ejpmr, 2017,4(8), 324-328

SJIF Impact Factor 4.161

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

PHARMACOGNOSTICAL EVALUATION OF RHIZOME OF *ZINGIBER OFFICINALE* ROSC.

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Article Received on 23/05/2017 **Article Revised on 13/06/2017** **Article Accepted on 03/07/2017**

ABSTRACT

Zingiber officinale Rosc. belonging to family Zingiberaceae is one of the world's important spices and a widely used medicinal plant in Ayurveda. Medicinal plants have shown tremendous potential for the development of new drug molecules for various serious diseases. The present study deals with pharmacognostical and preliminary phytochemical study of rhizome of *Zingiber officinale* Rosc. The purpose of this study is to determine medicinally active substances present in the sample. Alkaloids, tannins, volatile oil etc. are present in the drug. Pharmacognostical parameters for *Zingiber officinale* Rosc. were studied with the aim of drawing the pharmacopeial standards for the drug. TLC profile was also established.

KEYWORDS- Phramacognosy, Phytochemistry, *Zingiber officinale* Rosc.

INTRODUCTION

The use of plants and other natural substances as medicine can be traced back to *Veda*, classics of Ayurveda and other works of antiquity like Papyrus Ebers (1550 B.C.), works of Hippocrates (460-370 B.C.), Aristotle (384-322 B.C.) and Theopharastus (370-287 B.C.). Still, today the word is looking towards Ayurveda for a safer and side effect free treatment. In order to make sure the safe use of the Ayurveda medicines, the first necessary step is the standardization of the plant drugs. It is the need of houe that the plant drugs should be standardized on the pharmacognostical parameters.

The term Pharmacognosy is derived from two Greek words, 'Pharmacon' means drug and 'Gignosco or Gnosis' means to acquire knowledge. Pharmacognosy is the subject of crude drugs obtained from plant, animal and mineral origin. The crude drugs are plant or animal drugs that have undergone no other processes than collection and drying. Pharmacognosy is defined as the scientific and systematic study of structural, physical, chemical and biological characters of crude drugs along with their history, method of cultivation, collection and preparation for the market.[1] The Standardization of drugs has been given importance even in our ancient texts. It can be traced back to *Atharva Veda*: Pharmacognostic identification of drug with classification (*Khanda 2 & Sookta 7);* Identification according to their gross morphology (*Khanda 2, Sookta 12 - 16 &27);* In *Vishnu Purana,* morphology of the drug is described (VII-37-39). In classics of Ayurveda, *Charak* had described the guidelines for standardization of drugs.[2]

Keeping all the facts in mind, in the present study preliminary pharmacognostical studies of rhizome of *Zingiber officinale* Rosc has been carried out. *Zingiber officinale* Rosc is described in Ayurveda as *Nagar, Shunthi, Vishvaoushadha, Mahaoushadha* etc. It is perennial, creeping herb, rhizome stout, tuberous with erect leafy stem, 60-90 cm.tall. Leaves sessile, linear-lanceolate, 10-25 x 1.5-3 cm, narrowed to the base, acute or acuminate, sheath 10-15 cm.long. Flower greenish white with a small dark purple lip, in oblong, cylindric spikes ensheathed in a few scarious, glabrous bracts 4-7 cm. long. Fruits are oblong capsules.[3]

MATERIAL AND METHODS

Dry rhizomes of *Zingiber officinale* Rosc were bought from crude drug market of Jaipur. The authentication of crude drugs was done at Raw Material Herbarium and Museum, NISCAIR, Delhi. The authentication number of sample is NISCAIR/RHMD/2016/ 2999-26-C. Macroscopic and microscopic evaluation was carried out. The drug was pulverized in mechanical grinder to a moderate fine powder and was stored in an air tight container to carry out further studies. All reagents and chemicals used were of analytical grade.

PHARMACOGNOSTICAL EVALUATION

Macroscopic Study

Material- dry sample

Method- Test samples were spread on table & then examined for size, shape, colour, odour, texture, taste and fracture.

Microscopic Study
Material- Fine powder of dry rhizome of *Zingiber officinale* Rosc., eosin, ferric chloride, methylene blue, safranine.[4]

Method- Powdered sample was stained with the above said dyes. After staining, mounting was done on micro slides.

In this process, sections were transferred on slides & glycerin was added on sections. Then coverslip was put on sections, excess water was wiped out & then the slides were observed in microscope & photos were taken.

Physico-Chemical Analysis
Material- powdered sample, reagents and chemicals of analytical grade.
Methods- As per the guidelines described by CCRAS.[5]

Thin Layer Chromatography
Material- extract of the drug, T.L.C. plate coated with 0.25 mm layer of silica gel G60F 254, n-Hexane, di-Ethyl ether.

Methods- Sample was applied with the help of capillary 1(one) cm above the base of T.L.C. plate. Then it was dipped in mobile solution (n-Hexane: Diethyl ether (4:6). T.L.C. plate was removed from the mobile solution immediately after the spot reached the 1(one) cm below the top of the T.L.C. plate.

OBSERVATIONS AND RESULTS

Table 1. Macroscopic characters of dry rhizome of *Zingiber officinale* Rosc.

S. No.	Parametrs	Observations
1	**Size**	Dry rhizome pieces 1.5 to 2.5 cm. long, 1.6 to 2 cm. wide and o.5 to 1cm. thick.
2	**Shape**	Rhizome, laterally compressed bearing short, flattish, ovate, oblique, branches on upper side each having at its apex a depressed scar
3	**Colour**	Golden red colour or whitish pale yellow
4	**Texture**	Peeled surface smooth in touch and showing longitudinal striation
5	**Odour**	Aromatic (agreeable).
6	**Taste**	Pungent, Spicy, Agreeable.
7	**Fracture**	Short and merely fracture, fibers projecting from the broken surface.

Table 2. Powder Microscopy of dry rhizome of *Zingiber officinale* Rosc.

S. No.	Reagent	Observations	Characterstics
1	Iodine stain	Violet colour	Presence of starch and cellulose
2	Iodine stain	Yellow coloured crystalloid	Presence of prorein
3	Safranine	Red colured crystalloid	Indicate the presence of lignin
4	Methyline blue	Deep blue colour	Indicate the presence of mucilage
5	Eosin	Red coloured crystalloid	Indicate the presence of protein
6	$FeCl_3$ Stain	Bluish black and greenish coloured crystalloid	Indicate the presence of tannins
7	Sudan Red III	Red colour	Fixed oils, volatile oils
8	Sulphuric Acid 60%		Needle shaped crystals of Calcium sulphate showing presence of calcium oxalate.

Table 3. physiochemical analysis of *Zingiber officinale* Rosc.

S.no.	Test	Value	API value
1.	Foreign Matter	0.07%	NMT0.5%
2.	Moisture content	7.6%W/W	Not mention
3.	pH value	6.4	Not mention
4.	Aqueous soluble extract	14.20% W/W	NLT 10%
5.	Alcohol soluble extract	4.2% W/W	NLT 3%
6.	Total ash	4.27% W/W	NMT 6%
7.	Acid insoluble ash	0.49% W/W	NMT 1.5%
8.	Water soluble ash	2.75% W/W	Not mention
9.	Volatile oil	1.3%	

Table 4. Phytochemical analysis of *Zingiber officinale* Rosc.

Carbohydrate test			
Sr. no.	Name of test	Aqueous extract	Alcohol extract
A.	Molisch test	+ve	+ve
B.	Benedict test	+ve	+ve
C.	Barfoed's test	-ve	-ve
D.	Fehling test	+ve	+ve

Alkaloids			
A.	Dragondrof test	-ve	+ve
B.	Wagner's test	-ve	+ve
C.	Hager's test	-ve	+ve

Amino acids			
A.	Ninhydrine test	-ve	+ve

Proteins			
A.	Biuret test	+ve	+ve
B.	Xanthoprotic test	+ve	+ve
C.	Millon's test	+ve	-ve

Saponin			
A.	Foam test	+ve	-ve

Glycosides			
A.	Borntragor's test	+ve	+ve

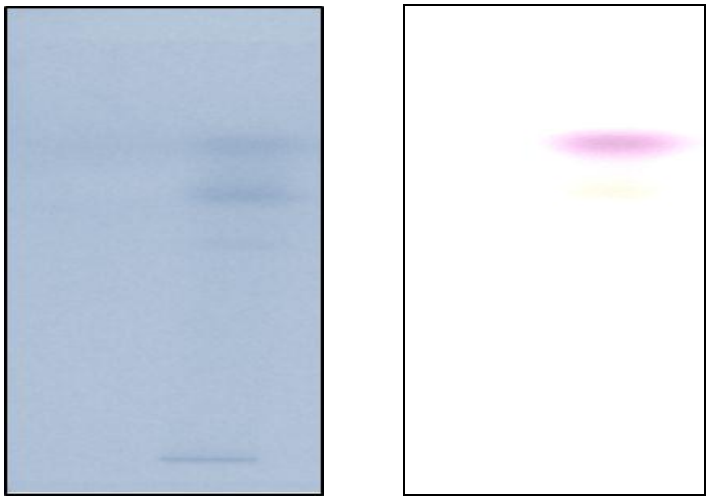
Phenolic compound			
A.	Phenolic test	-ve	+ve

Steroids			
A.	Salkowaski reaction	-ve	+ve

Tannin			
A.	$FeCl_3$ test	-ve	+ve
B.	Lead acetate test	+ve	+ve
C.	Potassium dichromate test	+ve	-ve

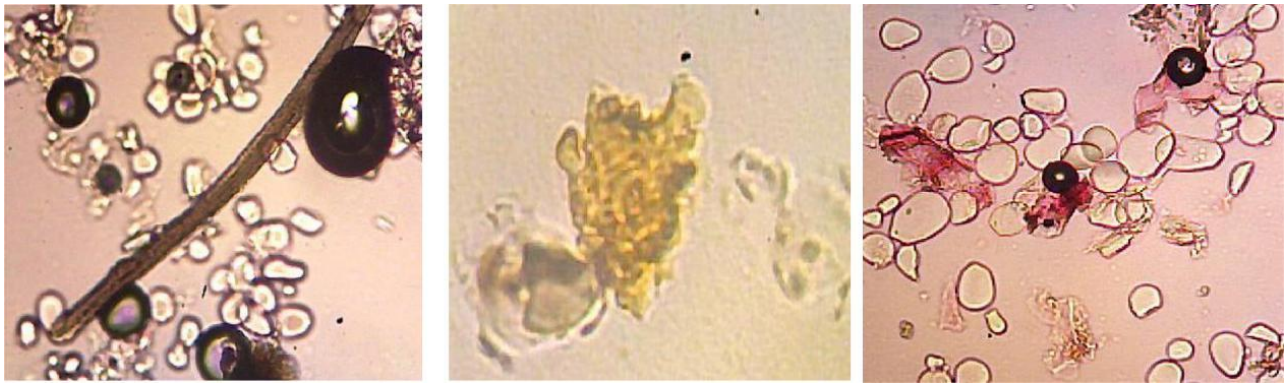
Table 5. Rf Value of TLC of *Zingiber officinale* Rosc.

Spot	Rf value
Visualization in 254 nm	
1	0.63
2	0.68
3	0.77
Visualization in day light	
1	0.60



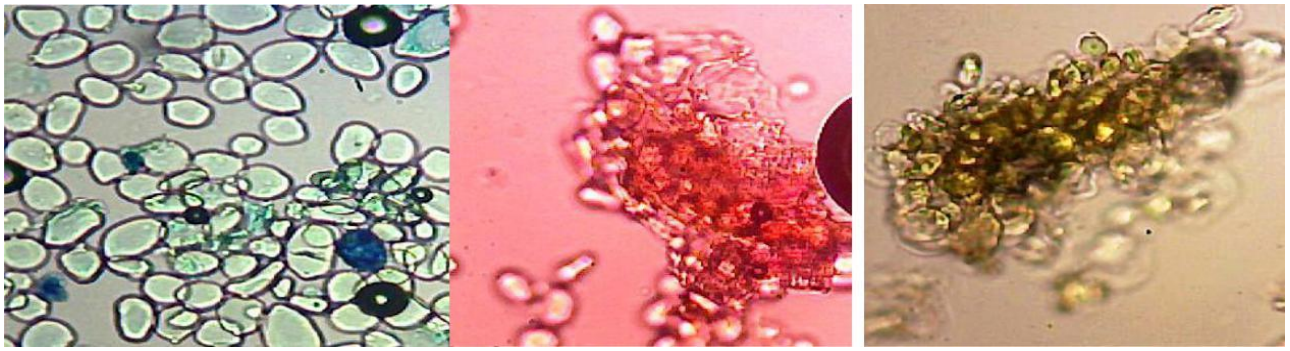
Visualization in 254 nm **Visualization in Day light**

Figure 1. Chromatography



Iodine Stain (starch) Iodine Stain (protein) Safranine (lignin)

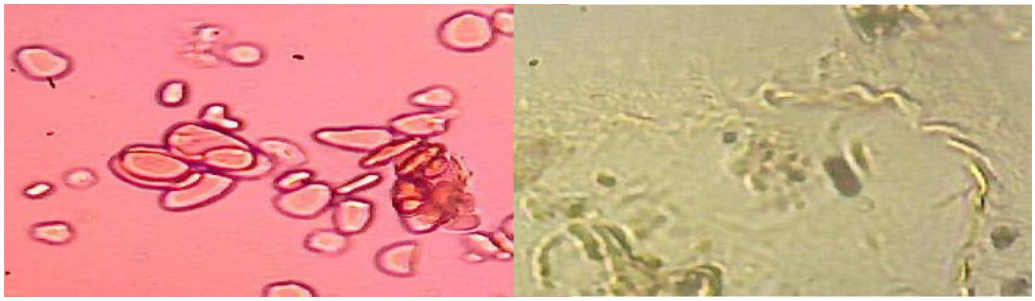
Figure 2. Powder Microscopy



Iodine stain (starch)
Methylene blue (mucilage)

Iodine stain (protein)
Eosin (protein)

Safranine (lignin)
$FeCl_3$ (tannins)



Sudan red III
(Fixed oils, fats, resins)

Sulphuric Acid 60%
(Calcium sulphate crystals)

DISCUSSION

Pharmacognosy research studies play an important role in identification of authentic drugs. It helps in drug identification in every aspect. The powder microscopy of dry rhizome of *Zingiber officinale* Rosc showed the presence of starch, protein, mucilage, tannins, fixed oil, fat, resins and crystals of calcium sulphate. In the phytochemical study it was found that carbohydrates, proteins, glycosides and tannins are present in both aqueous extract and alcoholic extract while alkaloids, amino acids, phenolic compounds and steroids are present in alcoholic extract only. Saponins are found to be present in aqueous extract only. TLC profile indicated the presence of various chemical constituents. The Rf value 0.60 as visualized in day light marks the presence of primary chemical constituent Gingerol.

CONCLUSION

The dry rhizome of *Zingiber officinale* Rosc was found to be authentic and values of all the parameters were as per API. The parameters whose values are not mentioned in API were also evaluated. This can be fruitful for further researchers.

REFERENCES

1. Gokhale S.B., Kokate C. K., Purohita A.P., A textbook of Pharmacognosy, Nirali Prakashan, Pune, 2012; 1.2.
2. Agnivesha, Charak Samhita with Ayurveda Dipika Commentary, editor Yadav Ji Trikam Ji Acharya, Chaukhambha Surbharti Prakashan, Varansi, 2014; 275.
3. P.C.Sharma, M.B.Yelne, Assisted by Aruna Joshi, Database on Medicinal Plants used in Ayurveda, Volume X - Central Council For Research in Ayurveda and Siddha, New Delhi, 2002; 315.
4. Dr. K.R. Khandelwal. Practical Pharmacognosy, 20th edition, Nirali Prakashan, Pune, 2010; 5.2-5.5
5. Lavekar G.S. et.al., Laboratory guide for analysis of Ayurveda & siddha formulations, CCRAS, New Delhi, 2010; page 27, 28,29,30, 83-87, 89-92.