

# **REVIEW OF LITERATURE**

### 3. Review of Literature

A general review of literature on the ethnomedicinal, pharmacognostical, phytochemical and biological activity studies of the five species is provided in this chapter.

#### 1. *Boswellia ovalifoliolata* Balak. et Henry

##### *a. Medicinal and ethnobotanical studies*

Nagaraju (1992) and Vedavathy (1992) reported that the gum is used to cure arthritis. Nagaraju (1992) also reported that the gum is used in dysentery. Vedavathy (1992) recorded that the gum and leaf are used in ulcers of mouth and throat.

Vedavathy *et al.*, (1997a,b) reported that the plant is given in hydrocele.

##### *b. Phytochemical studies*

Madhava Chetty and Rao (1990) made phytochemical comparison of *Boswellia ovalifoliolata* with *Boswellia serrata*.

Vedavathy (1992) reported the phytochemical analysis of flavonoids and steroidal sapogenins from the stem bark and resin.

##### *c. Biological activity studies*

Vedavathy and Rao (1995) studied the anti-inflammatory activity of stem bark and resin. They observed that the maximum effect at the first phase of Carrageenan inflammation was exhibited. They also noticed anti-ulcer activity and anti-histamine action in minimal doses.

## 2. *Pterocarpus santalinus* Linn.

### *a. Medicinal and ethnobotanical studies*

Meyer and Cook (1943) and Wise and John (1952) described that the wood yields a kino similar to that produced by other species of the genus *Pterocarpus marsupium* Roxb., is used as an application of sores.

Ramakrishna (1962) reported that the wood dye is used for colouring high class alcoholic liquors.

The dye obtained from the wood is used for colouring pharmaceutical preparations and food stuffs and is suitable for colouring paper pulp (Anonymous, 1969).

Kirtikar and Basu (1975) discussed the ayurvedic description of the species. They recorded that the wood is astringent, tonic, diaphoretic and the wood paste is used in bilious affections and skin diseases. They also described that the fruits are used as an astringent tonic in chronic dysentery.

Satyavathi and Gupta (1987) recorded that wood and fruit are used in ayurvedic and folk medicines against diabetes, skin eruptions, stomach ulcers, skin diseases and bilious affections.

Sudarsanam (1987), Basi Reddy (1991) and Nagaraju and Rao (1990) reported that the heart wood decoction is given to diabetic patients.

Thammanna and Rao (1990) reported that the uses of wood as astringent, tonic and diaphoretic and also used in diabetes. They described the fruit decoction is used as an astringent tonic in chronic dysentery.

Vedavathy (1992) and Vedavathy *et al.* (1997a,b) carried out the ethnobotanical importance of the species. Their literature revealed that the wood is used in the treatment of rheumatic pains and in diabetes.

Raju *et al.* (1999) reported the economic values of the species. They reported that the wood is chiefly used for dyeing wool, cotton and leather and for staining other woods.

Noor Ahmad (1997) investigated the economic values of the plant. It revealed that about 800 tonnes of red sanders are exported annually only to Japan where it is used in the manufacture of a musical instrument employed during marriage functions.

### ***b. Pharmacognostical studies***

Troup (1921) discussed the morphology, general description, habitat and silvicultural characters.

Kesava Raju and Jagadeswar Rao (1987) reported the distribution of the species using the geological formations in Cuddapah landscape.

Kaseva Raju *et al.* (1989) also reported on the physiological and geological factors governing the distribution of red sanders.

### ***c. Phytochemical studies***

Ravindranath and Seshadri (1972, 1973) carried out chloroform extraction of heart wood which yielded a mixture of red pigments along with two major compounds viz., Santalin A and Santalin B, both of which gave permethyl ether on methylation.

Seshadri (1972) reported polyphenols of the wood.

Guru Dutt and Seshadri (1974) carried out the identification of compounds SantalinA as 9, 10, 12 - tri-o-methyl santalin where as Santalin B as 9, 10, 12, 4 tetra-o-methyl santalin.

Kumar and Seshadri (1974) studied sapwood on extraction with petroleum ether which yielded acetyl oleonic acid and erythrodiol, whereas

the chloroform and alcoholic extracts were found to contain Santalin A and Santalin B.

Kumar and Seshadri (1975) also carried out an examination of chloroform extract that yielded triterpinoid of a new lupene-diol characterised as lup-(20) 29-en-2 $\alpha$ -3 $\alpha$ -diol.

Kumar and Seshadri (1976) reported a new triterpene betulin and another new leupenediol characterised as lup-20(29)-en-2x, 3 $\beta$ -diol from the bark.

Venkataramaiah *et al.* (1980) reported the levels of phenolic acids. They separated 12 phenolic acids in the wood.

Vedavathy (1992) reviewed the phytochemical studies of the plant.

#### ***d. Biological activity studies***

Mehta *et al.* (1979) carried out pharmacological activity of 90% ethanol extract of heart wood and stem bark. The plant showed a CNS depressant activity including tranquillizing action, anti convulsant action against electroshock convulsions. They reported the extract had no analgesic activity.

Vijayalakshmi *et al.* (1979) reported the nematicidal activity of wood against the second stage juveniles of *Meloidogyne incognita* (koffoid and white) chit wood.

Dhawan *et al.* (1980) carried out the antispasmodic activity on isolated guinea pig ileum. The stem extract showed seman coagulant activity. The LD 50 has been >1000 mg/kg body wt. I.P in mice.

Nagaraju *et al.* (1991) reported the significant blood sugar lowering effect of wood using a 95% ethanol extract in albino rats.

Other interesting works carried out by various authors on this species are as follows.

Lakshmi Sita *et al.* (1992) reported the successful development of red sander wood plantlets by induction of multiple shoots from shoot tips and successful transfer of micropropagated plants to soil.

Narasimha Rao (1995) worked on metabolic studies of red sanders.

Anuradha (1995) reported enhancing of growth and axillary branching in bud cultures and seed cultures.

Raju *et al.* (1999) carried out the biogeochemical studies of leaf and heart wood samples. Reports showed the characteristic elemental association and accumulation of different elements. It suggests that red sanders is an accumulator plant for strontium.

### **3. *Terminalia pallida* Brandis**

#### ***a. Medicinal and ethnobotanical studies***

Sudarsanam (1987) reported the fruit as a purgative and used in diuresis and fever.

Basi Reddy (1991) reported the uses of fruit in veterinary medicine. Nagaraju (1992) recorded that the fruit is used in venereal diseases along with the tuber of *Pimpinella tirupatiensis*.

Nagaraju (1992), Vedavathy (1992) and Vedavathy *et al.* (1997a,b) reported that the fruit is used to cure peptic ulcers.

Vedavathy *et al.* (1997a,b) recorded that the wood and fruit are used to cure swellings.

Abdul Resheed Miah (1995) reported that the fruit decoction is given in diarrhoea and also the fruit is used as dry pickle.

#### ***b. Pharmacognostical studies***

Madhava Chetty and Rao (1990) reviewed the morphological description of the plant.

Rao and Raja Reddy (1983a, b) described the extended distribution of the species and threat status of the plant in Tirumala.

#### ***c. Phytochemical studies***

Venkataramaiah *et al.* (1988) reported the phenolic compounds from the plant.

Madhava Chetty and Rao (1990) carried out the phytochemical comparison of the plant with *Terminalia chebula* Retz.

Vedavathy (1992) carried out phytochemical studies of the fruit. She reported the steroidal sapogenins from the fruit and stem.

#### ***d. Biological activity studies***

Sudarsanam (1987) studied the mild CNS depressant action of the wood and fruit by reducing time and spontaneous motor activity and exhibiting hypothermia. He also studied the crude extract of the plant showed mild to good influence on nicotine induced contractions. He observed that the stem and fruit showed 100% inhibit the mycelial growth of *Sclerotium rolpii* at 2000 ppm. He also reported that the leaf extract showed good CVS action by increasing B.P. considerably but the effect was not prolonged.

#### 4. *Syzygium alternifolium* (Wight) Walp.

##### *a. Medicinal and ethnobotanical studies*

Sudarsanam (1987) and Vedavathy (1992) recorded the ethno-medicinal values of the species. The literature revealed that the fruit is used in diabetes, rheumatic pains and in stomach ulcers. Stem is also used as an antiseptic agent.

Basi Reddy (1991) and Nagaraju (1992) reported that the fruit is used in diabetes.

Vedavathy *et al.* (1997a,b) recorded that the fruit is used to control diabetes.

Shavalli Khan (1996) reported that the ripe fruits are nutritious and used in making squashes, jellies and vinegar.

##### *b. Pharmacognostical studies*

Rao and Raja Reddy (1983a,b) described this plant as one of the endemic plant species in Tirumala hills and reported that it is one of the threatend plants of Tirupati and its environs.

Rao and Madhava Chetty (1990) discussed the habitat and general features of the plant and records that it is found in Tirumala forests only.

##### *c. Phytochemical studies*

Venkataramaiah *et al.* (1988) reported phenolic compounds in the plant.

Rajasekar Rao *et al.* (1989) reported some economically important compounds viz., sitosterol, (+) pinto and sideroxylin in the leaves.

Rajasekar Rao and Srinivasa Rao (1991) investigated a new syzalterin and shown to be as 6, 8-Di-C-methyl flavone from the leaves.

Vedavathy (1992) reported the phytochemical analysis of the fruit and stem bark.

Shavalli Khan (1996) carried out clonal propagation of the plant through tissue culture methods.

#### ***d. Biological activity studies***

Sudarsanam (1987) investigated the fruit and stem showed promising spasmolytic activity by blocking nicotine (50%) and serotonin (53%) action. He also reported promising anti-inflammatory activity from the fruit and stem bark with the inhibition ranging from 30 to 45%.

Sudarsanam (1987) reported that the stem bark showed mild CVS action by reducing B.P. for about 60 minutes at the dose of 25 mg/kg /i and also carried out the crude extract of all parts which show 100% inhibition of mycelial growth of *Sclerotium ropii* at 2000 ppm.

### **5. *Pimpinella tirupatiensis* Bal. & Sub.**

#### ***a. Medicinal and ethnobotanical studies***

Sudarsanam (1987) and Basi Reddy (1991) reported that the root tuber is used as an aphrodisiac and in stomachache and records that the tuber decoction is used in ulcers.

Nagaraju (1992) and Vedavathy (1992) reported that the tuber infusion with coconut and sugar is used to cure sexual debility.

Nagaraju (1992) reported that the tuber with the fruit of *Terminalia chebula* Retz., used to cure peptic ulcers.

Vedavathy (1997a,b) recorded that the tuber is given as an abortifacient.

Sudhakar and Vedavathy (1999) reported that the root tuber is edible and used by the *Yanadi* tribes.

### ***b. Pharmacognostical studies***

Rao and Raja Reddy (1983a) recorded the extended distribution of the plant on Tirumala hills.

Madhava Chetty and Rao (1990) described the morphology of the plant.

Thammanna *et al.* (1994) reviewed the morphological description of the species.

### ***c. Phytochemical studies***

Sudarsanam (1987) carried out preliminary chemical analysis of the tuber.

Vedavathy (1992) reported steroidal sapogenins from the tuberous root.

### ***d. Biological activity studies***

Sudarsanam (1987) reported that the root possesses moderate anti-histamine action against histamine induced contractions

Vedavathy (1992) investigated that the tuber exhibited prolonged analgesic effect though mild, but more prolonged than analgin. She also

reported the anti-ulcer activity of the tuber. The extract significantly reduced the incidence of gastric ulcers produced by pylorus ligation and protected the rats from ulcerogenic effect to variable extents. She studied the anti-inflammatory activity of the stem on albino rats. She observed that 50% ethanol extract showed the maximum anti-inflammatory activity at the second phase of Carrageenan inflammation. She also reported that the plant exhibit slight anti-histamine action in minimal doses.