

CORRECT BOTANICAL NAME OF BANTAMAKU

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Consequent upon observation that a single Unani drug is referred to in the literature by two or more plants by their scientific names, thus creating confusions. For example, unani drug "Ban-tamaku" is confused with *Atropa acuminata* Royle ex Lindley and *Verbascum thapsus* Linn. The comparative pharmacognostic studies conducted on Unani drug and on the above said plants have resulted in the identification of Unani drug "Bantamaku" as *Verbascum thapsus* L.

Key words: Medicinal plants, Pharmacognosy, Bantamaku, Unani drug.

Introduction

The correct botanical names of unani drugs "Babuna", "Asarum", "Daduhi", "Changeri", "Khatmi" and "Arjuna" have been established as *Matericaria chamomilla* Linn., *Valeriana wallichii* DC., *Euphorbia hirata* Linn., *Oxalis Corniculata* Linn., *Althaea officinalis* Linn., and *Therminalia arjuna* Wight respectively [1-5]. The correct botanical name of "Bantamaku" has, however, not yet been determined. Pharmacognostic studies on "Bantamaku" *Atropa acuminata* Royle ex Lindley and *Verbascum thapsus* Linn., were conducted in order to determine the correct botanical origin of "Bantamaku". The drug "Bantamaku" is considered to be sedative, diuretic, mydriatic, demulent, astringent and pectoral; used as an anodyne, employed for the treatment of asthma and other pulmonary complaints [8]. Leaves are used as an application to inflamed parts. Leaves and flowers are useful in pulmonary diseases, coughs, consumption, bleeding of the lungs and bowels. Seeds are aphoridis, narcotic, used as a fish poison. Root is febrifuge [6].

Materials and Methods

The drug "Bantamaku" which is consisted of dried pieces of leaf and stem was obtained from Akbarimandi, Lahore. *Atropa acuminata* Royle ex Lindley was collected from the botanical garden of the Pakistan Forest Institute, Peshawar, while specimen of *Verbascum thapsus* Linn., was obtained from the herbarium, PCSIR Laboratories, Peshawar. The stem and the leaves of *Atropa acuminata* Linn., Royle ex Lindley were dried under the shade. The maceration studies of the drug "Bantamaku" and the said two plants were carried out by Jaffery's method [9]. Small pieces of leaves and stems were fixed in formaline-acetic acid (FAA) for microtome sectioning. After dehydration by normal butyl and ethyl alcohol, the paraffin embedding was done by Zirkle's method [9]. The sections were stained by double stains (safranin and fast green). The drawing of the macerated tissues and T.S. Sections cells were made by camera lucida and measurements of the cells were recorded (Table 1).

The uniform powdered material of the drug "Bantamaku", *Atropa acuminata* Royle ex Lindley and *Verbascum thapsus* Linn., was obtained by shifting through mesh no. 80. The starch grains appear black when the powdered material was treated with 5% iodine solution [9-11]. Calcium oxalate crystals were identified by treating the powdered material with cupric acetate and ferric sulphate. A yellow colour indicates the presence of calcium oxalate crystals [10].

Results and Discussion

The pharmacognostic studies on *Verbascum thapsus* Linn. (Genuine material). The leaf and stem of *Verbascum thapsus* Linn., are taken as genuine material because when its pharmacognostic characters were compared with the market sample, "Bantamaku", they were similar to each other. Moreover, *Verbascum thapsus* Linn., and the market sample, "Bantamaku" belong to the same family, Scrophulariaceae, pharmacognostic features of *Atropa acuminata* Royle ex Lindley are not only different from that of *Verbascum thapsus* Linn. (which is taken as genuine material), but also it belongs to other family, solanaceae.

Macerated studies on Verbascum thapsus Linn. Leaf. Wavy shaped ep. par. were observed. Ranunculaceous type of sto. raised above the parenchymatous epidermal cells were present. Collenchymatous tissues, pal. par. and spo. par. with micro-crystals were investigated. n. gland. lignified, candelabra shaped, branched wooly hairs which consisted of central axis with whorls of 2-8 laterals were determined. Moreover, two types of gl. (a) hair with unicellular head (b) hair with bicellular head; the cells of which divided vertically were recorded. Spi. were also located in the macerated tissues, of leaf of *Verbascum thapsus* Linn. (Fig.1).

Stem: Co.par. without starch and with starch were investigated. Rt. were oriented in the vascular system. Sci. were also observed in the said system. Two types of fibres were examined. F (a) Fibres with one end rounded and the other end pointed (b) fibres with both ends pointed (Fig 2).

TABLE 1. MEASUREMENTS OF THE CELLS OF "BANTAMAKU", *Verbascum thapsus* LINN., AND *ATROPA ACUMINATA* ROYL. EX LINDLEY.

Type of the cells	Bantamaku		<i>Verbascum thapsus</i> Linn.		<i>Atropa acuminata</i> Royle ex Lindley	
	Breadth (micron)	Length (micron)	Breadth (micron)	Length (micron)	Breadth (micron)	Length (micron)
L Epidermal parenchyma	36	45	36	45	30	35
E Palisade perenchyma	25	32	25	32	20	28
A Collenchyma	24	40	24	40	-	-
F Spongy parenchyma	23	50	23	50	32	65
Candelabra hair:						
(a) Stalk cell	18	50	18	50	-	-
(b) Branch cell	18	155	8	155	-	-
Spiral vessel	10	475	10	475	124	210
Reticulate vessel	-	-	-	-	45	140
Annular vessel	-	-	-	-	40	165
S Epidermal perenchyma	25	48	25	48	18	45
T Cortical parenchyma	25	45	25	45	40	45
E Reticulate vessels	50	125	50	125	45	140
M Scalariform vessels	40	460	32	460	20	520
Fibres with one end pointed	30	1600	30	1600	30	300
Fibre with both ends pointed	10	600	10	600	-	-
Spiral vessel	-	-	-	-	10	200
Annular vessel	-	-	-	-	60	250
Pitted vessel	-	-	-	-	65	300

TABLE 2. THE COMPARATIVE PHARMACOGNOSTIC STUDIES ON THE UNANI DRUGS "BANTAMAKU", *Verbascum thapsus* LINN., AND *ATROPA ACUMINATA* ROYL. EX LINDLEY

Macerated tissues	Bantamaku	<i>Verbascum thapsus</i> Linn.	<i>Atropa acuminata</i> Royle ex Lindley
L Candelabra shaped hairs	Present	Present	Absent
E Glandular hairs	Cells of hair's head separated vertically	Cells of hair's head separated vertically	Cells of hair's head separate vertically and horizontally
A Collenchyma	Present	Present	Absent
F Annular vessels	Absent	Absent	Present
Reticulate vessels	Absent	Absent	Present
S Annular vessels	Absent	Absent	Present
T Spiral vessels	Absent	Absent	Present
E			
M Pitted vessels	Absent	Absent	Present
Fibres with the both ends pointed	Present	Present	Absent
Family	Scrophulariaceae	Scrophulariaceae	Solanaceae

MICROTOMY:

Transverse section of Verbascum thapsus Linn. Leaf.

Epidermis: This walled par. constitutes the ep. Two types of hairs in T.S. of leaf were investigated (a) -gl. (b) n-gl. GL are further sub-grouped (i) 1-6 celled stalk with unicellular head (ii) 1-6 celled stalk with multicellular head. The cells of the head are separated with one another vertically (Fig. 3).

Mesophyll. One to two layered pal. beneath the ep. is observed. Several layered spo. par. are investigated. Micro

crystals in some cells of spo. par. are present.

Vascular bundles. Collateral type of vascular bundles are recorded.

Stem. Epidermis: Single layered par. are present (Fig 4).

Cortex. A few layers of the outer part of co. are collenchymatous in nature. A few cells were furnished with st.

Pericycle. Some cells of pericycle are comprised of fibres

Vascular bundles. Collateral type of vascular bundles alongwith one to two layered mr. are determined.

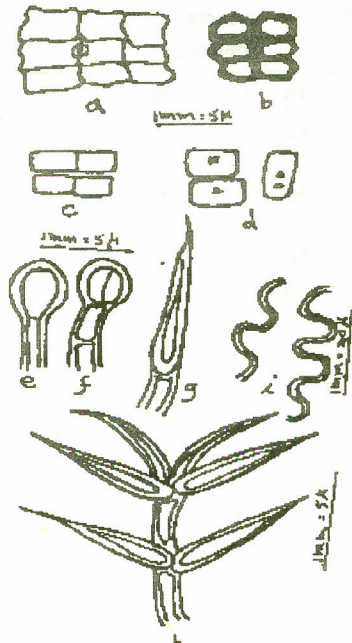


Fig 1. Macerated tissues of leaf of *Verbascum thapsus* Linn x 60. (a) ap. par. (b) Coll. (c) pal. par (d) spo. par. with micro-crystals (e) gl. hair with unicellular head (f) gl. hair with bi-cellular head. (g) n.-gl. hair (h) candelabra shaped non-glandular hair (i) spiral vessels.

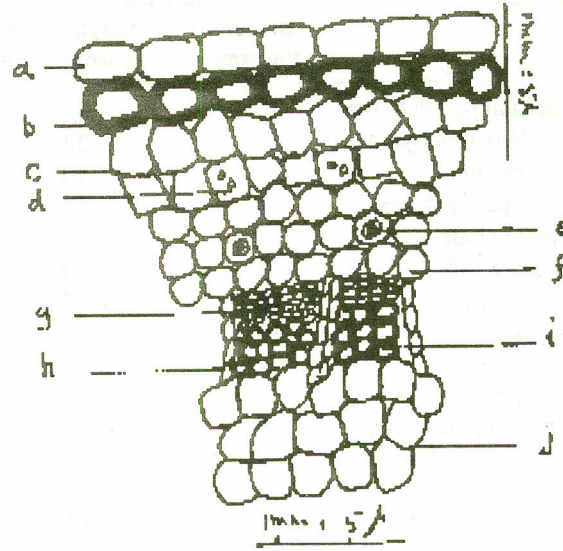


Fig 3. T.S. of leaf of *Verbascum thapsus* Linn x 60 (a) gl. hair with unicellular head (b) ep. (c) pal. (d) spo. par. (e) micro-crystal (f) x. (g) ph. (h) gl. hair with bi-cellular head (i) n. gl. hair.

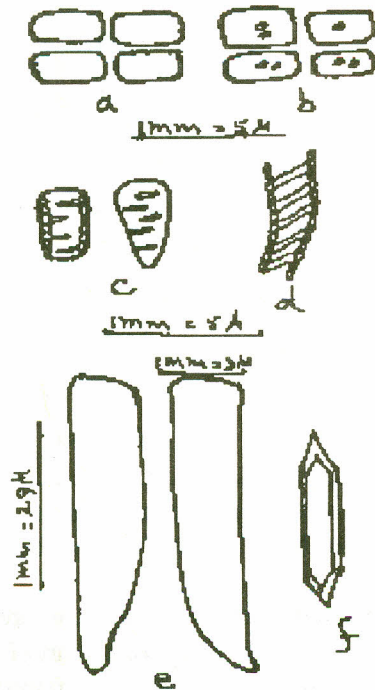


Fig 2. Macerated tissues of stem of *Verbascum thapsus* Linn x 60 (a) cor. par (b) co. par. with st. grains (c) rt. vessels (d) scl. vessel (e) Fibre with one end pointed (f) fibre with the both ends pointed.

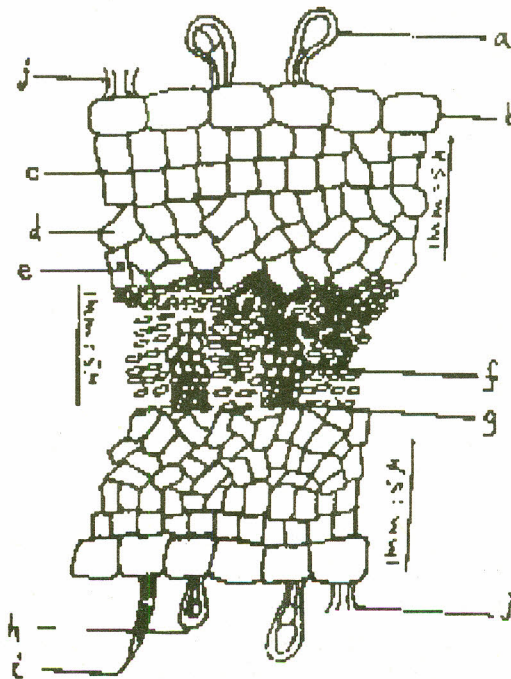


Fig 4. T.S. of stem of *Verbascum thapsus* Linn x 60 (a) ep. (b) col. (c) cor. (d) st. grains (e) fibre (f) par. (g) ph. (h) mr. (i) x. (j) p.

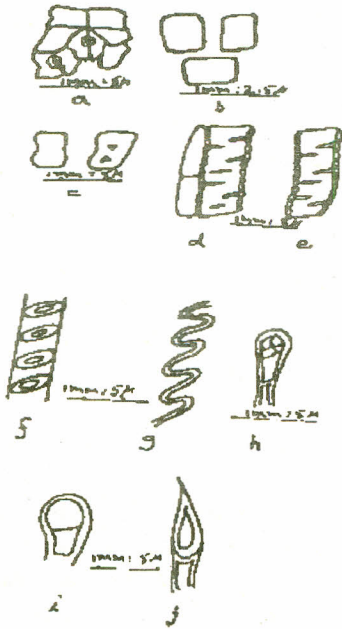


Fig 5. Macerated tissues of leaf of *Atropa acuminata* Roylex Lindley x 60 (a) ep. par.(b) pal. par. (c) spo. par without and with micro-crystals (d) rt. vessel along with par. (e)rt. vessel (f) an. vessel (g) spi. vessel (h) gl. hair with multicellular head (i)gl. hair with unicellular head (j) n.gl. hair.

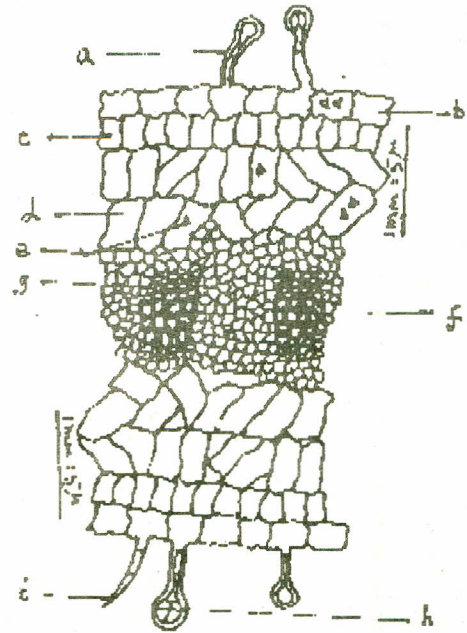


Fig 7. T.S. of leaf of *Atropa acuminata* Roylex Lindley x 60: (a) gl. hair with unicellular head (b) ep. (c) pal. (d)spo. par. (e) micro-crystal (f) x. (g) ph. (h)gl. hair with multi-cellular head (i) n. gl. hair.

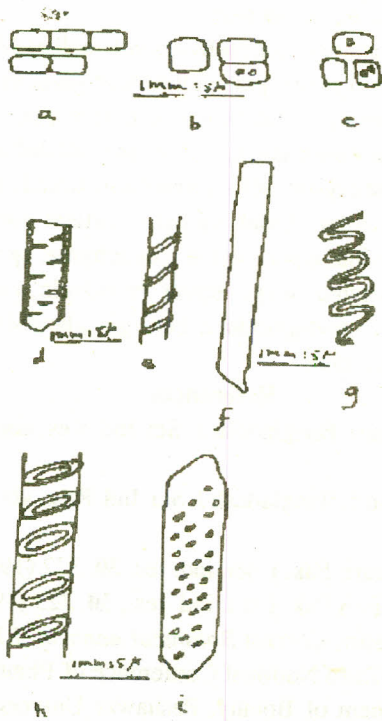


Fig 6. Macerated tissues of stem of *Atropa acuminata* Roylex Lindley x 60: (a) ep. par. (b) co.par. with and without st. grains. (c) cor. par. with and without micro-crystals. (d) rt. vessel (e)scl. vessel (f) fibre with one end pointed (g) sp. vessel (h) an. vessel (i) pt. vessel.

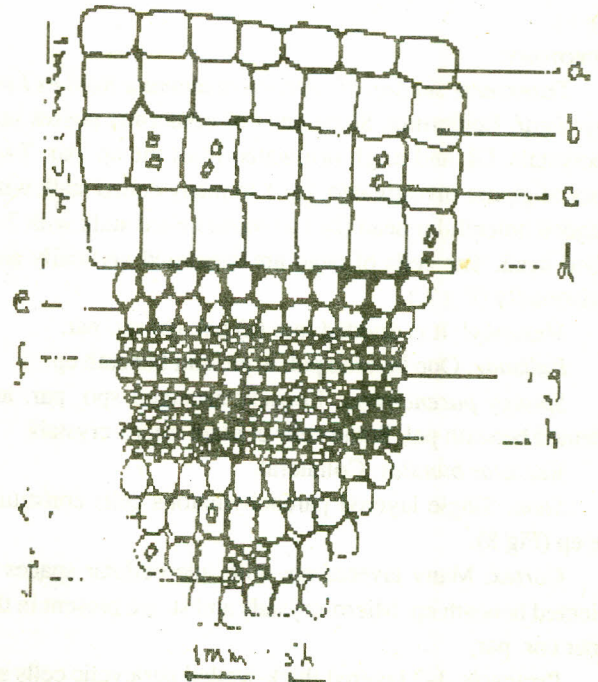


Fig 8. T.S. of stem of *Atropa acuminata* Roylex Lindley x 60: (a) ep. (b) co. (c) st. grains (d) micro-crystals (e) par. (f)ph. (g) cambium (h)x (i) p. (j) internal ph.

Pharmacognostic studies on Atropa acuminata Royle ex Lindley. The following pharmacognostic features i.e. macerated and microtomy studies on the above said plant are conducted:

The pharmacognostic characters of leaf and stem of unani drug "Bantamaku" were investigated and compared with the genuine material, *Verbascum thapsus* Linn. (Table 1,2). These comparative studies show that the genuine material, *Verbascum thapsus* Linn., and the unani drug "Bantamaku" are identical to each other. There is no need to describe the pharmacognostic features of unani drug "Bantamaku" in detail.

Macerated studies on Atropa acuminata Royle ex Lindley: Leaf. Thins walled ep. par with Ranunculaceous type of st. were located. pal. and spo. par. in the cortical tissues were examined. Rt. with x.-par. were present in the vesicular system. Vascular system was also consisted of an. and spi. Two types of hairs, (i) gl. (ii) n.gl. were observed. gl. were of two kinds (a) hair with multicellular head, the cells of which are separated horizontally and vertically (b) hair with unicellular head (Fig 5.).

Stem. Co.par. without secondary metabolites and with secondary metabolites like starch granules and calcium oxalate crystals were investigated. Rt., scl., spi., an. and pt. vessels constituted the vascular system. Fibres, one end rounded and the other end pointed were also investigated, (Fig 6).

MICROTOMY:

Transverse section of Atropa acuminata Royle ex Lindley: Leaf. Epidermis: Some cells of epidermis possess microcrystals. Gl. and n.-gl. originated from the ep. par. Two types of gl. are investigated: (a) 1 to many celled stalk with rounded unicellular head (b) 1 to many celled stalk with 2-4 celled head. The cells of head are separated vertically and horizontally (Fig 7.).

Mesophyl. It is divided into (a) pal. (b) spo par.

Palisade. One layered pal. is present beneath ep.

Spongy parenchyma. Loosely arranged spo. par. are oriented beneath pal. Some cells contain micro-crystals.

Vascular bundles: Collateral.

Stem. Single layered parenchymatous cells constitute the ep (Fig 8).

Cortex. Many layered co. with intercellular spaces is oriented beneath ep. Micro-crystals and st. are present in the inner cor. par.

Pericycle. 1-2 layered thick-walled pericyclic cells are investigated above the vascular bundles.

Vascular bundles. Cambium is present in between ph. and x. Internal ph. is also determined.

Pith: Intercellular spaces in the p. cells are present. Some cells are furnished with micro-crystals.

The above macerated and microtomy studies conducted on *Atropa acuminata* Royle ex Lindley was compared with that of the standard, *Verbascum thapsus* Linn. (Table 1,2). These comparative studies reveal that *Atropa acuminata* Royle ex Lindley is different from that of the standard, genuine material, *Verbascum thapsus* Linn.

Micro Chemical Tests. The micro chemical tests reveal that calcium oxalate crystals were absent in the stem of *Verbascum thapsus* Linn. and the drug, "Bantamaku" but these crystals were present in the stem of *Atropa acuminata* Royle ex Lindley. These chemical tests also show that *Verbascum thapsus* Royle ex Lindley and the drug, "Bantamaku" are similar to each other.

The pharmacognostic studies conducted on the genuine material of *Verbascum thapsus* and compared with unani drug "Bantamaku", and *Atropa acuminata* Royle ex Lindley (Table 1,2) reveal that the genuine material, *Verbascum thapsus* Linn. and the drug, "Bantamaku" are identical to each other, *Atropa acuminata* Royle ex Lindley though referred to the literature under unani name "Bantamaku" is totally different when compared with the standard, *Verbascum thapsus* Linn. According to these studies *Verbascum thapsus* Linn., and "Bantamaku" are one and the same thing. So, the correct botanical name of unani drug "Bantamaku" is *Verbascum thapsus* Linn.

Abbreviations used in the text

Sto.-stomata, par.-parenchyma, col.-collenchyma, spo.-spongy, st.-starch grains, pal.-pallisade, rt.-reticulate vessel, pt.-pitted vessel, ep.-epidermis, co.-cortex, per.-pericycle, ph.-phloem, ca.-cambium, x.-xylem, mr.-medullary ray, cr.-calcium oxalate crystal, scl.-scalariform vessel, spi.-spiral vessel, an.-annular vessel, co.par.-cortical parenchyma, coll.-collenchyma, x.par.-xylen parenchyma, ep.-par.-epidermal parenchyma, u.ep.-upper epidermis, i.ep.-lower epidermis, n.gl.-non-glandular hair, gl.-glandular hair, pt.-pitted vessel, p.-pith.

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