

HPTLC Finger Print Profile and Physicochemical Analysis of *Dracaena Trifasciata* (Snake plant)

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ABSTRACT

There are around 70 different species of *Dracaena Trifasciata* (new name *Sansevieria Trifasciata*). It is an air purifier plant which absorbs the air pollutants present in the air. Snake plant is a species of *Dracaena trifasciata* in the family *Asparagaceae* and sub-family *Nolinoideae*, native to tropical west Africa from Nigeria east to the Congo. It is most commonly known as the snake plant, mother-in-law tongue and Saint George's sword among other names, because of the shape and sharp margins of its leaves. Snake plant is one of the most recommended plants for improving air quality. The optimal place to keep this is in your bedroom, because it converts CO₂ into oxygen at night it also removes contaminants from air.

Present study the physicochemical, preliminary phytochemical and HPTLC identification were carried out. Physicochemical tests for the samples *Sansevieria Trifasciata* were performed viz. loss on drying at 105°C, total ash content, acid insoluble ash, alcohol soluble extractive, water soluble extractive, benzene and acetone soluble extractive were carried out.

The phytochemical analysis of *Sansevieria Trifasciata* revealed the presence of certain secondary metabolites which made the plant a significant medicinal plant and as such its use in traditional medicine could be traced to its rich phytochemical constituent especially of alkaloids, carbohydrates and flavonoids.

KEYWORDS: Physicochemical, Phytochemical, HPTLC–Fingerprinting, Total Ash, Loss on drying.

I. INTRODUCTION

It is an evergreen perennial plant which is sometimes above ground, sometimes underground. Its stiff leaves are long, hard and sharp. Mature leaves are dark green with light grey-green cross banding and

usually range from 70-90 centimetres (2.3-3.0ft) long and 5-6 centimetres (2.0-2.4) wide. The *Sansevieria Trifasciata* is shown in figure -1. [1] The NASA conducted a study to the uses of snake plant according to their results they found out that the snake plant absorbs toxins, such as nitrogen oxides and formaldehyde. *Sansevieria trifasciata* is able to absorb 107 types of toxins, including air pollution, cigarette smoke (nicotine), so it would make a great refresher. It also contains phytochemicals such as flavonoids, saponins, and glycosides which reduce the number of bacteria. [2] In China, snake plant decoction is used to avoid snake bites, cough, bronchitis, traumatic injuries. *Sansevieria trifasciata* are used in traditional medicine for the treatment of asthma, abdominal pains, colic, diarrhea, haemorrhoids, hypertension, menorrhagia, piles, sexual weakness, wounds, the foot, cough, leprosy, rheumatism, glandular enlargement. [3],[4]

It is now used mostly as an ornamental plant, outdoors in warmer climates, and indoors as a houseplant in cooler climates. It is popular as a houseplant because it is tolerant of low light levels and irregular watering; during winter, it needs only one watering every couple of months. It will rot easily if overwatered. [5] The plant is cultivated for its fibre in several tropical countries, it is also harvested from the wild for local medicinal use. It is commonly grown as an ornamental in tropical and subtropical regions, and as a pot plant in many other areas of the world. [6] Antioxidants are vital molecules which protect the body from harmful effects caused by radical-induced oxidative stress. Antioxidants are the compounds in which inhibit the oxidant reactions caused by free radicals. Free radicals which are also called as reactive oxygen species (ROS) or active oxygen species (ASO) are compounds during various metabolic cellular processes. The best source of polyphenolic

compounds such as flavoids, flavonoids, phenolic compounds, anthocyanins, phenylpropanoids, anthraquinones which are good antioxidant processes.[7]



Figur-1(Dracaena Trifasciata)

Some medicinal uses of Sansevieria Trifasciata

- The plant is used to treat ringworm and fungal infection.[8]
- The leaf sap is applied directly on infected sores, cuts and grazes. It is also used to treat scabies infection.[9]
- The fibre found in the leaves is used to make ropes, mats etc.[10]
- The leaves of the snake plant are used to make cosmetics.[11]
- The snake plant has anti-diabetic properties like modern and traditional herbal medicines.[12]
- The snake plant has many medicinal properties such as antimicrobial, antiviral, skin rashes and arthritis.[13]

Some Pharmacological Action of Sansevieria Trifasciata

Antibacterial-

Study evaluated the potency of *S. trifasciata* methanol extracts and fractions through antibacterial testing against Gram negative (*E. coli*) and Gram positive (*S. aureus*) bacterial. The methanol extract showed no activity against the tested bacteria. Of 10 fractions, two showed activity for both test bacteria, five against Gram positive bacteria and three showed no activity.[14]

Antiallergic -

The plant is used to treat ringworm and fungal infection also used for boils, cough, bronchitis, traumatic injuries.[15]

Air-Purifying Plant: -

Sansevieria trifasciata is in NASA's list of air-

purifying plants, improving indoor air quality by passively absorbing toxins (formaldehyde, formaldehyde, xylene and toluene). [16]

Aim & Objectives

During the research of present investigation have taken the following objectives pertaining to the pharmacognostical analysis of *Sansevieria Trifasciata* (leaf).

Main objectives of the research work

1. Physicochemical study of *Sansevieria Trifasciata* (leaf)
 - Loss On Drying
 - Water Soluble ash
 - Alcohol Soluble ash
 - Total ash
2. Phytochemical evaluation of *Sansevieria Trifasciata* (leaf)
3. HPTLC - Fingerprinting of *Sansevieria Trifasciata* (leaf)

II. MATERIALS & METHODS

Plant collection and extraction: The Fresh leaves of *Sansevieria Trifasciata* were collected from the Department of Deendayalresearch institute Chitrakoot . The leaves of *Sansevieria trifasciata* were collected in March 2022. The collected Plant was authenticated with the biological department. Then the collected leaves were washed three times And then cut into small pieces of leaves .Then put the cut leaves to drying at room temperature for few days .

Methanol(AR grade).Folinandciocalteu'sPh enolreagent,MolischreagentConc.HCL , H₂SO₄ Dragondrof's reagents, Ethanol, Na₂CO₃, NaOH,CuSO₄.5H₂O ,Potassium sodium tartrate, Phosphate buffer, Sodium sulphide (0.1N), Thiourea(0.3N)

- Physico-chemical parameters.
- Determination of Moisture Content (Loss on drying in at 105°C).
- Determination of alcohol soluble extractive.
- Determination of water soluble extractive.
- Determination of Ash values.
- Determination of total ash.
- Determination of Acid-insoluble ash.

Phytochemical screening : for example, identification of many phytochemicals with Fehling's solution and Benedict's reagent, alkaloids with Meyer and Dragandorf's reagent, Hager's ,Wagner' s , flavonoids with Shinoda and saponins, Protein with mercuric chloride, steroids with H₂SO₄, with ferric chloride Made from tannins, potassium, and mollish.

Preparation of plant extract

2 gm. Powdered sample extracted with 50 ml HPTLC grade methanol (80%) through open air reflux process at 40°C for 6 hour. The extract filtered through filter paper (Whatman No.1) to remove free un-extractable substances. The filters of plant extract were evaporated at room temperature at dryness. And preserved at 4-5°C for further process. Schematic presentation of the extraction procedure is given below .

High Performance Thin - Layer Chromatography of the test solutions of Sansevieria Trifasciata plant was carried out on Silica Gel 60 F254 precoated plates (0.2 mm thickness ; from Merck India Limited Mumbai) . A TLC applicator from CamagLinomat - 5 (Camag Switzerland 140443) was used for band application and photo documentation unit (CamagReprostar - 3 : 140604) was used for documentation of chromatographic fingerprints .

III. RESULTS & DISCUSSION

The Results of physicochemical analysis are given in Table no. 1 – 7 , Phytochemical Analysis are given in Table no. 8 and Rf value of HPTLC fingerprints profile of Sansevieria Trifasciata are given in Table no.9 The results are expressed as standard deviation. The total ash value is An indicative of total amount of inorganic material after complete incineration And the acid insoluble ash value is an indicative of silicate impurities, which Might have arisen due to improper washing of the ingredients. Ash value is useful in determining authenticity and purity of the drug And also these values are important quantitative standards, the extractive Values, alcohol soluble, water soluble, benzene soluble and acetone soluble Indicates the amount of active constituents in given amount of plant material When extracted with respective solvent. The loss on drying value obtained is an indicative of amount of Moisture content could prevent bacteria, fungal or yeast growth. In our study All the findings are within prescribed limits of ayurvedic Pharmacopoeia of India.

Table-1.LossOnDrying(LODValueOfSansevieria Trifasciataleaf)

S.N.	EMPTY PETRIDISH + 2GM POWER W.T.	AFTER 1/2 HOURS DRYING W.T	AFTER 1/2 HOURS DRYING W.T	DIFFERENCE
1	16.0039	15.8315	15.8310	0.1729
2	16.7343	16.5612	16.5623	0.172
3	15.6306	15.4564	15.8319	0.1742
			Total	0.5191

Sample weight – 2gm

Average wt. Difference – $0.5191/3 = 0.1730$

LOD = $0.1730 \times 100/2$

LOD = 8.65 %

Table– 2. Water Soluble Extractive Value Of Sansevieria Trifasciata (leaf)

S.N.	PETRIDISH PREWEIGHT	PETRIDISH FINAL W.T	DIFFERENCE
1	31.1673	31.2638	0.0965
2	31.2758	31.3648	0.0890
3	38.1264	38.2316	0.1051
		Total	0.2307/3

SAMPLE WEIGHT-2gm. Average Weight Difference = $0.0969 \times 500 = 48.45\%$

Table-3. EthanolSolubleExtractiveValueOfSansevieria Trifasciata(leaf)

S.N.	PETRIDISHPREW.T	PETRIDISHFINALW.T	DIFFERENE
1	31.4117	31.4380	0.0263
2	29.8965	29.2923	0.0258
3	31.2596	31.2856	0.026
		Total	0.0781/3

SAMPLEWEIGHT –2gm
AverageWeightDifference=0.0260 ×500
=13.01%

Table-4. BenzeneSolubleExtractiveValueOf Sansevieria Trifasciata(leaf)

S.N.	PETRIDISHPREW.T	PETRIDISH FINALW.T	DIFFERENCE
1	35.2455	35.2473	0.0018
2	35.8072	35.8109	0.0057
3	36.6207	36.6244	0.0037
		Total	0.0112/3

SAMPLEWEIGHT – 2gm
AverageWeightDifference =0.0037 ×500
= 1.86%

Table- 5.AcetoneSolubleExtractiveValueOfSansevieria Trifasciata (leaf)

S.N.	PETRIDISH PREW.T	PETRIDISH FINALW.T	DIFFERENCE
1	36.8076	36.8145	0.0069
2	32.8541	32.8613	0.0072
3	33.1403	33.1472	0.0069
		Total	0.021/3

SAMPLE WEIGHT – 2gm
Average Weight Difference=0.007 × 500 = 3.5%

Table -6.TotalAshvalueofSansevieria Trifasciata (leaf)

S.N.	Crucibleweight	Crucibleweight +2gmsample	1 st Weight	2 nd Weight	3 rd Weig ht	Difference
1	18.3876	20.3850	18.6232	18.6230	18.6229	0.2353
2	16.8210	18.8205	17.0578	17.0581	17.0575	0.2356
					Totalwei ght-	0.4709

SampleWaight-2gm
Average W.t difference- 0.4709/2
Total Ash- 0.2354×100/2 =Ash-11.77%

Table-7.AcidinsolublevalueofSansevieria Trifasciata (leaf)

S.N	W.t.ofEmptycrucible W.t	1 st dayweight	2 nd dayweight	Difference
1	18.3978	18.3978	18.3977	0.0001
2	16.8331	16.8329	16.8326	0.0005
			Total	0.0006

Sampleweight=2gm
Averageweightdifference=0.0006/2
Acidash= 0.0003×100/2
Totalashvalue=0.015 %

Table-8.Preliminaryphyto-chemicalinvestigation

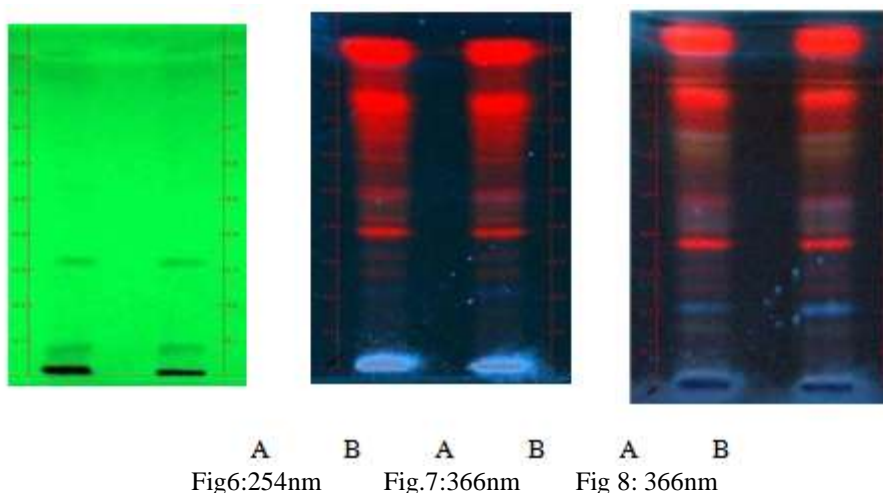
S.N	Phytochemical	Test	Benzene	Acetone	Ethanol	D.Water
1.	Carbohydrate	Fehling test	*	*	+	+
		Benedict's test	*	*	+	+
2.	Alkaloid	Wagner's test	+	-	*	+
		Mayer's test	+	-	*	+
		Dragendorff's test	+	-	*	+
		Hager's test	-	-	-	*
3.	Flavonoids	Shinoda test	*	*	+	*
		Fluorescence Test	*	*	*	+
4	Saponins	Froth test	*	*	*	+
5	Protein		+	+	+	+
6	Gum		*	*	*	-
7	Gelatin		*	*	*	+
8	Steroids		*	*	*	+

(*)Notdone
(+)Present
(-)Absent

HPTLC fingerprint profile of the test solution is depicted in (Fig. 2 and ,3 & 4)indicates the presence of different types of phytochemicals. Development of fingerprint profile would serve as a reference Standard of The authentic sample. The TLC plate was examined under 254nm, 366nm

And after derivatization 366nm. The R_f values and Colours of the bands obtained were recorded. It shows major spots and The R_f values and colours of the bands obtained were recorded and Given in Table

HPTLC fingerprints profile of snake plant



After derivatization Where Track A: test solution of snake plant & Track B: test solution of snake plant

Table-10: R _f values of HPTLC fingerprints profile of snake plant				
S. No.	R _f values	254nm before derivatization	366nm before derivatization	366nm after derivatization
1	R _f 1	0.08 (black)	0.38(red)	0.04(sky blue)
2	R _f 2	0.32(black)	0.42 (red)	0.22 (sky blue)
3	R _f 3	-	0.50(red)	0.38(red)
4	R _f 4	-	0.60(red)	0.50(pink)
5	R _f 5	-	0.76 (red)	0.76(red)
			0.90(red)	0.90(red)

Qualitative phyto-chemical analysis were performed in benzene, acetone, Ethanol and water extracts, various phytochemicals like Alkaloids, carbohydrates, Flavonoids, protein, resin and saponin were present in studied sample of justiciaAdhatoda. Which could make the drug useful for potential and preventive Healthcare needs . LOD was found 8.65% in our studied sample which indicates the drug in Safe And capable to prevent microbial growth. physicochemical test carried out and found water solubleExtractive value where found 48.45% , Ethanol soluble extractive value 13.01%,Benzene extractive value 1.86% and acetone soluble Extractive value3.5%. When Compound with the AFI, ASE and WSE was reported NLT 4% and 20% Respectively Which was accomplish with the standard limit with AFI.Ash total Ash and Acid insoluble ash was calculated and found 11.77% And 0.015% which comprises the limit NLT 22% and 1.5% respectively prescribed In AFI standard. preliminary phytochemical screening was done to Identify the possibility of active constituents for extracts of the drugs in different Solvents.Benzene, Acetone, Ethenol, and Water were screened for Phytochemical And various phytochemicals like alkaloids, flavonoids, saponin, Protein, carbohydrate were present in our study **samples. Which indicates the Drugs therapeutic potential of cure diseases.**

HPTLC Screening was done and plate was observed at254 nm & 366 nm before & after derivetisation with 5% methanolic H2SO4.At 254 nm Measure spot seen at Rf 0.08 (black), 0.32(black) . At 366 nm major spot at Rf 0.38 (red), 0.42 (red) , 0.50 (red) , 0.60 (red), 0.76(red) , 0.90 (red) . Similarly 366 nm after derivetisation major of seen at Rf 0.04 (sky blue) , 0.22 (sky blue) , 0.38 (red) , 0.50 (pink) , 0.76 (red) , 0.90(red). Sky-blue , red, pink , fluorescence , colour major indicates thepresent of Essential oil compounds.

IV. CONCLUSION

The ethanol , benzeen acetone and digital water extract of Sansevieria Trifasciata has been confirmed the presence of carbohydrates , alkaloids, Flavonoids, protein, steroids. In addition , the crude extract has potential Antioxidant , antibacterial , antiallergic, AntiDiabetic/leaves and air – purifying Plant activities .

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