Review Article

ETHNOPHARMACOLOGICAL PROPERTIES OF *CINNAMOMUM TAMALA* – A REVIEW

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ABSTRACT

The present review describes the morphological, phytochemical and pharmacologyaspects of *Cinnamomum tamala* (Lauraceae). The plant grows wild in the tropical and subtropical Himalayas, the Khasi hills, the nilgiri hills and at the foot of the Sikkim Himalayas. There are many plantation of this species. Used as carminative, used in colic and diarrhoea. Bark is aromatic, stimulant, antigonorrhoeic, hypoglycemic, stimulant, anti rheumatic and antidote for scorpion sting. So, the present paper enumerates an overview of phytochemical and pharmacological properties, which may help the researchers to set their minds for approaching the efficacy and potency of herb.

Keywords: *Cinnamomum tamala*; Lauraceae; Phytochemistry; Pharmacological profile.

INTRODUCTION

Cinnamomum tamala (Tam:Talisha Pattri) (fig 1) is a medium sized evergreen tree 2-10 m tall, leaves are staked, opposite, or sub opposite, elliptic-oblong, nerved from the base, shining, leathery, entire, long pointed, new leaves are slightly pinkish tinged, flowers are small, yellowish and blooming in the month of march to may. The plant grows wild in the tropical and subtropical Himalayas, the Khasi hills, the nilgiri hills and at the foot of the Sikkim Himalayas[1].

Indian cassia lignea, *Cinnamomum tamala* Nees and Ebern. (Hindi- Tejpat)[2] is an evergreen tropical tree, belonging lauraceae family. It is mainly used for flavouring food and widely used in pharmaceutical preparation because of its hypoglycemic, stimulant and carminative properties[3, 4]. The leaves of trees used as spice having clove like taste and pepper like odour. Essential oil of Cinnamomum leaves has excellent inhibitory effects on bacteria[5]. There are numerous studies on composition of tejpat essential oil[6]; however tejpat oleoresins are not studied so vastly. As a part of ongoing research programme[7, 8] present paper deals with the phytochemical and pharmacological profile of tejpat essential oil and different other constituents. The objective of this paper is to study the phyto-pharmaceutical review profile of *Cinnamomum tamala*.

Cinnamomum tamala Fr. Nees., belonging to family Lauraceae, is also known as Indian Cassia and the leaves are commonly called as bay leaves. Lauraceae is an economically important family consisting mostly of trees or tree-like shrubs. The genus *Cinnamomum* is represented by about 350 species worldwide. It is native to South-east Asia, some Pacific Islands and Australia, growing mainly in tropical rain forests at varying altitudes. Historically, it is one of the oldest known and used spices. *C. tamala* which is an evergreen tree up to 8m in height is also cultivated. Natural habitat is in the tropical and sub- tropical Himalayas at altitudes of 900-2500m. Due to its aroma, the leaves are kept in clothes and also chewed to disguise bad mouth odour. Its dried leaves are used as a common ingredient of Indian cooking. The leaves of this tree have a clove like taste and a faintly pepper like odour. The specific epithet '*tamala*' is after a local name of the plant in India. Essential oil extracted from the leaves contains monoterpenoides including phellandrene, eugenol, linalool and some traces of α-pinene, *p*-cymene, ß-pinene and limonene, phenylpropanoids. This plant is frequently mentioned in various Ayurvedic literatures for its various medicinal values[9].

It is also used in Indian system of traditional medicines. Leaves and bark have aromatic, astringent, stimulant and carminative qualities and used in rheumatism, colic, diarrhoea, nausea and vomiting. Ancient literature has revealed that in the first century A.D., dried leaves and bark of this plant were prescribed for fever, anemia and body odour. Its seeds were crushed and mixed with honey or sugar and administered to children for dysentry or cough[10].

Figure 1: *Cinnamomum tamala* (Tejpat)

Botanical name: *Cinnamomum tamala*

Family: Lauraceae

Common name: Tejpat, Kumaon.

Synonyms: *Cinnamomum tejpata* hort., *Laurus tamala* Buch. - Ham.

Part used: Leaves, Essentail oil.

Habitant: The plant grows in tropical rain forests at varying altitudes.

Cinnamomum tamala Nees. (Lauraceae), commonly called as Tejpat (trade name Tamalpatra) is an evergreen monoecious species, up to 8 m high and distributed all along the Lesser Himalaya from Jammu to Arunachal Pradesh, Khasi and Jaintia hills, Myanmar and Australia[11]. It is an important species in the transitional evergreen broadleaf forest between 800 – 2000 m asl. Natural stands of *C. tamala* are mostly found in shady moist habitats. Leaves are aromatic and traded as a spice[12] and also as a source of various Ayurvedic formulations[13]. It flowers during March to May and usually pollinated by small insects such as honey bees. The fruits are ellipsoidal drupe and require approximately one year attaining maturity. Hence, the flowers and fruits can be seen on the same time during April - May. Ripe fruits are dark purple in color and contain single seed. The seeds are primarily dispersed by frugivorous birds, which feed on them for the nutritious pulp and egest the seeds intact. In addition, strong winds, hail storms and sometimes arboreal mammals such as primates may help in mechanical dispersal of fruits. Seeds are also secondarily dispersed by rodents and other small mammals. Thus seeds of this species are deposited on the forest floor in two states i.e., with or without pulp exhibiting different patterns of germination and establishment.

Considering the economic potential and dwindling natural populations of *C. tamala* in several ranges, this species has been recommended for in-situ as well as ex-situ conservation by several authors. However, in the absence of standard agro-techniques and owing to lack of information on seed germination behavior, conservation efforts have not succeeded so far[14].

MORPHOLOGY

Leaf length, leaf width, petiole length, right and left inter vein distance were recorded manually by using measuring scale, leaf thickness and petiole thickness were measured with the help of digital vernier caliper and leaf area was recorded by using digital leaf area meter. The morphological variant seedlings premeditated were discrete from the normal plant seedlings in many characteristic features. Leaf pigments of both the plants did not differ much in leaf pigments[15].

PHYTOCHEMISTRY

The major constituents of the leaf essential oils of these species contain furanosesquiterpenoids as principal constituents. Furanogermenone (59.5%) was found to be the major compound in the leaf essential oil is β-caryophyllene (6.6%), sabinene (4.8%), germacrene D (4.6%) and curcumenol (2.3%). The leaf oil was characterized by a high content of sesquiterpenoids (96.8%), dominated mainly by furanosesquiterpenoids (79.3%) viz. furanodienone (46.6%), curzerenone (17.6%), furanodiene (1.8%) and curzerene (1.2%). *Cinnamomum verum* contained approximately 63% cinnamaldehyde, 8% limonene, 7% eugenol, 5.5% cinnamaldehyde propylene, and 1-2% of a variety of terpenoid compounds (α - pinene, camphene) as measured by gas chromatography/mass spectrometry[16].

Cinnamon *leaf* oil contains a variety of constituents including eugenolvand cinnamaldehyde, which is a local mucous and dermal membrane irritant. In a study of the essential oils from leaves of *Cinnamomum osmophloeum* (Taiwan cinnamon), terpenoid compounds accounted for approximately 90% of the chemical compounds with 1, 8-cineole, spathulenol, santolina triene, and caryophyllene oxide being the most common compounds[17]. The essential oils from leaves of *Cinnamomum* species accounts for about 0.5% dry weight. Analysis of a steam-distilled volatile oil from cinnamon fruit stalks yielded 27 compounds with cinnamyl acetate (36.59%) and caryophyllene (22.36%) being the major components[18].

Analysis of the hydro-distilled volatile oil from buds of *Cinnamomum verum* (*C. zeylanicum)* yielded terpene hydrocarbons (78%) and oxygenated terpenoids (9%) with the sesquiterpenes, α - bergamotene (27%) and α - copaene (23%), being the most common compounds[19].

Minor compounds included α - humulene, α - muurolene. The volatile oil of the buds contains more monoterpene and sesquiterpene compounds than oils from the flowers and fruits, whereas the concentration of *trans* - cinnamyl acetate is much higher in the volatile oils from flowers and fruit than from the buds. A study of cinnamon essential oil from *C. verum* grown in Madagascar indicated that the major constituent was *trans* - cinnamaldehyde (41.3%) [20].

PHARMACOLOGICAL ACTIVITIES

Antidiabetic activity:

Methanol and successive water extract of bark of *Cinnamomum tamala* was screened by using a-amylase inhibition assay for antidiabetic activity. The percentage inhibition values of bark of the *Cinnamomum tamala* were found to be 97.49% and 93.78% respectively. Similarly, IC50 values of methanol and successive water extract of the *Cinnamomum tamala* were 1.80 and 5.53 respectively. The methanol extract showed high potent activity than successive water extract of *Cinnamomum tamala*[21].

Antibacterial activity:

Cinnamomum tamala stem-bark extracts revealed a good antibacterial activity. Some earlier researches carried out

on the other species of *Cinnamomum* were also in concordance with our results[22]. Stem-bark extracts of *Cinnamomum tamala* were evaluated for *in vitro* antibacterial potential by agar well diffusion assay. The essential oil from the bark of *Cinnamomum zeylanicum* showed *in vitro* antimicrobial activity against several microorganisms[23].

Antioxidant activity:

Antioxidant potential of Cinnamomum oil and oleoresins for mustard oil has been evaluated by different methods such as peroxide, *p*- anisidine, thiobarbituric acid and total carbonyl value method.Further determination of antioxidant activity of essential oil and oleoresins of tejpat in linoleic acid system and scavenging effecton DPPH[24, 25].

Anti-ulcer activity:

The hydro alcoholic extract of *Cinnamomum tamala* leaves was able to protect the gastric mucosa from chemical, stress, and physically induced ulcers and inhibits gastric acid secretion probably by blocking H^+ K^+-ATPase action and offering antioxidant protection against oxidative stress-induced gastric damage. The findings of this experimental study could lead to further isolation, and pharmacological activity of new therapeutic compounds effective against ulcer[26].

Antimicrobial activity:

Volatile oil was found to be 100% active against *Fusarium moniliforme, Aspergillus niger, A. oryzae* and *A. solani* but not for *A. awamori* in inverted patri-plate method, though food poisoned method revealed 100% activity for *A. niger* and *Fusarium moniliforme* at 6µl dose. It was found to be highly effective in controlling the growth of *A. flavus, A. solani* and *A. oryzae*[27].

CONCLUSION

The multiple benefits of *Cinnamomum tamala* made it a true miracle of nature. Numerous studies have been conducted on different parts of *Cinnamomum tamala,* but this plant has not yet developed as a drug by pharmaceutical industries. A detailed and systematic study is required for identification, cataloguing and documentation of plants, which may provide a meaningful way for the promotion of the traditional knowledge of the herbal medicinal plants. The present review reveals that the plant is used in treating various ailments. It elicits on all the aspects of the herb and throws the attention to set the mind of the researchers to carry out the work for developing its various formulations, which can ultimately be beneficial for the human beings as well as animals.

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