



***Sonchus wightianus* DC: A Review – One Plant with Many Therapeutic Uses**

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ABSTRACT:

This review aimed to gather information about medicinal plants used to treat various problems in different areas of India. *Sonchus wightianus* DC is a plant with various traditional uses. People have been using the whole plant to treat conditions such as cough and bronchitis, and it's known for its antifungal properties. The milky substance from the plant can help heal bruises in the thigh and groin area. For liver inflammation, a decoction made from the plant is consumed twice a day for 10 days. This plant contains phenolic compounds that are believed to be beneficial. The roots and leaves of this plant are used to address issues like indigestion and as a remedy for reducing fever. The stem of the plant is used as a sedative and tonic. In addition to *S. wightianus*, other species of *Sonchus* plants are also utilized in various ways. They are made into infusions or decoctions, which can be taken orally or applied externally. These plants are used to treat conditions such as liver inflammation, cancer, inflammation, rheumatism, diarrhea, and even snake venom poisoning.

Keywords: *Sonchus wightianus* DC, *Agrobacterium tumefaciens*, liver inflammation, Gentamycin, *wightianus* leaf

1. INTRODUCTION:

This plant, *Sonchus wightianus* DC. Is an herbaceous plant that can either be annual or perennial. It stands upright, has branches, and the entire plant contains a sticky white latex. The root system consists of a short, bushy taproot with many lateral roots. The stem is upright, hollow, and sturdy, ranging from 30 to 150 centimeters in height. It often has a reddish tint, and you might notice gland-tipped hairs on the upper parts of the stem. The leaves are arranged alternately and have an oval shape, ranging from 4 to 18 centimeters in length and 0.5 to 1 centimeter in width. They have multiple lobes, typically 5 to 11 on each side, with fewer lobes on the upper leaves.

The way the flowers are grouped is called "inflorescence," and for this plant, it's irregularly cymose-umbellate. The involucre, which protects the flowers, is 15-25 millimeters wide when open and 9-14 millimeters high when closed over the maturing seeds. Glandular hairs may be present on the branches of the inflorescence and involucre bracts, and these glands can be yellow or purplish.

Each flower head, called a "capitulum," contains 25-50 yellow florets with both male and female parts. When the seeds mature, they become light brown, thin, and somewhat flattened with wing-like margins. They're about 2.5 millimeters long and 1.5 millimeters wide, with 3 or 4-5 longitudinal ribs on each side and a smooth surface. The pappus, which is like a fluffy structure attached to the seed, consists of numerous unbranched white bristles that are 8 mm long. The inner whorl of these bristles is rigid and spiny, while the outer whorl is flexuous and hooked at the tips.

Distribution and habitat:

The *Sonchus wightianus* DC. Commonly known as the white sow thistle, is originally from North Africa, Europe, and West Asia. In the Nainital area, you can find this plant in several locations including D.S.B. Campus, UGC- HRDC Campus, Ayarpata, Highcourt, Jyolicoat, and Ranibagh site. It's also widespread in various parts of Asia, including China, India, Southeast Asia, and South Indonesia. In India, it's commonly found in the hilly regions of the Uttarakhand Himalayas, typically at elevations ranging from about 300 to 2300 meters.



Fig: *Sonchus wightianus* DC: Whole plant

Leaves extracts : The antibacterial activity of leaf extracts of *Sonchus wightianus* (*S. wightianus*) indicate that these extracts have varying degrees of inhibitory activity against different bacterial strains. Here is a summary of the findings:

Methanol Extract: The methanol extract of *S. wightianus* leaf demonstrated the highest antibacterial activity against *Agrobacterium tumefaciens* with a zone of inhibition (ZOI) of 19 ± 0.8 mm. It also showed moderate inhibitory activity against *Bacillus megaterium* (16 ± 0.5 mm) and *Xanthomonas campestris* (16 ± 0.8 mm).

Hexane Extract: The hexane extract of *S. wightianus* leaf exhibited the highest activity (18 ± 2 mm) against *Bacillus megaterium*. It showed moderate inhibitory potential against *Bacillus cereus* (11 ± 0.3 mm) and *Agrobacterium tumefaciens* (10 ± 0.8 mm). However, this extract had no activity against *Xanthomonas campestris*.

Ethanol Extract: The ethanol extract of *S. wightianus* leaf was active against all the tested pathogens. It displayed moderate activity against *Agrobacterium tumefaciens* (12 ± 0.3 mm) and *Bacillus megaterium* (11 ± 0.8 mm), and lower inhibitory activity against *Bacillus cereus* (9 ± 0.57 mm) and *Xanthomonas campestris* (10 ± 0.3 mm).

Aqueous Extract: The aqueous extract of *S. wightianus* leaf exhibited activity against *Bacillus megaterium* with a moderate ZOI of 11 ± 0.6 mm. However, it did not show significant inhibitory activity against the other tested bacteria.

It's worth noting that all the tested extracts of *S. wightianus* leaf demonstrated less inhibitory activity compared to the standard antibiotic drug Gentamycin (50 mcg). The antibacterial activity of these extracts appears to be strain-dependent, with some extracts being more effective against certain bacterial strains than others. Additionally, the choice of solvent (methanol, ethanol, hexane, or aqueous) for extraction plays a role in the observed activity, with methanol and ethanol extracts generally showing better inhibitory potential.

Stem extracts:

Methanol Extract: This extract exhibited significant antibacterial activity against all the tested pathogens. It had the highest inhibition zone against *Agrobacterium tumefaciens* (18 mm), followed by *Bacillus cereus* and *Bacillus megaterium* (17 mm each), and *Xanthomonas campestris* (15 mm).

Ethanol Extract: The ethanol extract also showed significant antibacterial activity. It had the maximum inhibition zone against *Xanthomonas campestris* (17 mm), followed by *Bacillus cereus* and *Agrobacterium tumefaciens* (15 mm each), and *Bacillus megaterium* (12 mm).

Aqueous Extract: The aqueous extract exhibited moderate activity against *Agrobacterium tumefaciens* (18 mm), *Bacillus megaterium* (17 mm), *Bacillus cereus*, and *Xanthomonas campestris* (12 mm each).

Hexane Extract: The hexane extract did not show any inhibitory activity against the tested bacterial strains.

Root extracts:

Methanol Extract: This extract demonstrated significant inhibitory potential against all the tested pathogens. It had the highest inhibition zone against *Bacillus cereus* (17 mm), followed by *Agrobacterium tumefaciens* (16 mm), *Bacillus megaterium* (15 mm), and *Xanthomonas campestris* (13 mm).

Ethanol Extract: The ethanol extract showed its maximum inhibition against *Xanthomonas campestris* (16 mm), followed by *Agrobacterium tumefaciens* (14 mm), *Bacillus cereus*, and *Bacillus megaterium* (12 mm each).

Aqueous Extract: The aqueous extract exhibited moderate inhibition against *Bacillus cereus* and *Agrobacterium tumefaciens* (10 mm each), while *Bacillus megaterium* and *Xanthomonas campestris* showed less inhibition (7 mm each).

Hexane Extract: The hexane extract did not exhibit any inhibitory activity against the tested bacterial strains.

Leaves extracts: In our study, we examined various extracts from the leaves of *S. wightianus* to assess their antifungal activity against two pathogenic fungi at a concentration of 1000 µg/ml. The results of these tests are summarized among all the extracts we screened, the highest inhibition was observed in the case of the aqueous extract from the leaves.

Stem extracts: In our study, we investigated four extracts from the stem of *S. wightianus* to evaluate their antifungal activity against two different fungi at a concentration of 1000 µg/ml. Among these extracts, only the methanol and ethanol extracts showed any activity against *A. alternata*. Unfortunately, all tested extracts were ineffective against *C. oxysporum*, as it exhibited resistance to these extracts. Specifically, the methanol and ethanol extracts from the stem of *S. wightianus* demonstrated moderate inhibitory activity, with 20.28% and 18.47% inhibition against *A. alternata*, respectively. However, both the hexane and aqueous extracts were entirely inactive against this particular fungus. As for *C. oxysporum*, it proved resistant to all of the extracts examined in the study.

Root extracts: The methanol, ethanol, and aqueous extracts from the roots of *S. wightianus* exhibited antifungal activity against *A. alternata* at a concentration of 1000 µg/ml. However, all the other tested extracts were ineffective against the same fungus. Additionally, *C. oxysporum* was resistant to all the extracts examined in the study.

CONCLUSION:

The present review indicated that people residing in different regions or states still use hundreds of medicinal plants to treat different respiratory system-related issues. *Sonchus wightianus* DC is a plant with various traditional uses. People have been using the whole plant to treat conditions such as cough and bronchitis, and it's known for its antifungal properties. The milky substance from the plant can help heal bruises in the thigh and groin area. For liver inflammation, a decoction made from the plant is consumed twice a day for 10 days. This plant contains phenolic compounds that are believed to be beneficial. The roots and leaves of this plant are used to address issues like indigestion and as a remedy for reducing fever. The stem of the plant is used as a sedative and tonic. In addition to *S. wightianus*, other species of *Sonchus* plants are also utilized in various ways. They are made into infusions or decoctions, which can be taken orally or applied externally. These plants are used to treat conditions such as liver inflammation, cancer, inflammation, rheumatism, diarrhea, and even snake venom poisoning.

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