall.) Schott leaves were found to be 10.48% w/w, 5.16% w/w, 2.61% w/w, 2.18% w/w, 3.10% w/w, 1.92% w/w, 15.29% w/w, 10.18% w/w respectively. Fluorescence analysis of *Sauromatum guttatum* (Wall.) Schott tubers and leaves extracts were also reported.

Keywords: physico-chemical analysis, extractive values, moisture content, swelling index, foreign organic matters

Introduction

Sauromatum guttatum (Wall.) Schott is a plant belongs to family Araceae. It is local to upland territories of Africa and Asia, voodoo lily has blossoms that radiate a foul smell taking after decaying meat. This smell pulls in insect pollinators, for example, flies. In spite of its foul smell, voodoo lily is prominently developed as an ornamental. Its notoriety is expected to some extent to it being one of the least demanding aroids to proliferate and one of the hardest to kill.[1] In hindi, it is known as sanp ki butti.[2,3] It has been generally disseminated from tropical Africa to China, also found at Gangetic plains, Central India and Himalayas (up to about 1650 m. alt.), voodoo lily is accounted for to happen in different natural surroundings including evergreen forest, riverine forest, grass localities, ravine slopes and wet savannah, mostly in damp or wet areas in the shade and other place in the region of occurrence. In India, it is found at Siwaliks, Punjab, Ichalkaranji, Kagal, Kartikswami Ghat, Kolhapur, Chhota Nagpur, Mumbai, Ramling, Wai. and Western Ghats. Tubers are very large, globose, upto 15 cm diameter, producing buds from the top and sides. Leaves are pedatisect, solitary; 15-30 cm broad; segments 7-15 variable, elliptic and acuminate.[4, 5]

Material and Methods

Selection, collection and authentication of tubers and leaves of plant

The tubers and leaves of plant were gathered in the month of July-September 2016 from the different local sites of Rewa and Jabalpur areas of M.P. and identified & authenticated by Dr. S. N. Dwivedi, Prof. and Head, Department of Botany, Janata P.G. College, A.P.S. University, Rewa, M.P. and then it was deposited in our laboratory, voucher specimen No. PCog/SG/16.

Treatment and sampling of tubers and leaves of plant

The tubers and leaves of plant were air-dried in the shade for drying herbal plant materials and subsequently comminuted to coarse powder with a grinder.

Physicochemical evaluation

The dried parts (tubers and leaves) were subjected to standard procedure for determination of diverse physicochemical parameters.

Determination of foreign organic matter (FOM)

100 grams of the drug sample of tubers and leaves of *Sauromatum guttatum* both were carefully taken and spread out in a thin layer. Foreign matter must be detected by inspecting with unaided eye or with the help of lens (6 x). After separation and weighed, the present percentages of both parts were calculated.

Determination of moisture content (LOD)

Drug sample (without preliminary drying) of approximately 10 grams of tubers and leaves of *S. guttatum* were placed after having carefully weighed in a tared evaporating dish and kept for storage in an oven at 105^0 C for 5 hours and weighed. The percentages of loss on drying of both were calculated with reference to the air-dried drug.

Determination of ash value

Determination of the ash values of both parts (tubers and leaves) of *Sauromatum guttatum* are intended to detect low quality products, exhausted drugs and earthy or sandy matter. It can also be used as a means to detect chemical constituents using water soluble ash and acid insoluble ash.

Total ash

The air-dried powder of tubers and leaves of *Sauromatum guttatum* with an accurate amount of 3 gm were weighed separately and kept in a tared silica crucible and incinerated at temperature not greater than 450^0C until it was carbon free, cooled and weighed and therefore the percentages have been calculated of total ash with reference to the dry powder in the air. The percentages of total ash of both parts were also reported with reference to the air-dried powdered drug.

Acid insoluble ash

The ash acquired of both samples of *Sauromatum guttatum* with the above method was boiled for 5 minutes with 25 ml of diluted HCl. The residues were collected on ash less filter paper and washed with warm water, ignited and weighed. The percentages of acid insoluble ash of both parts (tubers and leaves) were intended with reference to the air-dried drug.

Water soluble ash

The ash acquired of both samples *Sauromatum guttatum* in total ash was boiled for 5 minutes with 25 ml of water. The insoluble matters were gathered on an ash-less filter paper, washed with high temperature water and ignited on at a constant weight at low temperature. The weights of the insoluble matters of both parts were subtracted from the weight of the ash. The weight differences characterize the water-soluble ash. The percentages of water-soluble ash of both parts (tubers and leaves) were reported with reference to the air-dried drug.

Determination of swelling index

The swelling index is determined for existence of mucilage in the tubers and leaves. Approximately 1 gram of tubers and leaves of plant *Sauromatum guttatum* separately were weighed accurately and placed in a 150 ml measuring cylinder, after that 50 ml of distilled water was included and kept aside for 24 hours with occasional shaking. The volume occupied by the tubers and leaves was measured after 24 hours of wetting.

Determination of extractive value

This method comprises of the quantity of active components extracted with solvents from a certain quantity of medicinal plant material. It is used for materials for which a suitable chemical or biological test does not yet exist.

Cold maceration

Accurately weighed approximately 4 gm of coarse air dried powder of both parts (tubers and leaves) individually were placed in conical flask with a glass stopper. Macerated with 100 ml of specified solvents (alcohol and water) for the affected plant material for 6 hours, stir frequently and then allowed to stand for 18 hours. It was rapidly filtered carefully so as not to lose solvent, then 25 ml of the filtrate was transferred to a calibrated or tared flat bottom dish and evaporated to dryness in a water bath. It was dried at 105 ° C for 6 hours, kept in a desiccator for cooling for 30 minutes and weighed without postponement. The contents of extractable material in mg per gram of both parts of air-dried material were calculated. For the extractable matter soluble in ethanol, the concentration of solvent specified in the test procedure for the plant material concerned was used; for extractable material soluble in water, water was used as solvent [6-9].

Fluorescence analysis of powdered drug

The powdered drug of both parts was analyzed to determine the fluorescence characteristics with and without chemical treatment. Observations were noticed regarding its colour in daylight and under the ultraviolet (short and long) [10, 11]

Results and Discussion

The physicochemical evaluation of tubers and leaves was carried out. Air dried material was utilized for quantitative determination of physiochemical values. In this study, ash values (total ash, acid insoluble ash and water soluble ash), moisture content, swelling index and foreign organic matters were determined. Alcohol and water soluble extractive values were determined and noted. Alcohol and water extractive values were determined as per WHO recommendations. The results have been shown in Table No. 1. In fluorescence analysis, the tubers and leaves in various solvents were examined under ordinary light and UV light (short and long). The powder was also treated with various chemical reagents and the changes in colour were recorded. The results have been shown in Table No. 2 and Table No.3.

Conclusion

The physicochemical evaluation of tubers and leaves was carried out. In this study, the ash values (which are total ash, acid insoluble ash and water soluble ash), moisture content, swelling index & foreign organic matters were reported. Water soluble extractive was found to be very high when compared to other extractable matter in the drug. Furthermore, the fluorescence analysis of the powdered tubers and leaves in a range of solvents was observed in ordinary light and UV (short and long). The powder was also treated with varied chemical reagents *viz*., 5% $FeCl_3$, 1M H_2SO_4, dil. HNO_3, 5%NaOH, 5%NaOH + Water, 5% Iodine, conc. HNO_3, Ethanol and dil. HCl and the changes in colour were recorded.

Tables and Graphs

Table 1: Physico-chemical analysis of *Sauromatum guttatum* (Wall.) Schott.

S. No.	Parameters	Values Obtained (% w/w)	
		SGT	SGL
1.	Total ash (TA)	7.25	10.48
2.	Water soluble ash (WSA)	3.50	5.16
3.	Acid insoluble ash (AIA)	1.13	2.61
4.	Moisture content (MC)	1.29	2.18
5.	Swelling index (SI)	3.16	3.10
6.	Foreign organic matters (FOM)	1.89	1.92
7.	Water soluble extractive value	19.86	15.29
8.	Alcohol soluble extractive value	12.27	10.18

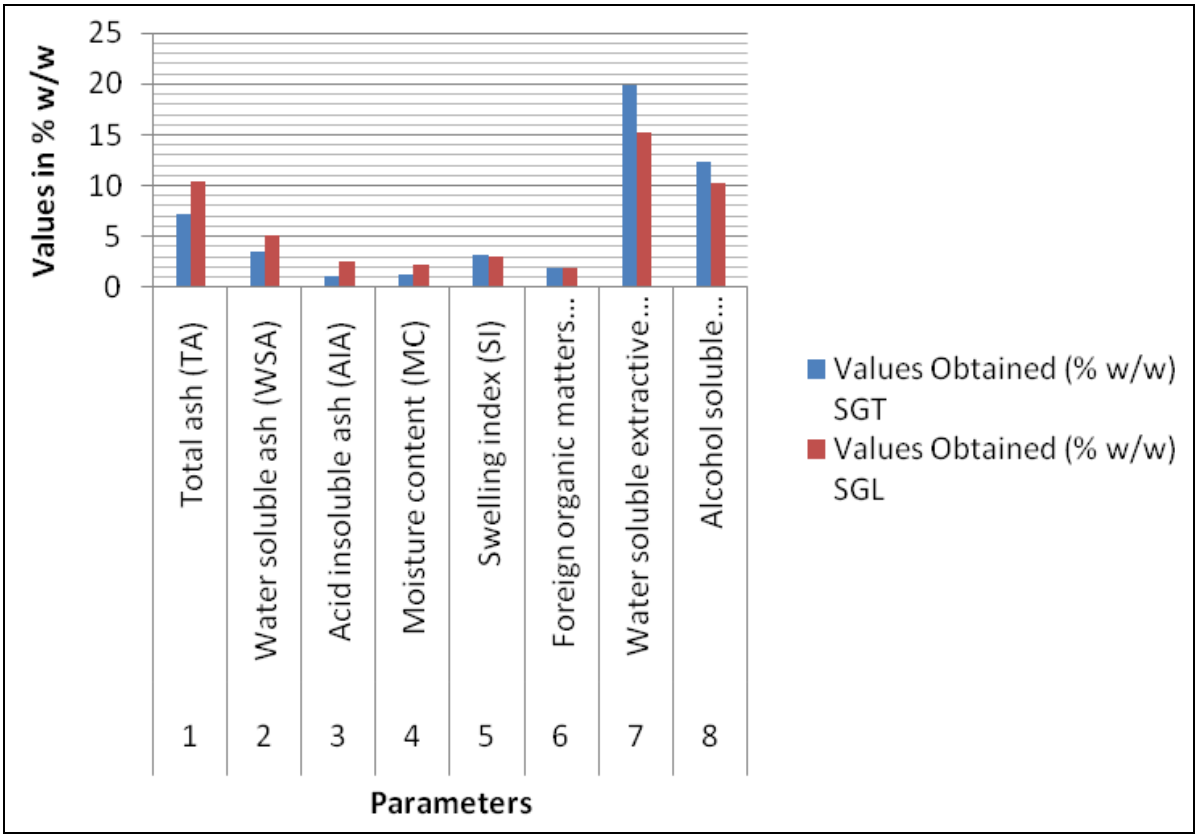

Fig 1: Graphical representation of physicochemical analysis of *Sauromatum guttatum* (Wall.) Schott.

Where

SGT: *Sauromatum guttatum* (Wall.) Schott. Tubers

SGL: *Sauromatum guttatum* (Wall.) Schott. Leaves

Table 2: Fluorescence analysis of tubers of *Sauromatum guttatum* (Wall.) Schott.

S. No.	Powder Crude Drug+ Reagents	Day Light	UV (Short) 254 nm	UV (Long) 366 nm
1.	Powder crude drug as such	Brown	Brown	Dark brown
2.	Drug + 5% $FeCl_3$	Light green	Light green	Dark green
3.	Drug +1M H_2SO_4	Light green	Light green	Green
4.	Drug + Dil. HNO_3	Green	Green	Green
5.	Drug + 5% NaOH	Light green	Light brown	Dark green
6.	Drug + 5% NaOH + Water	Light green	Light green	Light green
7.	Drug + 5% Iodine	Light brown	Light brown	Dark brown
8.	Drug + Conc. HNO_3	Light brown	Light brown	Dark brown
9.	Drug + Ethanol	Light green	Light green	Black green
10.	Drug + Dil. HCl	Dull green	Dark green	Dark green

Table 3: Fluorescence analysis of leaves of *Sauromatum guttatum* (Wall.) Schott.

S. No.	Powder Crude Drug+ Reagents	Day Light	UV (Short) 254 nm	UV (Long) 366 nm
1.	Powder crude drug as such	Dark brown	Dark brown	Dark brown
2.	Drug + 5% $FeCl_3$	Light brown	Light brown	Dark brown
3.	Drug +1M H_2SO_4	Light violet	Light violet	Pale violet
4.	Drug + Dil. HNO_3	Dark green	Light green	Dark green
5.	Drug + 5% NaOH	Pale brown	Brown	Black brown
6.	Drug + 5% NaOH + Water	Pale Green	Light green	Dark green
7.	Drug + 5% Iodine	Light brown	Brown	Blackish brown
8.	Drug + Conc. HNO_3	Light brown	Yellow	Colorless
9.	Drug + Ethanol	Brown	Colorless	Colorless
10.	Drug + Dil. HCl	Brown	Colorless	Colorless

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