

。药材。

## A Pharmacognostical Study on the Fistular Onion Bulb (*Allium fistulosum*)

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**Abstract** “Congbai”, fistular onion bulb, a Chinese herbal drug, was systematically studied in such aspects as botanical morphology, macroscopical characters, histology and so on. Scientific basis was provided to draw up the standard of identifying “Congbai”.

**Key words** “Congbai” *Allium fistulosum* L. macroscopical characters histological characters pharmacognostical identification

**摘 要** 葱白为百合科植物葱 *Allium fistulosum* L. 的鳞茎。具有发表通阳解毒的功能。沈阳康达制药厂最新研制的“胰冲剂”，用于治疗糖尿病，疗效较好。葱白是该组方药物主要成分之一。但由于该品多见于民间验方，药典及地方标准均无收载，有关其生药鉴定方面的研究尚无报道。为进一步开发利用这一药用资源，为该品的鉴别标准提供依据，本文对其植物形态、药材性状、组织构造等方面进行了研究。

**关键词** 葱白 性状特征 组织构造 生药鉴定

“Congbai”, *Allium fistulosum* L., was initially recorded in Transactions of Famous Physicians (《名医别录》). But it was named as “Congjingbai” in Compendium of Materia Medica (《本草纲目》) and “Congbaitou” in Explanation of Medicine (《药品化义》)<sup>[1]</sup>. “Congbai” is the bulb of *Allium fistulosum* L. (*Liliaceae*), with the effects of relieving superficies syndrome, activating yang, and detoxicating. It is mainly used for the treatment of cold and heat headache due to affection by cold, abdominal pain due to coldness of the genitals, malnutrition due to parasitic infestation, difficulty in urination and defecation, dysentery, swelling pain, etc.. The compatibility of “Shengma” (*Rhizoma Cimicifugae*) and “Congbai” is used for the treatment of common cold according to folk remedy. The experiment in decreasing the content of nitrite in gastric juice with fresh scallion was reported<sup>[2]</sup>. The effect of “Banxia Congbai Suppository” on acute mastitis was observed<sup>[3]</sup>. 130 cases of premature acute mastitis were treated with Congbai and Banxia (*Rhizoma pinelliae*) combined with ginger

juice by liquid cupping method, with the effective rate of 96.9%<sup>[4]</sup>. In the books from ancient Supplement to Handbook of Prescriptions for Emergencies (《补缺肘后方》), Huatuo's Prescriptions for Critical Diseases (《华佗危病方》), and Compendium of Materia Medica (《本草纲目》) to nowadays Herbal Drug Handbook (《本草手册》) as well as clinical reports, the folk medicinal history of “Congbai” on preventing and treating diseases has been recorded there<sup>[1]</sup>. “Congbai” contains volatile oil (mainly contains garlicin), diallyl sulfur ether; contains vitamin C (97 mg% damp sample), vitamin B<sub>1</sub>, vitamin B<sub>2</sub>, nicotinic acid, fatty oil and phlegm<sup>[1]</sup>. Yi granule, which is a recipe made by Shenyang Kangda Pharmaceutical Factory, has good therapeutic effect on diabetes. “Congbai” is one of the main ingredients in it. However, “Congbai” is not recorded in Chinese Pharmacopoeia and Local Criterion of Medicine but only used in folk remedy. Study on its pharmacognostical identification has not been reported. In order to develop and utilize this drug better, and provide scientific basis

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for its identification criterion, we systematically studied on the identification of its botanical morphology, macroscopical and histological characters.

## 1 Plant Morphology

Perennial herb, 50 cm high. Usually clustering, whole body with pungent stink. Fibrous root, occurring in a cluster, white. Fresh stem columnar, tip a little fat. Fresh leaves with layer upon layer, white, having longitudinal veins. Leaves growing at base, columnar, hollow, about 45 cm long, 1.5 ~ 2 cm in diameter, tip tapering, green, with longitudinal veins; leaf sheath, light green. Flower stem branching out from the clump of leaves, usually single, inflated, hollow in the middle, green, also with longitudinal veins; umbel, glabrous; involucre, membranous, ovate or ovate-lanceolate; perianth 6, lanceolate, white, outer series 3, short and small, inner series 3, long and big, with a longitudinal vein in the middle of the perianth; stamens 6, filaments branching out, anther yellow, T-shaped; ovary 3-celled. Capsules 3-ribbed. Seeds black, in triangular shape, semicircular. It is cultivated everywhere in the whole nation.

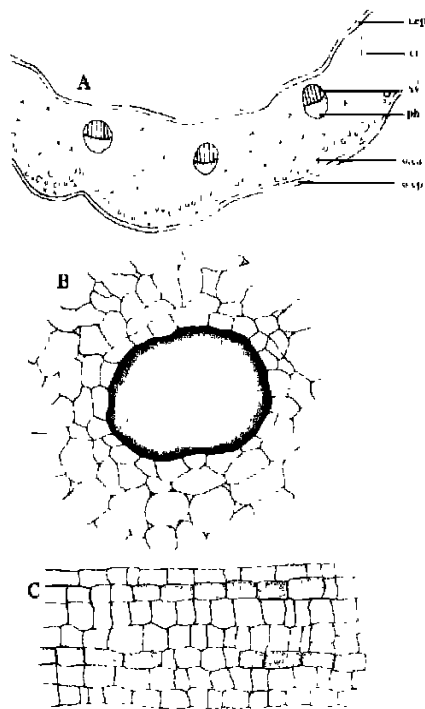
## 2 Macroscopical Characters of "Congbai"

Bulb cylindrical, 15~ 35 cm long, 1~ 3.5 cm in diameter, tip a little fat; surface white, green in the end; scale leaf with layer upon layer, having longitudinal veins; texture soft, easily broken, pungent mucus appearing after being broken; section with several layers of scale-leaf-circle vein; center with an elliptic or two horse's-hoof-shaped tender leaves, commonly named as "Congxin", green or yellowish green on the edge, section white, under the magnifying glass, fine mesh visible, sponge-like in shape. Odour heavy peppery; taste peppery, pungent stink lasting for long time while chewing.

## 3 Histological Characters of "Congbai"

**3.1 Transverse Section of the Base Tissue of Scale Leaf** The inner epidermis and outer epidermis consisting of a layer of square-like cells; having several vascular bundles; the xylem tending towards the inner epidermis; having a strip com-

posed of oil cells and oil cavities between the outer epidermis and the vascular bundles; Having brownish yellow volatile oil in oil cavity, 35~ 150  $\mu$  m in diameter; the oil cell relatively big, whose longitudinal section rectangle-like shaped, having brownish yellow volatile oil; parenchymatous cell circle-like shaped, containing some calcium oxalate druses, circularly cluster-shaped or circle-like, 6~ 20  $\mu$  m in diameter ( Fig. 1 ).



A-diagram of transverse section

B-Details of oil cavity

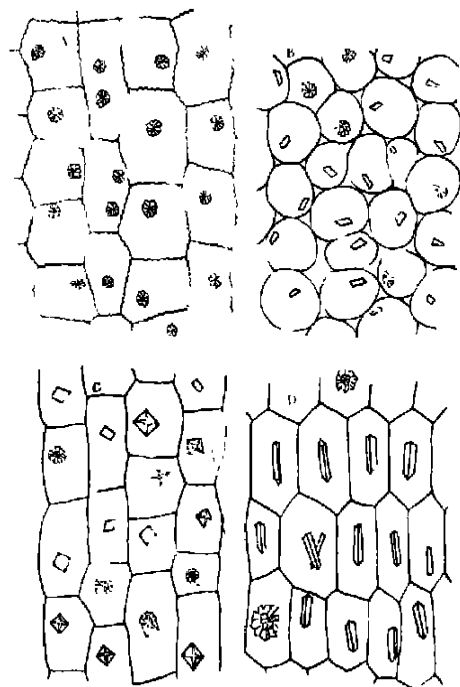
C-Details of longitudinal section of oil cells

ie-ep inner epidermis cr-calcium oxalate crystals  
xy-xylem ph-phloem o.o.-oil cavity o.ep-out-  
er epidermis

**Fig. 1 Diagram of Scale-leaf Base of *Allium fistulosum* L.**

**3.2 Longitudinal Section of Scale Leaf Tissue** For the longitudinal section near the outer epidermis of the outer layer scale leaf of the relatively thick bulb, parenchymatous cell rectangular, containing 1-(2) styloid crystals or druses; styloid crystals 46  $\mu$  m in length, 1.5~ 22  $\mu$  m in diameter, druses 3~ 18 (30)  $\mu$  m in diameter, with more pyramids. For the longitudinal section near the outer epidermis of the outer layer scale leaf of the relatively thin bulb, parenchymatous cell mostly

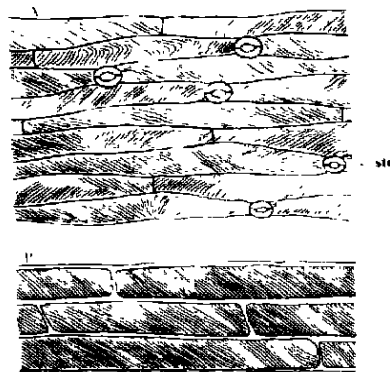
containing prismatic crystals, short styloid crystals, and druses; prismatic crystals mostly regular octahedron in shape, 3~ 19 $\mu$ m in diameter. For the longitudinal section near the outer epidermis of the inner layer scale leaf of bulb, cell nearly square or polygon-like; the cell wall fine ripples shaped, enclosing globularity-like calcium oxalate druses, being smaller than that in the outer layer scale leaf (Fig. 2).



A-Longitudinal section of outer layer scale-leafybase of thicker bulb B-Longitudinal section of outer layer scale-leafybase of thinner bulb C-Transverse section of outer layer scale-leafybase of thicker bulb D-Longitudinal section of inner layer scale-leaf base of thicker bulb

**Fig. 2 Various Forms of Calcium Oxalate Crystals of *A. fistulosum* L.**

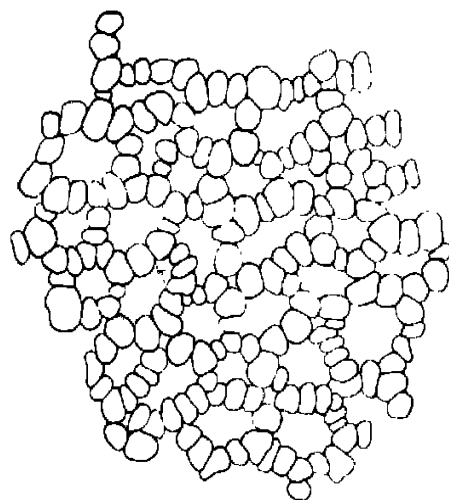
**3.3 Surface Section** The surface sections of the inner epidermis and outer epidermis of the scale leaf, for the relatively thick bulb, the outer epidermis cells of the scale leaf long-strip shaped; stomata circle-like or elliptic, 54 $\mu$ m in length and 42 $\mu$ m in breadth; the surface of the cell being with cuticular veins; for the relatively thin bulb, the shape of cell and stomata similar as above but having not cuticular veins on the cell surface; without scattering stomata in the inner epidermis cell of the scale leaf (Fig. 3).



A-Outer epidermis B-Inner epidermis  
sto-stomata

**Fig. 3 Detailed Epidermis Drawing of Outer Layer Scale-leaf of *A. fistulosum* L.**

**3.4 Transverse Section of the Parenchymatous Tissue of “Congbai” (“Congxin”):** Take “Congbai” (“Congxin”) to make transverse section, heating with chloral hydrate. Then observe it under the microscope. Cell circle-like, intercellular space relatively big, without any crystal (Fig. 4).



**Fig. 4 Detailed Transverse Section Drawing of Parenchymatous Tissue of Congxin**  
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