ORIGINAL RESEARCH PAPER
Volume - 9 | Issue - 9 | September - 2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ILLUSTRATIVE ATLAS ON ANATOMICAL AND PHYSICOCHEMICAL STANDARDS OF KETAKI (*PANDANUS ODORATISSIMUS* L.) FRAGARNT MALE INFLORESCENCE USED IN AYURVEDA.

Ayurveda

Brijesh	Professor, Department of Agadatantra, JSAM, Nadiad, Gujarat.
Nesari Tanuja	Director, All India Institute of Medical Sciences, New Delhi.
Mallya Suma V*	Associate professor Department of Dravyaguna Sri Dharmasthala Manjunatheshwara College of Ayurveda, Kuthpady, Udupi. *Corresponding Author
Kamat Madhusoodan	Former Associate professor, CIMR, MAHE
Sunilkumar KN	Research officer, Siddha Central Research Institute, CCRAS, Minisrty of AYUSH, Chennai, Tamilnadu, India.

ABSTRACT

About: Fragrant inflorescence of *Pandanus odoratissimus* L. are used in various therapeutic condition in Ayurveda. **Materials and Methods:** Male Inflorescence of *test drug* were collected from their natural habitat subjected for macro-microscopy and physicohemical study. **Results:** Spadix of male flowers 25-30 cm long, enclosed in long, white, fragarant, caudate acuminate spathes. TS of peduncle show a typical character of a monocot stem with outer epidermis; the ground tissue is made up of thick-walled parenchyma cells and vascular bundles found scattered in the ground tissue. TS of spathe exhibit typical character of a monocot leaf, both epidermmii are papillose with thick outer wall having thick coating of cuticle; about 2 to 3 layers under the epidermis shows drops of volatile oil; TS through lamina also show similar structure found in spathe. Physico-chemical constants of a fragrant corolla shown loss on drying as (13.97), total ash 9.885, acid insoluble ash 0.447 and extractive values as 2.533 and 13.159 in alcoholic and water respectively.

KEYWORDS

Pandanus odoratissimus L., macro-microscopy, Physico-chemical

INTRODUCTION:

Pandanus odoratissimus L. a source of Ketaki is a densely branched shrub; the fragrant spadices which are used in the extraction of Kewda attar, the most popular perfume extracted and used in India since ancient days[1]. This plant found commonly throughout the hotter moister parts of India, especially in coastal areas of Indian Peninsula on both sides and Andaman[2]. Banks of river, canals, fields, ponds are said to be its natural habitat, and these plants are considered to be good soil binder. Around 600 species are found in this pandanus genus all over the world whereas 40-60 are found in India[3]. Stem of this shrub is 6m high, supported by aerial roots[4]. The tree begins to flower 3 to 4 years after planting, matured tree gives flower during rainy season[5]. Flower may take minimum 15 days to mature depending upon geographical condition, and a fully mature tree may bear 30-40 spadices per year[6]. The male inflorescence valued for the fragrant smell emitted by the tender yellowish-white spathes covering the flowers and valuable attar obtained from them[7].

All parts of this plants are reported to be used medicinally; like roots, flower, fruit. The fragrant flowers are said to be carminative, stomachic, cooling and antiseptic[8]. These are beneficial in headache, psychological illness, ulcers, dysuria, scabies and other skin disease[9]. The essential oil extracted out of the flowers (*Ketaki arka*) effective remedy in headache, rheumatoid arthritis, antispasmodic[10]. Methyl ether of beta- phenyl alchohol, diterpene, d-linalool, phenylethyl acetate, citral, ester of pthalic acid are chief constituent of the oil[11]. With all this background it has been planned to conduct macro-microscopic and physicochemical study of fragrant male inflorescence which is commonly used in oil extraction, which in turn used in many therapeutic procedures.

MATERIALS AND METHODS:

Male Inflorescence of *Pandanus odoratissimus* L. were collected from their natural habitat, photographs were taken, authenticated using floras and botanist's opinion and samples deposited at SDM centre for research in Ayurveda and Allied sciences (Voucher No.12100801). Inflorescence were separated from their colourful bracts, shade dried. Few floral parts preserved separately in fixative solution FAA (Formalin- 5ml+acetic acid 5ml+ 70%ethyl alcohol -90 ml) for more than 48 hours[12].

Macroscopy:

External features of floral parts were documented using Canon IXUS digital camera. Organoleptic features like colour, taste, appearance, smell recorded and tabulated according to standard guidelines[13](Figure 1)

Microscopy:

These preserved samples were cut into thin transverse section using a sharp blade and the sections were stained with saffranine. Transverse sections were photographed using Zeiss AXIO trinocular microscope attached with ZiessAxio Cam camera under bright field light. Magnifications of the figures are indicated by the scale bars[14]. (Figure 2)

Physico-chemical Standards:

The whole inflorescence was cut in to small pieces, including spathe, flowers etc. Some part was shade dried and powdered and subjected to record physicochemical standards[15].

RESULTS

Macroscopy

Spadix of male flowers 25-30 cm long, enclosed in long, yellowish-white, fragrant, caudate acuminate spathes. (Figure 1)

Figure1. Macroscopy of Ketaki(Pandanus odoratissimus L.)

Figure 1.1. Fresh inflorescence **Figure 1.2**. Dried floral parts

Microscopy

TS of peduncle: Shows characters similar to a monocot stem; the outermost layer is an epidermis with thick cuticle; the ground tissue is made up of thick-walled parenchyma cells, several of them being idioblasts with bundle of acicular crystals; vascular bundles are scattered through0ot the ground tissue, each vascular bundle comprises of vessels, groups of fibres and phloem patches. (Figure 2)

Figure 2. Microscopy of peduncle of inflorescence of Ketaki(Pandanus odoratissimus L.)

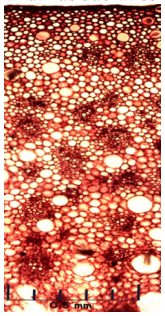

Figure 2.1. TS of Peduncle

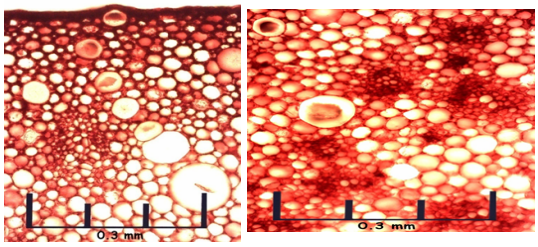

Figure 2.2. Outer region enlarged **Figure 2.3**. Inner region enlarged

TS of spathe: Shows characters similar to that of a monocot leaf; the outline of section through midrib is 'V' shaped, the lower elevation is more projected with slight broadening; there are upper and lower epidermis protecting the inner tissues; both the epidermis are papillose with thick outer wall having thick coating of cuticle; about 2 to 3 layers under the epidermis shows drops of volatile oil; the parenchymatous ground tissue shows idioblasts with bundles of acicular crystals, similar to those seen in the section of peduncle, but are less in number; there are elongated to oval shaped vascular bundles arranged perpendicular to the lamina, the one in the midrib is slightly bigger; each bundle has serially arranged vessels surrounded by phloem and encircled by thick-walled fibres; very minute grains of starch are observed in few of the parenchyma cells of the ground tissue. TS through lamina also shows features as that of leaf lamina. (Figure 3)

Figure 3. Microscopy of spathe of inflorescence of Ketaki (Pandanus odoratissimus L.)

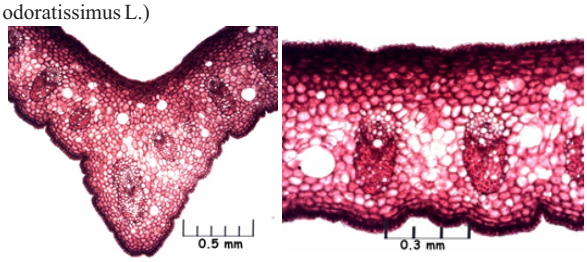

Figure 3.1. TS of spathe – midrib **Figure 3.2**. TS of spathe – lamina

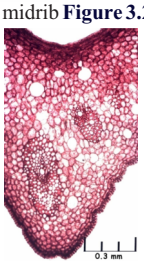

Figure 3.3. Portion of midrib enlarged

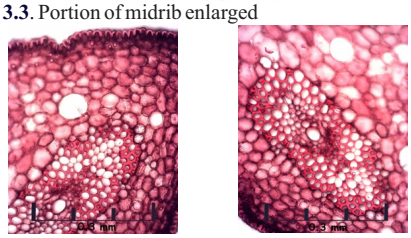

Figure 3.4. Cortex with acicular crystals **Figure 3.5**. Vascular bundle

Physico-chemical Standards:

Herbs grow in different geographical condition and will be collected at different season. Physico-chemical constituents determine about their moisture content, carbonaceous matter, solubility in different media. The results obtained of a test drug are displayed in Table 1.

Table 1. Physico-chemical parameters of Ketaki(Pandanus odoratissimus L.)

Parameter	Result n = 3 (% w/w)
Loss on drying	13.97
Total ash	9.885
Acid insoluble ash	0.447
Alcohol soluble extractive	2.533
Water soluble extractive	13.159

DISCUSSION

Ketaki *(Pandanus odoratissimus* L.) are densely growing shrub found along sea shores, pond, canals. Many parts of this plant are used in medicine like stem, essential oil, floral parts etc. Around 40 to 60 different species are said to be found in India. The fragrant yellowish flowers are chiefly used in medicine specially the oil extracted out of this corolla are used in headache, psychiatric diseases, antispasmodic. This oil known as kewda oil also said to be used in perfumery diseases. A macro-microscopic atlas prepared along with physico-chemical standard data definitely help in drug authentication for clinical researchers[16].

Male flowers were collected and studied scientifically. Spadix of male flowers 25-30 cm long, enclosed in long, white, fragarant, caudate acuminate spathes. Transverse section of both peduncle and spathe were taken and observed under microscope. TS of peduncle show a typical character of a monocot stem with outer epidermis lined by thick cuticle; the ground tissue is made up of thick-walled parenchyma cells and vascular bundles found scattered in the ground tissue.

TS of spathe exhibit typical character of a monocot leaf; section through midrib is 'V' shaped, both epidermmii are papillose with thick outer wall having thick coating of cuticle; about 2 to 3 layers under the epidermis shows drops of volatile oil; the parenchymatous ground tissue shows idioblasts with bundles of acicular crystals, and elongated to oval shaped vascular bundles arranged perpendicular to the lamina, TS through lamina also show similar structure found in spathe.

Physico-chemical constants of a fragrant corolla shown high loss on drying value suggestive of high moisture content (13.97). Total ash was 9.885 indicates carbonaceous matter. Acid insoluble ash was 0.447 express their mineral content[17]. Extractive values were 2.533 and 13.159 in alcoholic and water respectively.

CONCLUSION

Ketaki *(Pandanus odoratissimus* L.) a monocot shrub with fragrant corolla found beneficial in many pathological conditions. Many species of *Pandanus* found in India, commonly growing on bank of river, sea shore. In this paper pharmacognostic standard value recorded help in further studies in relation o drug authentication.

REFERENCES:

1. Prafulla p adkar, VH Bhask, Pandanus odoratissimus(kewda); A review on Ethnopharmacology, Phytochemisrty and Nutritional aspects; Advances in Pharmacological and Phramaceutical sciences; 2014 pp1-19
2. Nadakarni KM., Indian Material Medica Vol-I, Dehradun; International book Distributor: 2006, pp 894
3. Anonymous. The wealth of India, A dictionary of Indian raw materials & industrial products Vol-VII. Newdelhi: Council of scientific & industrial research: 2009 P.270-275
4. Bhat Gopalkrishna K, Flora of Udupi; Indian Naturalist, Udupi, 2003, pp 673
5. Kirtikar KR and Basu BD, Indian Medicinal plants Vol-4, Dehradun;International Book Distributors,1996 pp 2591-93
6. Gamble JS, Flora of the Presidency of Madras, Vol3, Secretory of state for Indian Council, London, 1928, pp1569
7. Hooker JD, Flora of British India, published under the authority of the secretory of state of Indian Council, 1894, London, pp 485
8. API Part I vol I pp 69
9. Sharma PC, Yelne MB, Dennis TJ, Database on Medicinal Plants used in Ayurveda Vol 3, CCRAS, New Delhi, 2005 pp 378
10. VK Raina Et al., Essential oil composition of "Kewda"(Pandanus odoratissimus) from India, Flavour and Fragrance Journal 2004; 19 pp 434-36.
11. Khare CP. Indian Medicinal Plants an illustrated Dictionary, New Delhi, Springer, 2007, pp 461
12. Hima Shashidharan, Suma Venkatesh Mallya, Prabhu Suchitra, Koppala Narayana Sunil Kumar, Identity parameters on traditionally used Antiurolithiatic Herb Scoparia dulcis Linn., Journal of Ayurveda and Integrated Medical Sciences, Vol2(3)2017, pp 72-79
13. Juliet et al., Authentication and proximate analysis of Madhuka indica Gmell., A wild edible flower used for traditional fermentation of Ayurvedic biomedicines; J Ayu Med

Sci 2016;1(1); 12-18.
14. KV Mamata, Mallya Suma V, Pharmacognostic features of bark drugs Bauhinea variegate L. and Bauhinia purpurea L. sources of Kanchanara, Aryavaidyan, Vol xxxii(2) 2019 pp 9-23
15. Mallya Suma V, Nesari Tanuja, Sunil kumar KN, Pharmacognostic standards of Katphala(Myrica nagi Hook. F. non- Thumb); a potent bark drug used in Indian system of medicine; Journal of Scientific and Innovative Research 2016; 5(4); 135-7
16. Mukharjee Pulok K, Quality Control of Herbal Drugs; New Delhi: Business Horizons;2002; p68
17. Wallis TE, Text book of Pharmacognosy, New Delhi, CBS Publisher and Distributors, 1985, pp527.