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## ***A Mini Review on Abies Webbiana Lindl.: A Medicinally Important Plant of India***

**Poonam Arora\*, S. H. Ansari, Adil Ahmad**

*Department of Pharmacognosy and Phytochemistry, School of Pharmaceutical Education and Research, Jamia Hamdard, New Delhi, India*

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### **ABSTRACT**

*Abies webbiana* is an ayurvedic medicinal plant used in various herbal formulations. Plant commonly known by name *Talispatra*, is an important component of *Talisadi churna*. *A. webbiana* leaves have been reported as antibacterial and antifungal, mast cell stabilizing, anxiolytic, antitumor, anti-inflammatory, anti-tussive, female antifertility, febrifuge, anti-spasmodic properties, central nervous system (CNS) depressant actions and are effective against hyperglycemia. Its leaves are mainly used in ayurvedic preparations used for respiratory disorders. A number of phytoconstituents including Monoterpenes (from essential oil), flavonoids, biflavonoid glycosides, phytosterols, amino acids, saponins, tannins, alkaloids, lipids, triterpenoids, steroids and diterpene glycosides are present in plant. The plant morphology resembles very much to *T. baccata*, an important source of taxanes, Even though the medicinal properties and chemical constituents of selected plants are different, their common name and morphology causes confusion in their identity.

**Keywords:** *Abies webbiana*, *talispatra*, antibacterial, monoterpenes, phytosterols

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\*Corresponding Author Email: [poonamarora96@gmail.com](mailto:poonamarora96@gmail.com)

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## INTRODUCTION

*Abies webbiana* Lindl., commonly known as Talispatra in Hindi, and Indian Silver Fir in English, is a large, tall, evergreen tree with multiple uses. Drug consists of dried leaves of *Abies webbiana* Lindl (Fam. Pinaceae) commonly known as *Talispatra*.<sup>1, 2</sup> Plant is in different languages as Patradhyam (Sanskrit), talish patra (Hindi), talish pala (Bengali), Himalayan silver (Eng), talish (Assam), laghu taleespatra (Marathi), talish patra (Guj), talispatra (Tamil). *Abies webbiana* Lindl. is an evergreen tree up to 60 m height widely distributed on higher ranges of temperate and sub-alpine himalayan regions. In India, the plant has been described for its multiple therapeutic uses in chronic obstructive pulmonary diseases, asthma, cough, gulma (tumor), amoebiasis, hiccup, helminthiasis and many more. Leaves are mucpolyic, antitussive anti-inflammatory, expectorant.

### Scientific classification:

Kingdom	:	Plantae
Phylum	:	Pinophyta
Class	:	Pinopsida
Order	:	Pinales
Family	:	Pinaceae
Genus	:	<i>Abies</i>
Species	:	<i>webbiana</i>
Binomial name ;	:	<i>Abies webbiana</i> (Wall ex D. Don) Lindl.
Synonym	:	<i>Abies spectabilis</i> (D.Don) Spach

### General Distribution

*Abies webbiana* Lindl. is an evergreen tree up to 60 m height widely distributed on higher ranges of temperate and sub-alpine regions of Himalayan region ranging from Kashmir to Assam state in India and particularly in the state of Sikkim. It is also found in Afghanistan (Hindu Kush range), Tibet (China), Nepal, Karakoram Range and Bhutan at an altitude of 2500-4000 m largely located in high humid region with heavy rainfall and dense mist. About 50 species of genus *Abies* occur in the world.<sup>1,3</sup> Some species have been used traditionally in the treatment of cold, stomachache, indigestion, vascular, pulmonary and venereal diseases.<sup>4,5</sup>

### Morphological Description

Tree is stunted and gnarled. Leaves are 1.3-2.5 cm long, flattened, linear, stiff, brittle and spirally arranged on branches more or less distichous from below. Upper surface dark green torusty

brown, shiny, lower surface mealy with prominent midrib and shows silvery white line along its each side. Odour, aromatic, taste, astringent and slightly pungent. Young shoots are covered with short brown hairs.<sup>6, 1, 2</sup>

### Ethnomedicinal/Traditional Uses

In India, the plant has been described for its use in swasa (chronic obstructive pulmonary diseases), kasa (cough), gulma (tumor), agnimandya (hypochlorhydria), amadosha (amoebiasis), hikka (hiccup), chhardi (vomiting), krimi (helminthiasis) and mukharoga (mouth disorders). In west Bengal juice of fresh leaves is given after parturition. In northern India, leaves of the plant have been traditionally used for their carminative, stomachic, expectorant, decongestant, antiseptic, astringent, antihyperglycemic, female antifertility, febrifuge and anti-spasmodic properties.<sup>7</sup> Decoctions of leaves are useful in cases of cough, asthma, chronic bronchitis and other pulmonary affections and rheumatism.<sup>8</sup> In the western countries, the ash of leaves is sprinkle over measles, mumps and chicken pox to get relief from itching.<sup>9</sup> In northern India, the dried leaves are known for their carminative properties, expectorant, tonic, astringent, asthma, bronchitis, and catarrh of bladder the powder leaves are given with juice of *Adhatoda vasica* and honey. Mixture of gum mixed with rose oil used externally for headache, neuralgia. People in Berar use infusion in the treatment of hoarseness. The tree is grown as an ornamental in hills.

### Reported Chemical Constituents

A number of phytoconstituents have been isolated from *A. webbiana* including essential oil (0.5%). The major constituents of oil are  $\alpha$ -pinene,  $\beta$ -pinene, camphene, limonene and bornyl acetate.<sup>10</sup>

Leaves contain a new bioflavonoid Abiesin (5,3'',7''- trihydroxy-7,4',4'''-trimethoxy-(3',6'')-biflavone) isolated from its ether soluble fraction of ethyl acetate extractive.<sup>11</sup> Ethyl acetate extract obtained after successive extractions with petroleum ether and chloroform yielded *n*-triacontanol,  $\beta$ -sitosterol and betuloside [4-(*p*-hydroxyphenyl)-butanol-2-( $\beta$ -D-glucopyranoside)]<sup>12</sup> whereas residue yielded methyl betuloside [4-(*p*-methoxyphenyl)-butanol-2-( $\beta$ -D-glucopyranoside)].<sup>13</sup> A new aziridine alkaloid C-1, i.e., 1-(4'-methoxyphenyl)-aziridine, was isolated from the leaves of *Abies webbiana* Lindl. (Pinaceae), grown in Sikkim Himalayan region of India.<sup>14</sup> A new nitrogenous compound, namely, 2-(*o*-tolylamino) ethanol was also isolated from chloroform extract of leaves.<sup>15</sup>

Preliminary phytochemical screening showed the presence of alkaloids, flavonoids, steroids, and terpenoids and absence of glycosides and saponins in leaves, tannins in bark and flavonoids and saponins in rhizomes.

## REPORTED BIOLOGICAL ACTIVITIES

### a) Bronchodilator activity

In isolated rabbit tracheal preparations, crude extract of *A. webbiana* leaves caused relaxation of carbachol and K<sup>+</sup>-induced contractions comparable to standard drug, verapamil suggesting the bronchodilatory effect which may be mediated through calcium channel blockage.<sup>16</sup>

### b) Antispasmodic Activity

Crude extract of *A. webbiana* leaves spasmolytic activity in spontaneous and K<sup>+</sup> (80 mM)-induced contractions isolated rabbit jejunum in a concentration-dependent manner providing evidence for its folkloric use stomach disorders.<sup>16</sup>

### c) Antitussive Activity

Methanol extract of *A. webbiana* leaf extract (400 and 600 mg/kg) showed maximum inhibition of SO<sub>2</sub>-induced cough frequency by 71.69% and 78.67%, respectively, when compared with the control group and was comparable in effect to codeine phosphate.<sup>17</sup>

### d) Anti-Inflammatory Activity

The methanol extract of leaves of *Abies webbiana* showed the anti-inflammatory activity as compared to that of diclofenac sodium (150 mg/kg, p.o.) in carrageenan-induced paw edema model of rats.<sup>18</sup>

### e) Antibacterial Activity

Leaves of *A. webbiana* were screened for antibacterial activity against several strains of bacteria such as *Bacillus cereus*, *Bacillus pumilus*, *Bacillus subtilis*, *Bordetella bronchiseptica*, *Micrococous luteus*, *Staphylococcus epidermidis*, *Staphylococcus aureus*, *salmonella typhi*, *Escheria colli*, *Candida albicans*, *Aspergillus niger* and *Saccharomyces cerevisiae* by cup plate method. The results showed antibacterial activity against all tested strains but maximum activity was exhibited against *Staphylococcus aureus* and *salmonella typhi* only. The extract also showed concentration dependent antifungal activity.<sup>19</sup>

### f) Antioxidant Activity

Hydroalcoholic extract of *Abies spectabilis* exhibited a substantial antioxidant activity in DPPH, nitric oxide and hydrogen peroxide radical scavenging *in vitro* models and reducing power was comparable to L-ascorbic acid, curcumin and  $\alpha$ -tocopherol.<sup>20</sup>

### g) Sedative Activity

Methanol extract *A. webbiana* (100, 150, and 200 mg/kg b.w.) administered in mice showed no hypnotic activity in animals. However, the administration of extract prior to the administration of

pentobarbitone sodium and diazepam significantly increased the effects of standard sedatives at these dose levels in mice.<sup>18</sup>

#### **h) Anti-Platelet Activity**

In a study, crude extract of *A. webbiana* leaves inhibited both ADP- and epinephrine-induced aggregation of human platelets demonstrating therapeutic potential of plant against thrombo-embolic conditions. The observed anti-platelet effect was observed at low doses against epinephrine when compared to ADP.<sup>16</sup>

#### **i) Antipyretic Activity**

Intraperitoneal administration of methanolic extract of *Abies spectabilis* leaves at dose of 200 mg/kg and 400mg/kg b.w. exhibited reduction of body temperature in yeast induced hyperxia in rats.<sup>19</sup>

#### **j) Neuropharmacological Activity**

The methanol and ethyl acetate extracts of *Abies webbiana* aerial parts were tested for antianxiety, anticonvulsant, antidepressant, sedative, antistress and analgesic activities using elevated plus maze model, maximal electroshock test, despair swim test, thiopentone sodium, cold swimming test, tail immersion test. The results exhibited significant antidepressant and mild anticonvulsant activity.<sup>21</sup>

#### **k) Antitumor activity**

Crude extract of *A. webbiana* leaves was found to inhibit tumor growth cells in mice.<sup>22</sup>

#### **Marketed Preparations**

*Abies webbiana* is one of the ingredients of siddha formulations such as Taalisadi choornam (prescribed in stomach problems), Thippli rasaayanam (prescribed in respiratory problems), Vyoshhadi vati (prescribed in respiratory and stomach mixed problems) and Ayurvedic formulations like Drakshadi Churna, Talisadi Curna, Bhaskara Lavana, Pranada Gutika, Jatiphaladi Churna, Puga Khanda and Talisadi Modaka.

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