

PRELIMINARY COMPARATIVE PHARMACOGNOSTIC STUDY OF GENUINE AND ADULTERANT RAW MATERIAL IN ATIVISHA (*ACONITUMHETEROPHYLLUM WALL. EX ROYLE*)

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ABSTRACT

Ativisha consists of the dried tuberous root of the aconitum heterophyllum wall. ex royle of ranunculaceae family. a perennial herb native and endemic to western himalayas. it is popular drug that is extensively used in ayurvedic pediatric medicine, specially used in respiratory disorders, fever, diarrhoea and vomiting in children. the fact that the suppliers of crude herbal materials are mostly traders having limited knowledge of their true identity. due to unavailability and high cost, they use their substitutes and adulterants in order to get more and more benefits. children's being more vulnerable, special care has to be taken in selecting the drugs. this paper includes preliminary pharmacognostical but very important aspects to ensure the standard and quality assurance of the raw drug of ativisha. preliminary comparative pharmacognostic study of genuine and adulterant raw material in ativisha. here the sample genuine ativisha with both small and big sized starch grains and taste is bitter followed by salivation in the mouth it may official ativisha. where the other sample with big starch grains with sweet taste may be an adulterated market sample sold under the name of ativisha.

KEYWORDS: Ativisha, Aconitumheterophyllum, Quality assurance, Adulteration.

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INTRODUCTION

Ativisha is the dried tuberous root of Aconitum heterophyllum Wall. Ex Royle of the family Ranunculaceae.⁽¹⁾ A perennial herb native and endemic to the Western Himalayas that grows at an altitude of 2000 to 5000 meters in the Himalayas. It is a distinctive species of the Sikkim, Nepal, and Chumbiregion.⁽²⁾ It has antipyretic, antibacterial, anthelmintic, antitussive and anti-inflammatory actions, and is used in the treatment of bronchitis, chronic cough, upper respiratory tract infections. It is a natural drug that is commonly used in pediatric Ayurvedic medicine.⁽³⁾ In their natural environments, many plant species have a restricted range, requiring conservation measures for protection.

The lack of availability of such medicinal plants in the raw drug market has led to arbitrary substitution and adulteration.⁽⁴⁾ Adulteration is a method of partially or completely replacing the original crude drugs with other substances that are either free from or inferior to therapeutic and chemical properties with the purpose of raising benefit.⁽⁵⁻⁶⁾ The records of adverse events or side effects are invariably found not to be due to the intended herb, but rather to the presence of an unwanted herb.⁽⁷⁾ This paper include preliminary pharmacognostical but very important aspects to ensure the standard and quality of raw drug of Ativisha.

MATERIAL AND METHODS

Collection of study material

The study materials were collected from raw material store, in-house pharmacy, MGACH and RC, Wardha procured as Ativisha and genuine sample from Shri shailmedipharm Nagpur.

Identification and authentication

The study material was identified and authenticated from the Department of Dravyaguna (Ayurvedic pharmacology and material medica), MGACH and RC, Wardha.

Histological study

External morphological features of the tubers were observed using a dissecting microscope. Transverse section (TS) of the tubers was taken, the plant material was microscopically studied. Freehand transverse sections of tubers were taken and examined. Various organoleptic parameters (shape, texture, color, odor, and taste) of the tubers were studied by organoleptic evaluation. Histological and powder microscopy were carried out by using standard reagents and stains.^(8,9)

Microphotographs were taken using a microscope NLCD-307B LCD Digital Microscope at different magnifications (4x, 10x and 40x)

OBSERVATIONS AND RESULTS

Table 1: Organoleptic parameters of raw drugs

Organoleptic parameters	Ativisha	Adulterate
Shape	Rounded to spindle length - 2 cm to 8 cm Width - 0.4 cm to 1.5 cm	Cylindrical length - 2 cm to 10 cm Width - 0.4 cm to 2 cm
Color	Whitish grey	Whitish grey
Odor	No characteristic smell	No characteristic smell
Taste	Bitter	Sweet
Texture	Faintly longitudinal wrinkled, few whitish scars of rootlets	Faintly longitudinal wrinkled

Table 2: Organoleptic parameters of powder

Organoleptic parameters	Ativisha	Adulterate
Color	Buff	Cremish
Odor	Slightly bitter	Slightly sweetish
Taste	Bitter ends in salivation	Sweet

Table 3: Histological features of Ativisha and Adulterate Ativisha

Characters	Ativisha	Adulterate
Exoderm	Lignified 1-2 layers	Suberized more than 3 layers
Vascul bundles	4-6 strands	More than 10
Central stellar vascular strand	4-5	Randomly arranged
Starch grains	Simple and compound	Simple



Figure 7: Powder of genuine Ativisha



Figure 8: Powder of Adulterant Ativisha

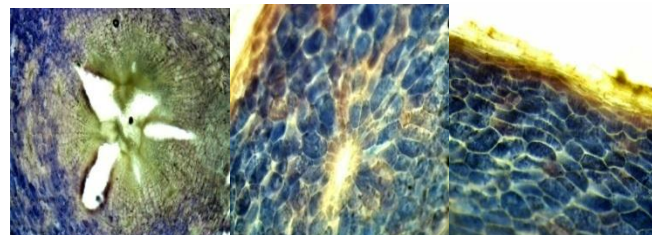


Figure 9: Histological study of genuine Ativishastaining with iodine solution (a) t.s of genuine Ativishatuber (b) Elongated paranchymatus cell (c) Enlarged view of paranchymatus cell

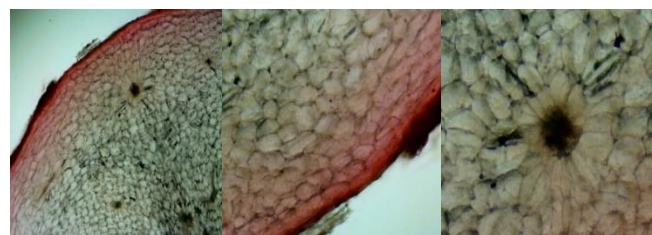


Figure 10: Histological study of genuine Ativisha staining with safranin solution (a) t.s of genuine Ativishatuber, (b) Elongated paranchymatus cell, (c) Enlarged view of paranchymatus cell

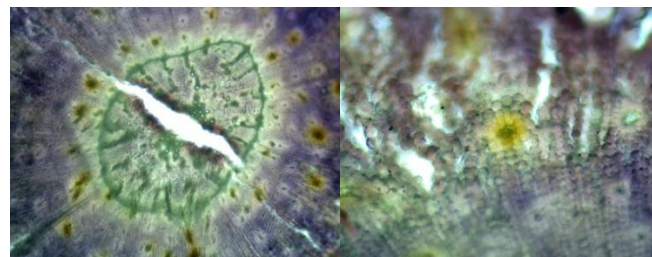


Figure 11: Histological study of adultrante Ativisha staining with iodine solution (a) t.s of adultrante Ativishatuber, (b) Elongated paranchymatus cell

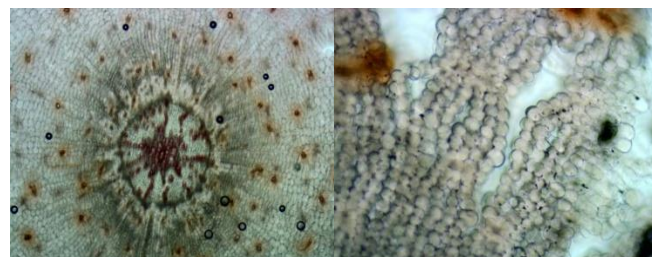


Figure 12: Histological study of adultrante Ativisha staining with safranin solution (a) t.s of adultrante Ativishatuber, (b) Elongated paranchymatus cell



Figure 1: Tubers of genuine Ativisha



Figure 2: Procured as Tubers of Ativishashail from Shri medi pharm Nagpur from raw material store, in-house pharmacy



Figure 3: External morphology of tubers of tubers



Figure 4: External morphology of tubers of genuine Ativisha Adulterant Ativisha



Figure 5: Schematic section of tubers



Figure 6: Schematic section of tubers of genuine Ativisha Adulterant Ativisha

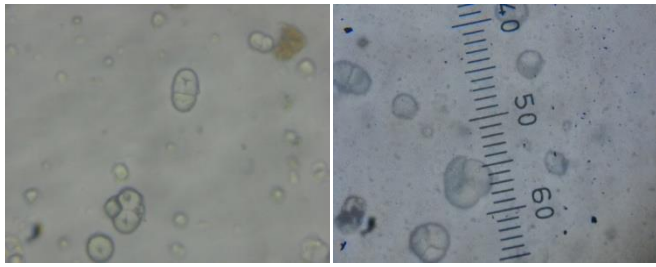


Figure 13: Powder microscopic study of genuine Ativisha (a) Simple and compound starch grains 10x (b) Micromerement 40x

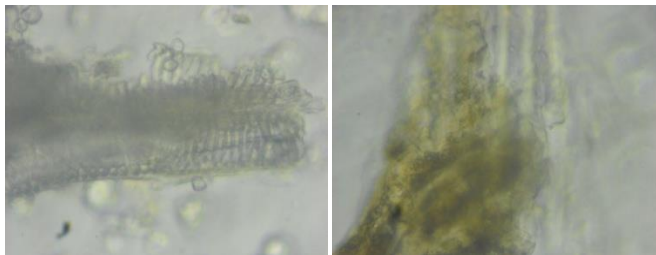


Figure 14: Powder microscopic study of genuine Ativisha (a) Scalariform vessels 40x (b) Brown content 40x

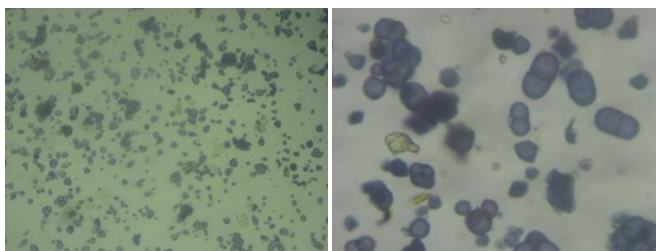


Figure 15: Powder microscopic study of genuine Ativisha (a) Iodine stained starch grains 4x (b) Iodine stained starch grains 10x

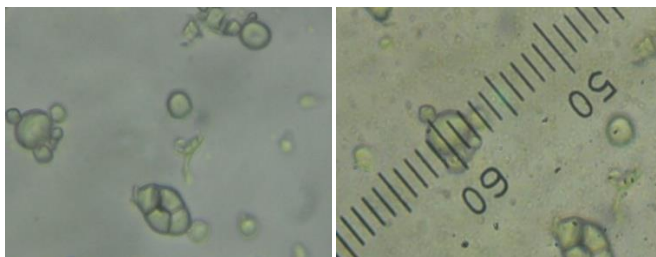


Figure 16: Powder microscopic study of adulterant Ativisha (a) Simple and compound starch grains 10x (b) Micromerement 40x

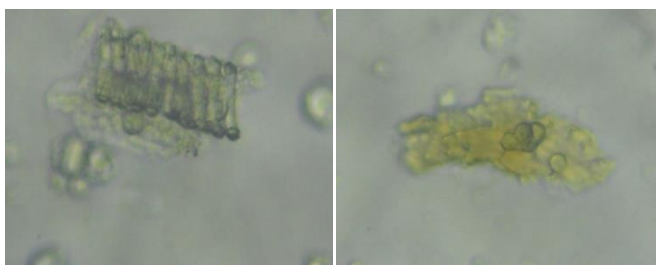


Figure 17: Powder microscopic study of adulterant Ativisha (a) Annular vessels 40x (b) Brown content 40x

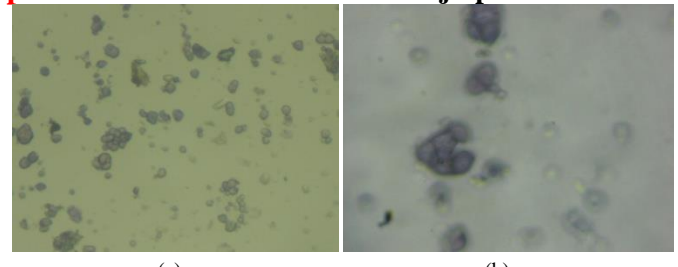


Figure 18: Powder microscopic study of adulterant Ativisha (a) Iodine stained starch grains 4x (b) Iodine stained starch grains 10x

DISCUSSION

Organoleptic characters

The root (tuber) of Ativisha rounded to the spindle in shape measures about 2 cm to 8 cm in length and 0.4 cm to 1.5 cm in width. Externally whitish-grey in color, while some root scars on the tuber. Bitter in taste and not having any characteristic odor. [Table 1, Figure 1]

The adulterant root (tuber) of Ativisha cylindrical in shape measures about 2 cm to 10 cm and 0.4 cm to 2 cm in width. Externally yellowish-brown in color. Sweet in taste and not having any characteristic odor. [Table 1, Figure 2]

Histological study

Diagrammatic Ativisha T.S. shows that outer exoderm followed by cortex and central stellar region. Detailed T.S of the root tubers of Ativisha (*A. heterophyllum*) showed that outer exoderm made up of collapsed parenchyma like cells with brown content and are also lignified followed by the large cortex. In the cortical zone of the tuber, there are 4-6 "vascular strands." Each exarch vascular strand has 4-6 radiating xylem strands, with parenchyma cells filling the gaps. In a more or less discontinuous ring, phloem grows in patches just outside the xylem strands. In the gaps between the phloem patches, the parenchyma cells of vascular strands continue into the ground tissue. The ample amount of simple and compound, round to oval starch grains embedded in cortical cells. The parenchyma cells are in very regular radiating files (cambiform), which some previous researchers mistook for cambium. The entire perimeter is covered by a single-layered endodermis with thickened inner tangential walls and radial walls thickened with both suber in and lignin. Inside the endodermis, a few layers of cells are divided into an outer zone of 2 to 3 layers of cork and an inner zone of 2 to 3 layers of thin-walled cells. The central stellar region is occupied by 4 patches of the xylem vessels up to the centre with xylem fibers and parenchyma cells. [Table 3, Figure 9, 10, 13, 14, 15]

Diagrammatic market adulterated T.S. shows that outer exoderm followed by cortex and central stellar region. Detailed t.s of the adulterated root tubers of Ativisha showed that the outer exoderm made up of collapsed parenchyma like cells with brown content and are also not lignified followed by the large cortex. The tuber has abruptly distributed "vascular strands" embedded in the cortical zone. Each exarch vascular strand has 2-4 radiating xylem strands, the large Parenchyma cells occupy the spaces between them. In a more or less

discontinuous ring, phloem grows in patches just outside the xylem strands. In the gaps between the phloem patches, the parenchyma cells of vascular strands continue into the ground tissue.. The ample amount of simple and compound, round to oval starch grains embedded in cortical cells. The parenchyma cells are arranged in very regular radiating files (cambiform). Suberin thickens the inner tangential and radial walls of those cells, and a typical single layered endodermis spreads over the entire perimeter. Outside the endodermis, a few layers of cells are divided into an outer zone of 2 to 3 layers of cork and an inner zone of 2 to 3 layers of thin-walled cells. The central stellar region occupied by the radically arranged more xylem vessels up to the centre with xylem fibers and parenchyma cells. [Table 3, Figure 11, 12, 16, 17, 18]

Diagnostic characters observed under the microscope of adulterate Ativisha are big-sized simple starch grains with hilum measures of about $0.02\mu\text{m}$, 2compound starch grains with more than 5 divisions with $0.1-3\mu\text{m}^2$, Annular vessels, and brownish content.

Diagnostic characters observed under the microscope genuine Ativisha are small measures $0.01\mu\text{m}^2$ and big sized simple starch grains with hilum measures $0.05\mu\text{m}^2$, about, compound starch grains with 4 divisions with $0.1-5\mu\text{m}^2$, scalariform vessels, fibers and brownish content.

CONCLUSION

Here the sample genuine Ativisha with both small and big sized starch grains and taste is bitter followed by salivation in the mouth it may official Ativisha. Where the other sample with big starch grains with sweet taste may be adulterated market sample sold under the name of Ativisha. Though this groundwork requisites for preliminary pharmacognostic standardization of Ativisha is covered in the current study, additional important analysis and investigations are required for the identification of all the physico-chemical characters of test drugs to substantiate the clinical efficacy.

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CONFLICT OF INTEREST

Nil

ETHICAL CLEARANCE

Taken from institutional ethics committee

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