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Ethnomedical, Pharmacological and Phytochemical Updates on *Cinnamomum tamala*

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ABSTRACT

Cinnamomum tamala also known as Tezpat, having a place with the family *Lauraceae*, a noteworthy exposed tree in India, China, Nepal, Bhutan and Bangladesh. It is evergreen tree with medium in size. Phytochemicals studies perceived the diverse constituents, to be specific, glycosides, saponins, flavonoids and terpenes found in different pieces of plant *C. tamala* and determined the presence of various metabolites having huge enemy of diabetic, hepatotoxicity, against oxidant, hostile to pyretic, hostile to tumor, wound recuperating action, against microbial and a lot more issues. This review deals the several ethno medical and traditional uses of different parts of *C. tamala*.

Key words: *Cinnamomum tamala*, Phytochemical analysis, ethno medical, phytoconstituents

1. INTRODUCTION

Traditional medicines are being used all the more a great part of the time wherever all through the world. Anyway, often these are choices made by the patient. Coordinating these medicines into standard health treatment would expect examination to comprehend the adequacy, wellbeing, and its pharmacological action. It has been recognised from scientific interference that plant derivatives have display broad range of effectiveness and protection with comparatively lesser side effect as equated to synthetic derivatives. Thus, there is a necessity to increase screening of plants having medicinal worth. ^(1,2)

Cinnamomum tamala also known as Tezpat, having a place with the family *Lauraceae*, a noteworthy exposed tree India, China, Nepal, Bhutan and Bangladesh. It is evergreen tree with medium in size. ⁽³⁾

2. Taxonomic classification

Domain: Eukaryota

Kingdom: Plantae

Sub Kingdom: Viridiplantae

Phylum: Streptophyta

Subphylum: Embryophyta

Class: Mangnoliopsida

Order: Laurles

Family: Lauraceae

Genus: Cinnamomum

Species: Cinnamomum tamala

Synonym(s): Dalchini (In hindi), Pattai illai (In tamil), Tezpatta, and Tamalpatra. ⁽⁴⁾

3. Botanical Description and Organoleptic Characteristics

Tezpat is an intermediate dimension tree. It gains generally up to ten metres height. Its leaves are shrill and up to 5 inches lengthy, thriving having shape of just like ovoid, they are thick-headed and are not just opposite to each other but they are so arranged that they taught to be oppositely organized, flushed. These leaves are faintly reddish pink in colour when they are new, flowers are petite and yellowish, fully-fledged in spring session. Tree propagates in torrid and semi tropic zone in mountains of north region at raises of three hundred to twenty-four hundred metres and initiates from Northern part of India and some nearby areas. ⁽⁵⁾

Aroma of leaf gives suitability to be placed in wardrobe for giving a nice perfumery odour, mastication to hide oral odour. Dried leaves are used as a flavouring agent and for fragrance in cooking. On tasting, leaves give observation like clove whereas on perceiving its odour, it gives feel somewhat like pepper. In Indian tradition, it is well known utilized medicine. Bark and leaves of Cinnamomum are aromatic in nature and having properties like stimulating, constricting and relieving flatulence. And because of these properties they are used to treat loose motions, musculoskeletal disorders, queasy sensation and emesis. In old documents, it is reported that dried bark and dried leaves of Cinnamomum were mentioned to treat

increased body temperature and pale complexion. Seeds of the plants were given to children in treatment of stomach cramps associated with inflammation in intestine. ⁽⁶⁾

4. Identifications of Phytochemical Constituents

Leaves of *C. tamala* gives essential oil by steam distillation known to be cinnamon oil. It contains various components but majorly eugenol, sabinene, germacrene D, β -caryophyllene and curcumenol. This cinnamon oil consists of different class of sesquiterpenoids i.e. furanodienone, curzerenone, furanodiene and curzerene. ⁽⁷⁻⁹⁾ The leaves has camphene, myrcene, limonene, and alfafinene as its major constituents. Bark of *C. tamala* consist of cinnamaldehyde. Cinnamon oil is used as anti-flatulent, diuretic and carminative. ⁽¹⁰⁾

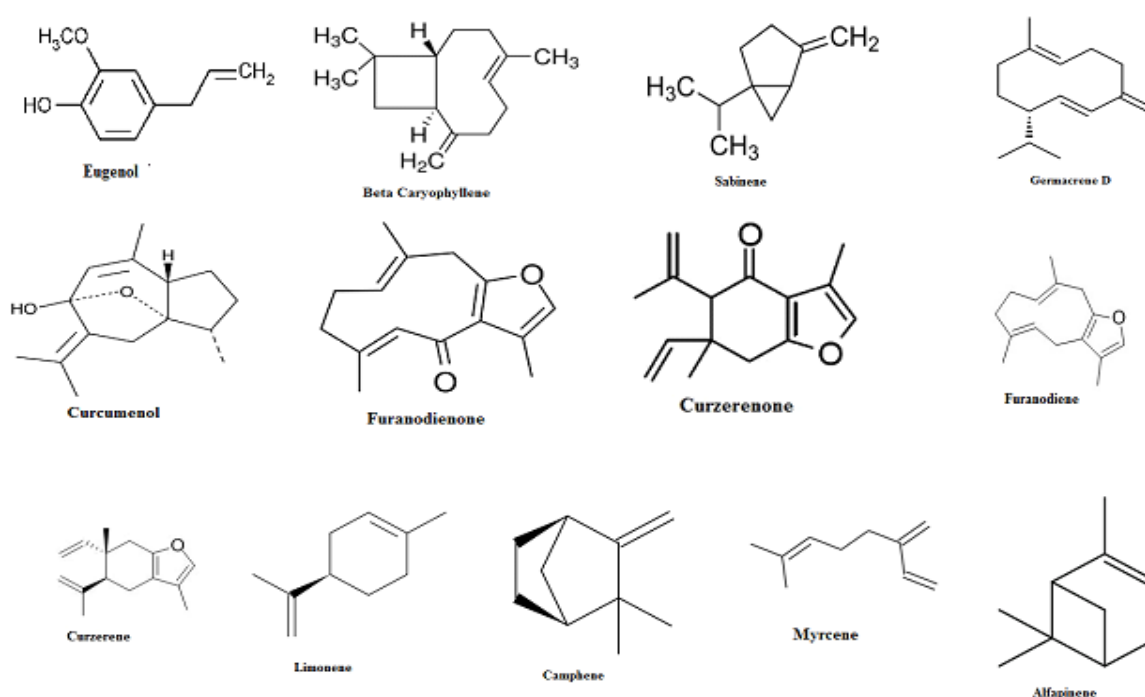


Figure 1. Structure of isolated compound of *Cinnamomum tamala* ⁽⁷⁻⁹⁾

5 PHARMACOLOGICAL USES

5.1 Antidiabetic activity

Alloxan induced diabetic model was used to study antidiabetic effect of Aqueous extract (CTLEt) of *Cinnamomum* leaves. To increase sugar level in rats make them diabetic, an intraperitoneally injection of alloxan was given at a dose of 100mg/Kg by body weight. Dose of 1, 1.5 and 2ml of extract were given orally to animals to determine antidiabetic effect and compared with standard antidiabetic agent glibenclamide at 5mg/kg dose. Blood glucose

levels by CTLEt treatment on 18th hours of the study were found to be 8.6-5.1, 10.4-4.9 and 14.7-4.3mmol/L by 1, 1.5 and 2ml CTLEt with lab diet respectively in comparison of 9.5-8.5, 8.7-7.8, 7.7-7.1mmol/L by control and 13.9-6.5, 16.3-6.1, 9.5-5.1mmol/L by glibenclamide. (11)

In a streptozotocin induced diabetic study, ethanolic extract of *Cinnamomum tamala* leaves at 100 mg/kg body weight was given for 40 days. STZ dose at 50 mg/kg i.p. was given to induce diabetes and increase in glucose level (275 to 300 mg/100 ml). Treatment of diabetic animals with ethanolic extract *Cinnamomum tamala* extract at 200mg/kg significantly lowered the blood glucose level from 82.33 ± 2.73 to 76.66 ± 1.75 mg/dl in 90min, and maintained body weight from 193 ± 7 to 209.2 ± 4 g and lipid-profile parameters towards near normal range. (12)

5.2 Antioxidant activity

A DPPH radical scavenging assay performed using ethanolic extract of *Cinnamomum tamala* leaves at a dose of 1, 5, 25, 50, 100, 200, 500 μ g/ml using Ascorbic acid as a standard at same concentration. Resultantly, maximum inhibition and 50% inhibitory concentration of extracts were found to be 87.61% and 13.55 μ g/ml compare to 95.26% and 5.35 μ g/ml by standard. (13)

A DPPH radical scavenging assay performed using methanolic extract of *Cinnamomum tamala* leaves at a dose of 1, 3, 5, 10, 15, 20, 30 μ g/ml using Ascorbic acid as a standard at same concentration whose IC₅₀ value was 3.21 μ g/ml where the plant extract gives the IC₅₀ value of 6.0 μ g/ml. Thus, the study showed a potent antioxidant property of *C. tamala*. (14)

5.3 Antipyretic activity

In an antipyretic study, pyrexia was induced in fasted animal by subcutaneous injection of a 20% aqueous suspension of Brewer's yeast in normal saline at rate of 1ml/kg body weight. Elevation in body temperature was recorded after 18 hrs of yeast injection and determined at an intermission of 1 hour for 3 hours. *C. tamala* extract at 250 and 500 mg/kg were given orally which shows reduction in rectal temperature of mice 37.16 ± 0.13 and 36.22 ± 0.17 °C respectively compare to 38.43 ± 0.16 °C of control after 3 hours. (15)

5.4 Hepatoprotective

In a Paracetamol induced hepatotoxicity study, PCM was given at 2g/kg orally for three days

followed by 200 and 400 mg/kg suspension of *C. tamala* (SCT) and silymarin was used as standard drug at 100mg/kg. GSH levels increase by 18.4 and 26.68% by treatment with SCT whereas 79.75% increment was found by silymarin. SCT treatment prevented the elevation of serum GPT, GOT, ALP, cholesterol, total bilirubin, and direct bilirubin levels as compared to group treated with PCM. ⁽¹⁶⁾

A research conducted to evaluate the liver defensive action of cinnamon plant; its alcoholic extract was used. toxicity in liver of rats was persuaded by carbon tetra chloride, upon administration of ethanolic plant extract for 28 days, there is a significant reduction in CCl₄ toxicity on serum marker of liver damage, ALT, ALP etc. and increase in SOD and catalase enzymes. Histopathological studies also suggest that extract significantly reduced the toxicity of CCl₄ and preserved the histoarchitecture of liver tissue to normal. ⁽¹⁷⁾

5.5 Anti-inflammatory activity

In a Carrageenan-induced paw oedema model in Wistar rats, inflammation was treated by ethanolic extract of Cinnamomum at 200 and 400 mg/kg and by standard drug Indomethacin at 10mg/Kg dose. Reduction in paw oedema volume was found as 0.82 ± 0.03 and 0.56 ± 0.07 ml in 4hr by ethanolic extract at 200 and 400 mg/Kg respectively whereas 0.52 ± 0.05 ml was found by standard drug compared to 1.43 ± 0.09 ml in control animals. ⁽¹⁸⁾

In an anti-inflammatory study, 100, 200 and 400mg/kg concentration of watery extract of *C. tamala* leaves (CTW) was used to evaluate its activity against oedema in rats induced by carrageenan. Inhibition of inflammation by was found to be 25.65, 31.57 and 54.4% correspondingly. ⁽¹⁹⁾

5.6 Anti-tumour

Leaves extract of *C. tamala* was used to determine antitumor activity in mouse fibrosarcoma model. The dose of CT (A), 200 mg/kg body weight of animal, given by intra-peritoneal route, reduced the tumour volume in the study animals as compared to control group animals. A total of 85.71% tumour weight inhibition in animals of the 200 mg/kg i.p. CT (A) dose group and 86% tumour weight reduction by positive control doxorubicin was observed. ⁽²⁰⁾

In an anti-cancer study, ethanolic extract and acetone extract of Cinnamomum leaves were evaluated in mice bearing Ehrlich Ascites Carcinoma. Parameters like tumor weight, survival time of tumour bearing animal, analysis blood components, and determination of cytotoxicity were selected. After treating mice with extracts and standard drug, its life span found to be increased when it compared to tumour control. In blood study, the parameters which were

changed by carcinoma in control groups, were found to be restored up to nearby normal levels.

Tumour weight of treated groups found to be reduced. In cytotoxicity analysis ethanolic extract at 200µg/ml concentration shows better effect than acetone extract. ⁽²¹⁾

5.7 Wound healing activity

In diabetic rats, wound healing activity of *Cinnamomum* extracts was determined using excision wound model. Diabetes was induced by giving alloxan, and a wound was created. This wound was treated topically (5%) and orally (100mg/kg) by leaves extract of *Cinnamomum* for ten days. Parameters like conc. of collagen which were determined by hydroxylproline, extent of wound reduction, amount of formation of new connective tissues both wet and dry were evaluated. In treated groups all the parameters were found to give positive results which shows extract have wound healing activity. ⁽²²⁾

In another wound healing study, alcoholic extract of *Cinnamomum* leaves were used to heal wound in excision wound model. Tensile strength was found to be increased in treated groups also formation of new connective tissues and collagen was increased. ⁽²³⁾

5.8 Antimicrobial

In an antimicrobial study, Agar well diffusion method was used to evaluate activity of *C. tamala* leaves extract. Nine organisms used in study were *A. tumifaciens*, *B. subtilis*, *S. aureus*, *K. pneumonia*, *E. coli*, *P. aeruginosa*, *S. typhi*, *C. albicans*, *E. carotovora* and *A. tumifaciens*. Muller Hinton Agar was used to keep the gram positive and negative strains. Broth culture of organisms were kept in a petri dish and Muller Hinton Agar was added and after that leaves extract was added and in last inoculated. Growth inhibition by extracts was determined that shows positive results in many strains. Among Hexane, DCM, Isobutanol, Aqueous and Crude extract, aqueous extract shows high zone of inhibition. ⁽²⁴⁾

In another antimicrobial study, different species are used to determine activity of plants extract of *C. tamala*. Method used was agar diffusion. Results shows that *C. tamala* gives best antimicrobial activity against *S. aureus* species. ⁽²⁵⁾

6. CONCLUSION

The extracts of different parts of plant of *C. tamala* and their isolated compounds possess therapeutic activities and having potential to endorse research. This has provided a striking biological resource for drug investigation. Although the plant has pronounced traditional

significance and numerous natural activities, but the detailed phytochemical study so far has not been explored properly. Thus, there is a need of phytochemical analysis of *C. tamala* plant.

7. SUMMARY

The preliminary phytochemical screening of extracts of *C. tamala* confirmed leaf and bark as rich resource of active constituents like alkaloids, tannins, saponins, glycosides and flavonoids. The various *in-vivo* and *in-vitro* studies of *C. tamala* extract possess various biological activities such as antioxidant, antipyretic, anti-diabetic, wound healing, anti-inflammatory, anticancer, hepatoprotective, anti-microbial etc.

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