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A Comprehensive Review On Cinnamomum Tamala

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Abstract: *Cinnamomum tamala* (Lauraceae) is also known tejpata in Indian languages. It has been used therapeutically for centuries with the most commonly used species in Indian kitchen. According to different researches *Cinnamomum tamala* leaves is used to treat skin, upper and lower alimentary track, gastric, and CNS disorders. This review reviled the current status of researches conducted about the therapeutic effect of *C. tamala*. In view of the above details, it can be clearance that the plant is very useful for the researchers to study the efficacy and potency of species.

Index Terms - Cinnamomum tamala, **spice, efficacy, disorders**

1 INTRODUCTION

Tejpata (also spelled as Tejpata, and Tejpat, in English named as medicine. It is commonly used in Indian kitchen for enhancing the taste of the different foods. Additionally, it stimulates the digestive enzymes, which helps to improve the digestion of food and increases the Indian bioavailability of the nutrients during the digestion process in the intestine. The dried leaves of *Cinnamomum tamala* plant Bay Leaf, and botanically *Cinnamomum tamala* is an Indian spice as well as Ayurveda tree are called Tejpata and used as a spice and in Ayurveda medicine. The flowers of this plant are also used in folk medicine.

1.1 Vernacular name

Bengali : Tejpata
Hindi : Tejpata
Punjabi : Tejpata
Urdu : Tejpata
Gujarati : Tamalapatra
Oriya : Tejpatra
Tamil : Talishapattattiri
Telegu : Talisapatri
Sanskrit : Tamalaka
Family : Lauraceae
Genus : Cinnamomum (Cinnamon)
Species : Cinnamomum Tamala (C. Tamala) - Indian bark

Figure 1*Cinnamomum tamala* leaves

1.2. Botanical description

Cinnamomum tamala leaves are a perennial moderate-sized, 12-20 cm long and 5-8 cm in broad, Stems are rough and brown in colour. Bark is soft sometimes produce mucilage. The flowers are white in colour and generally blossom in the last week of March or first week of April. The fruits are drupe and ripen fruits are dark purple in colour [1].

1.2.1 Flower: *Cinnamomum tamala* flowers of Cinnamomum verum were found in axillary and terminal panicles at the end of twigs. Its peduncle is creamy white and 5–7 cm long. Individual flowers are very small, of about 3 mm in diameter, with a foetid smell. [15]

1.2.2 Leaves: 12.5-20 cm long, 5-7.5 cm wide at the centre, 3 converging nerves from base to apex young leaves pink, petiole 7.5-13 mm long, margin entire, apex acute or accuminate, both surfaces smooth, stomata paracytic odour, aromatic, taste, slightly sweet, mucilaginous and aromatic.

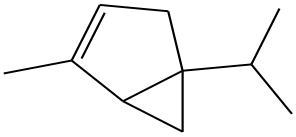
1.2.3 Bark: The plant contains a up to 7m height, branches up to 95cm width, rugged bark which is greyish red to dark brown in colour. Bark of the plant produces a mucilage/gum. [15]

1.2.4 Fruits: the plant ripe fruit is dark purple colour, ovate drupe (fruit with thin skin and they contain a seed), the plant contains a drupe up to13mm long and the fruit required a seed for 1 year attaining full growth. The fruit contain a single seed. [15]

2 Phytochemicals of *Cinnamomum tamala* leaves

Cinnamomum tamala leaves are rich in Terpenoids, Tannins, Phenol/Polyphenols, Flavonoids, Alkaloids, and Saponin like phytochemicals. The major component of *Cinnamomum tamala* oil is eugenol (4-hydroxy-3-methoxy-allylbenzene), β-caryophyllene (6.6%), sabinene (4.8%), germacrene D (4.6%) and curcumenol (2.3%). The leaf oil is 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%) [2, 3]. The main chemical constituents of *Cinnamom Guatemala* species leaves are camphene, myrcene, limonene, methyl ether of eugenol and alfapinene. Its bark possesses cinnamaldehyde which is responsible for its aroma but the other constituent impart the characteristics odour and flavour. Medicinally *Cinnamomum tamala* oil used as anti-flatulent, diuretic and carminative [4].

Zafar et al., 2018 performed GC-MS analyses of the oils and the following chemicals were isolated; α-Thujene, α-Pinene, Camphene, Benzaldehyde, β-Pinene, β-Myrcene, α-Phellendrene, δ-3-Carene, p-Cymene, Limonene, 1,8-Cineole, cis-Ocimene, γ-Terpinene, α-Terpinolene, Linalool, p-Cymen-8-ol, α-Terpineol, Cinnamaldehyde (Z), Benzenepropanol, Linalyl acetate, Cinnamaldehyde (E), Eugenol, α-Ylangene, β-Elemene, trans-Caryophyllene, Aromadendrene, Cinnamyl acetate, α-Humulene, Valencene, α-Muurolene, trans-β-Guaiene, Eugenyl acetate, Caryophyllene oxide, β-Copaen-4-α-ol, Viridiflorol, Tetradecanal, Cubenol, γ-Eudesmol, epi-α-Cadinol, α-Muurolol, α-Cadinol.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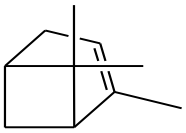
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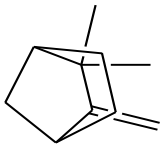
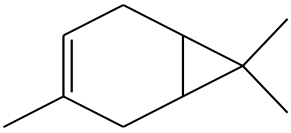
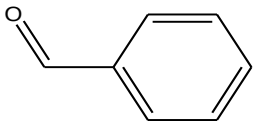
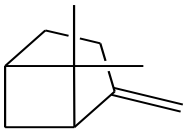

Camphene


Delta-3-Carene


Benzaldehyde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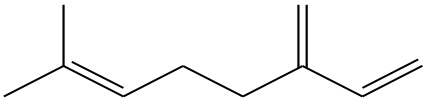
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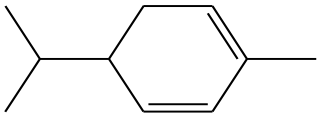
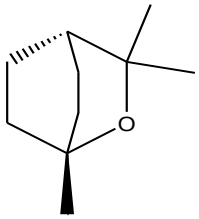
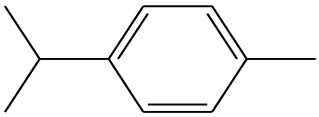

Alpha-Phellandrene


1,8-Cineole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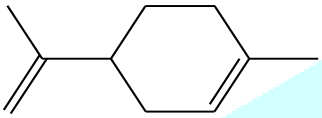
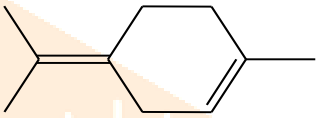
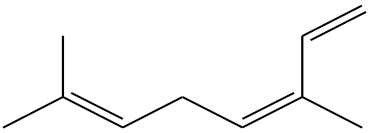
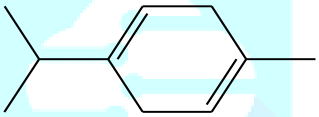
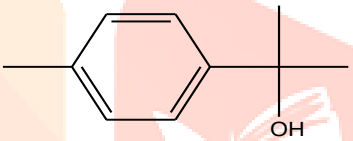

Limonene


Alpha-Terpinolene


cis-Ocimene


1-methyl-4-propan-2-ylcyclohexa-1,4-diene



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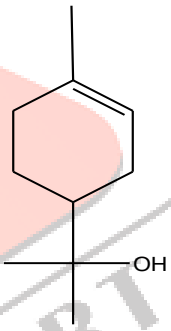
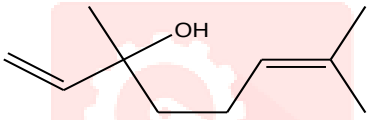
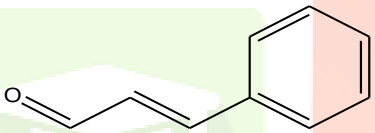


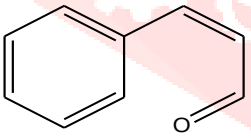
Alpha-Terpineol



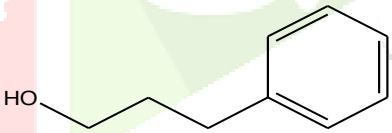
Linalool



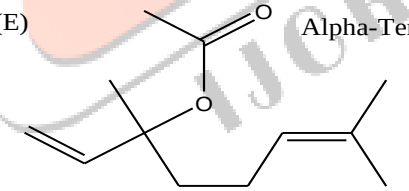
Cinnamaldehyde (E)



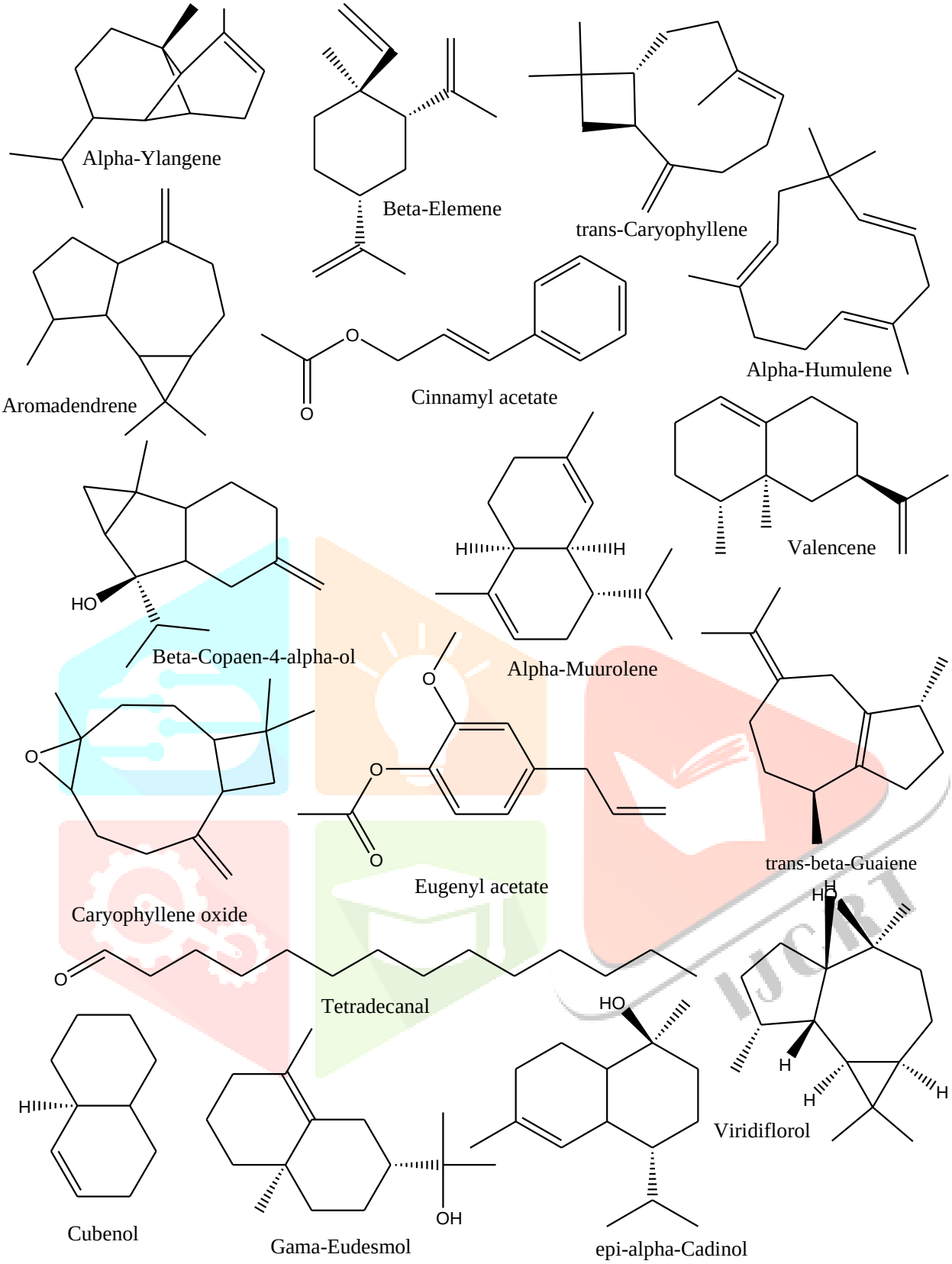
Cinnamaldehyde (Z)

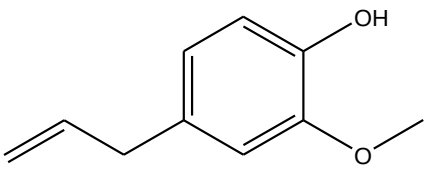


Benzenepropanol

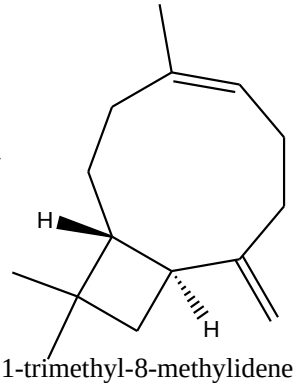


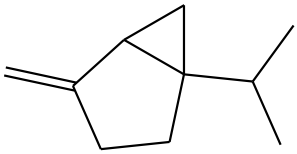
Linalyl acetate


Alpha-Ylangene
Beta-Elemene
trans-Caryophyllene
Aromadendrene
Cinnamyl acetate
Alpha-Humulene
Valencene
Beta-Copaen-4-alpha-ol
Alpha-Muurolene
Caryophyllene oxide
Eugenyl acetate
trans-beta-Guaiene
Tetradecanal
Viridiflorol
Cubenol
Gama-Eudesmol
epi-alpha-Cadinol



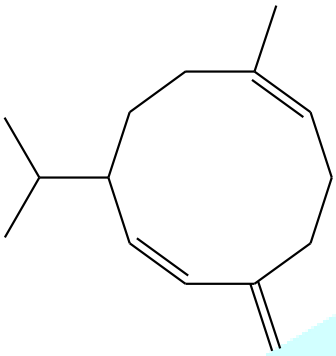
2-methoxy-4-prop-2-enylphenol

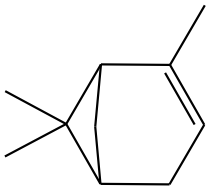




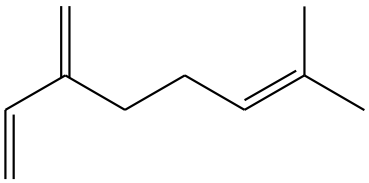
4-methylidene-1-propan-2-ylbicyclo[3.1.0]hexane

(1R,4E,9S)-4,11,11-trimethyl-8-methylidenebicyclo[7.2.0]undec-4-ene



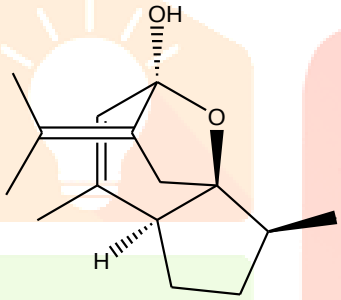


2,6,6-trimethylbicyclo[3.1.1]hept-2-ene

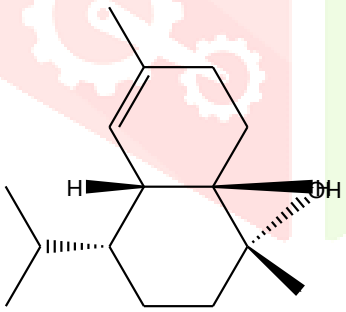


myrcene

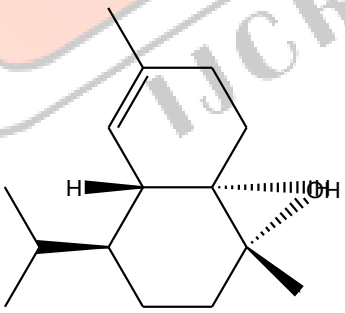
(1E,6E)-1-methyl-5-methylidene-8-propan-2-ylcyclodeca-1,6-diene



(1S,2S,5S,8R)-2,6-dimethyl-9-propan-2-ylidene-11-oxatricyclo[6.2.1.01,5]undec-6-en-8-ol



Alpha-Muurolol



Alpha-Cadinol

Table 1 Minerals, Proximate composition, vitamins and calorie value of *Cinnamomum tamala* leaves [16]

Minerals	**Quantity** (mg 100 g-1)	**Proximate composition**	**(%/W)**	**Vitamins**	**Quantity** (mg 100 g-1)
Calcium	1092.50	Moisture	8.05	Riboflavin	0.10
Magnesium	117.50	Total ash	6.56	Niacin	0.09
Sodium	6.43	Carbohydrate	70.70	Folic acid	0.09
Potassium	616.17	Protein	11.10	Ascorbic acid	19.4
Phosphorus	99.47	Dietary fibre	59.09		
Iron	19.15	Fat	3.58		
Copper	0.85	**Caloric value**	230.50(kcal 100 g^{-1})		
Zinc	6.04				
Manganese	3.23				
Calcium	1092.50				
Magnesium	117.50				

3 Pharmacological Activities: Therapeutically *Cinnamomum tamala* is anti-depressant, antianxietic [5], ulcer protective [6], anti-diabetic, anticancer [7], anti-inflammatory [8], anticancer [9], anti-hyperlipidmic [10], Antidiarrhoeal [11], antimicrobial [12, 13, 14].

3.1 CNS Disorders (Depression, anxiety)

Numerous researchers reports shown that the extract of plant possess anti-depressant effect same as imipramine (antidepressant drug) at proper dose administration (400 mg/kg) and in another hand the studied found that plant possess beneficial effect against anxiety disorder (used as a anti-anxiety/anxiolytic agent) and also useful for the treatment or management of psychological disorders [5].

2.2 Management of Gastrointestinal diseases

Leaves Extract of *C. tamala* possess GI protective activity. In the evaluation of study, the orally administration of leaves extract of plant in rats at proper dose level 50 mg/kg, 100 mg/kg, 100 mg/kg (Body weight) for 5 day daily twice time. Result found that the extract of plant is effective against cold restraint stress, ethanol, pylorus ligation (increase acid secretion in stomach) which induced gastric ulcer. In other words, say that the leaves extract of plant is useful for the prevention of gastric ulcer [6]

3.3 Anticancer activity

The Tejpata plant leaves extract contains a various major bioactive constituents such as bornyl acetate which is useful against cancer (ovarian cancer). Study found that these major bioactive constituent possess cytotoxic effect against cancer cell and decreases the prostate growth and inhibit/reduces the growth of no. of abnormal cell (hyperplastic) and also possess anti-inflammatory activity [9]. Using A-2780 human ovarian cancer cell lines, bioassay led fractionation of Cinnamon tamala leaf extracts generated bornyl acetate (1), caryophylene oxide (2), p-coumaric acid (3), and vanillic acid (4). Spectroscopic techniques (EIMS, (1)H, and (13)C NMR) were used to confirm the structures of the isolated compounds. Compound 1 had the most cytotoxicity (IC50=5.30 x 10(-4) mg/ml), followed by compound 2 (84.401.53% inhibition; IC50=8.94 x 10(-3) mg/ml), while compounds 3 and 4 were inactive in the bioassay [17].

3.4 Antidiabetic Activity

The present study evaluated the anti-hyperglycemic activty of the aqueous extracts of *Cinnamomum tamala* leaves extract on blood glucose of albino rats. *C. tamala* leaves extract was administered at doses of 125 and 250 mg/kg body weight respectively on streptozotocin induced diabetic rats for 3 weeks. Diabetic rats had much reduced body weight than normal rats. Administration of the extracts at the dose of 250 mg/kg body wt./day resulted in a marked decrease in the levels of fasting blood glucose and urine sugar, with a concomitant increase in bodyweight. The extract also produced a significant decrease in peroxidation products, viz., thiobarbituric acid reactive substances. Reduced glutathione and glycogen content, which had shown significant decrease following induction of diabetes, were found to be increased in the hepatic tissue of STZ-diabetic rats treated with *C. tamala* leaves extract. STZ-diabetic rats treated with *C. tamala* leaves extract (250mg/kg) significantly reversed all these changes to near normal. Quantification of antioxidants of the leaves-phenols, ascorbate and carotenoids revealed that *C. tamala* leaves had high antioxidants [7]

3.5 Anti-inflammatory Activity

The leaves powder of tejpata extracted with distilled water through hot maceration method. These aqueous extract useful for anti-inflammatory activity. The administration of dose (100mg/kg, 200mg/kg, and 400 mg/ kg) in rats and induced paw oedema in rat through carrageenan and acetic acid is used in rat for vascular permeability. The plant extract Anti- inflammatory activity is evaluated through membrane stabilizing property. The aqueous extract inhibit or reduce the oedema in rat induced by carrageenan and also decrease/inhibit vascular permeability induced by acetic acid and the study also found that the In vitro administration of plant extract possess membrane stabilizing activity in conc. Dose dependent manner up to (1mg/ml) [8].

3.6 Anti-hyperlipidemic activity

Researchers study found that the Aqueous, ethanol extract of leaves of this plant is possess hypo cholestrolemic effect. The ethanol and aqueous leaves extract of plant is administered orally in rats (dose 400mg/kg per day) for 10 days. Continuously administration of leaves extract dose results found that prevent or reduce the increased level of serum in total cholesterol, LDL (Low Density Lipoprotein) bad cholesterol, VLDL(Very Low Density Lipoprotein), and increase/improve the level of Good cholesterol/HDL (high density lipoprotein) [10].

3.7 Antidiarrheal activity

Antidiarrhoeal activity of the extract of *C. tamala* was tested using the model by castor oil induced diarrhoea in mice. The mice were all screened initially by giving 0.5 ml of castor oil and only those showing diarrhoea were selected for the final experiment. The test animals were randomly chosen and divided into four groups having five mice in each. Group-I was kept as control and received 1% Tween-80 at the dose of 10 ml/kg of body weight; group-II received loperamide at 50 mg/kg; group-III and IV were 'test groups' and were treated with extract of *C. tamala* at 250 and 500 mg/kg.

Control vehicle and the extract were administered orally, 1/2 h prior to the oral administration of 0.5 ml castor oil. Individual animals of each group were placed in separate cages having adsorbent paper beneath and examined for the presence of diarrhea every hour in four hours study after the castor oil administration. Number of stools or any fluid material that stained the adsorbent paper was counted at each successive hour during the experiment (4 hour). The latent period of each mouse was also counted. At the beginning of each hour new papers were placed for the old ones. Finally percent reduction of faecal output was calculated [11].

3.8 Antimicrobial activity

The essential oil isolated from the bark of *Cinnamomum glanduliferum* (Wall) Meissn showed strong antimicrobialactivity against gram-positive bacteria, gram-negative bacteria, and fungi. Oil and its components showed strongantimicrobial activity against methicillin-resistant Staphylococcus aureus, Geotrichum candidum, Pseudomonasaeruginosa, Bacillus subtilis, Helicobacter pylori, Aspergillus fumigatus. Essential oil showed growth inhibitory effectsagainst S. aureus and Mycobacterium tuberculosis, Escherichia coli, and displayed minimum inhibitory concentration(MIC) in range of 0.49 µg/ml to 32.5 µg/ml). *Cinnamomum tamala* also showed antidiarrhoeal activity [12,13,14].

4 CONCLUSION

Plant extracts and their essential oils have been known to possess remarkable therapeutic potential since ancient times. Like other plants and herbs, *Cinnamomum tamale* has also been known for its spice and medicinal potential since ancient times. This review focuses on the therapeutic potential and phytochemical analysis of its leaf oil.

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