



# Achyranthes

**Synonym:** *Cyathula*, two-toothed chaff-flower

**Chinese Name:** Niu Xi (Niuxi) 牛膝

**Latin name:** *Achyranthes bidentata* Blume

**Family:** Amaranthaceae

**Parts Used:** Roots

**Collection:** The roots are gathered in winter.

## Description

A perennial herb 0.7-1.2 m high. Stem erect, tetragonal, pubescent, nodes dilated, branches slender, rambling. Leaves opposite, petiolate, blade from elliptic to elliptic-lanceolate, acuminate, pubescent, membranous, 5-12 cm long by 2-6 cm wide. Inflorescence a terminal or axillary spike, 2-5 cm long, very slender, pedunculate; August-October. Bractlet often reduced; a spine minutely 2-auricled at the base. Perianth in 5 acute segments. Stamens 5, staminodes 5, ligule truncate, undulate in margin, much shorter than the filaments. Ovary superior, obovoid. Fruit an achene. The roots are straight cylindrical, 15-90 cm long by 0.4-1 cm in diameter, flexible, streaked lengthwise, brownish-yellow, often with traces of fibrous rootlets. The taste is slightly bitter.

## Habitat

At forest edges, along streams and among bushes; also cultivated. China.

## Source of earliest record

Shennong Bencao Jing

## Chemical Constituents

Ecdysterone, inokosterone, triterpenoidal glycosides (oleanolic acid as the aglycone), betaine, saponins, glycosides. The content of oleanolic acid in the root of *Achyranthes bidentata* Blume was reported to be 0.75-2.19%,<sup>1,2</sup> while the betaine content was reported to be 0.93-1.03% in various processed roots of *bidentata*.<sup>3</sup>

## Pharmacology

**Antitumor activity and immunopotentiating activity:** Xiang and Li<sup>4</sup> reported that *Achyranthes bidentata* polysachharides (ABP), extracted from the root of *Achyranthes bidentata*, induced interleukin-1 (IL-1) synthesis, as well as tumor necrosis factor-alpha (TNF-alpha) synthesis and secretion from thioglycolate-primed mouse peritoneal macrophages in vitro. Their results provided an explanation for the immunopotentiating effect of ABP.

## Traditional Chinese Medicine

中药

### Indications

1. Sore throat
2. Hypertension
3. Amenorrhea
4. Retention of placenta
5. Carbuncles
6. Traumatic injury
7. Asthenia of liver and kidney
8. Tiredness in the lower part of the body and legs
9. Rheumatic pain

### Functions

1. To invigorate blood, release stagnation and promote menstruation
2. To tonify liver and kidneys, and strengthen the tendons and muscles
3. To promote urination and relieve urinary disorders
4. To conduct blood flow downward

### Dosage

6-15 g

### Cautions and Contraindications

This herb is contraindicated during pregnancy, or with profuse menstrual flow.

In a later paper, the authors<sup>5</sup> reported that ABP inhibited the growth of sarcoma 180 and prolonged the survival days of mice bearing Ehrlich carcinoma. ABP also elevated the NK cell activity and serum TNF content in mice bearing S180. These results indicated that the antitumor effect of ABP may be related to its potentiating affect on both specific and nonspecific host immunological responses. Recently, Yu and Zhang<sup>6</sup> reported that ABP at a dose of 25-100 mg/kg/d x7 could inhibit tumor growth by 31-40%. A combination of cyclophosphamide (Cy) and ABP increased the rate of tumor growth inhibition to 58%. ABP was found to potentiate lymphokine-activated killer cell activity and increase the Con A-induced production of the tumor necrosis factor (TNF-beta) from murine splenocytes. It was also found that 1-2 micrograms/ml of ABP strongly inhibited the proliferation of S180 and K562 cells in vitro. The authors concluded that the results suggested that the antitumor mechanism of ABP may be related to potentiation of the host immunosurveillance mechanism and changes in cell membrane features.

**Antiviral activity:** Tian et al.<sup>7</sup> studied the sulfation of *Achyranthes bidentata* polysaccharides (ABPS) with sulfuric acid, sulfur trioxide-pyridine or chlorosulfonic acid-pyridine. A homogeneous sulfation method with a good yield of 82.11% was obtained using chlorosulfonic acid in an excess amount of pyridine. Sulfated ABPS was obtained as an amorphous sodium salt and was easily soluble in water. The UV spectrum of ABPS showed absorptions of 208, 268 and 286 nm. The ABPS sulfate showed high activity as an anti-HbsAg and HbeAg, and it was effective on simple herpes virus type-I.

**Hypotensive effect, antispasmodic and sedative effects:** Qin et al.<sup>8</sup> studied the pharmacological activities of *Uncaria sinensis* and *Achyranthes bidentata* both separately and in combination. Comparative studies of the hypotensive effect on normal and renal-type hypertensive rats, as well as the antispasmodic and sedative effects on mice, were performed. The results showed that *Uncaria sinensis* and *Achyranthes bidentata* have clear synergistic action when used in combination.

### Cosmetic Evaluation

The main benefits of *Achyranthes*, or Niu Xi, is to promote local blood circulation, stop pain and eliminate swelling. Niu Xi extract can be used as an additive in massage oils, creams, body wash and antiwrinkle products to promote blood circulation and nutrient supply to skin cells, thus improving skin renewal. Massage oils or creams containing Niu Xi extract have been used to alleviate joint and muscle pain, sprains, and headaches. Apply the massage treatment to the problem area, and slowly massage 3-5 minutes, 1-2 times a day. To eliminate tiredness and mental stress, apply massage oil or cream between the eyebrows; massage gently for 1-3 minutes.

**Note:** *Cyathula officinalis* Kuan is similarly used.

### References

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