

**Original article:**

**Study of evaluation of antimicrobial property of different concentrations of *Artemisia pallens* (Davana) extract against *Streptococcus mutans* serotype c (ATCC 25175)**

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**Abstract**

**Introduction:** Caries is recognized as the greatest prevalent disorder existing around the world since times .Caries is nearly the common of all diseases and partly because of its relatively rapid progress, and correlation of various factors i.e bacteria, dental plaque ,saliva, fermentable carbohydrates and concentration of different ions in the environment surrounding the tooth determines the extent and the rate at which metabolic events may result in net loss of mineral and development and progression of the lesion. In adolsecents , caries is the particular cause of loss of teeth..”

**Methodology:** The microbial inhibition assay was performed by standard norms and protocol by using the agar well diffusion method. Five different concentrations of *Artemisia pallens* (Davana) extract and 0.2% chlorhexidine as a gold standard was evaluated for their antimicrobial properties(Zone of Inhibition) in triplicate against streptococcus mutans serotype c(ATCC 25175). Adequate amount of Mueller Hinton Agar was evenly distributed over the surface of 15 cm diameter petridish to a thickness of 5 mm and was allowed to solidify under aseptic conditions.

**Results and Conclusion:** This study evaluated the bacterial growth inhibition of the derived acetone extracts of *Artemisia Pallens* plant. The concentration used for extract of the plant was 200,400,600,800 and 1000µl/ well on agar plates inoculated with *Streptococcus mutans*, serotype C ATCC (25175).

**Introduction:**

Caries is recognized as the greatest prevalent disorder existing around the world since times .Caries is nearly the common of all diseases and partly because of its relatively rapid progress, and correlation of various factors i.e bacteria, dental plaque ,saliva, fermentable carbohydrates and concentration of different ions in the environment surrounding the tooth determines the extent and the rate at which metabolic events may result in net loss of mineral and development and progression of the lesion. In adolsecents , caries is the particular cause of loss of teeth..” The concept of involvement of microorganisms as an eitiological factor has been credited to the chemo-parasitic theory by W.D Miller. <sup>1</sup>

The final effect of caries is breakdown of enamel and dentine to expose a path for bacteria to reach the primary tissues.*Artemisia pallens* (Davana) is one important medicinal plant that has been reported having an antiinflammatory, antihelmentic and antipyretic properties.<sup>2</sup> There are studies which have scientifically proven antibacterial properties of *Artemisia pallens* in vitro. This study was designed to palpate the antimicrobial potential of naturally available *Artemisia Pallens* plant as an alternative to the presently used synthetic agents

to combat dental caries. In light of the above discussion, we consider it is worthwhile to undertake a study of this well known Indian herbal medicine.<sup>3</sup>

#### **Material and methods:**

The in vitro study was undertaken to evaluate and compare the antimicrobial properties of different concentrations of *Artemisia Pallens* extract.

#### **Collection of the plant material-**

- The *Artemisia Pallens* (Davana) extract was procured from Y M College laboratory , Pune.
- Extract of *Artemisia pallens* (Davana) obtained as a market sample (authenticated by Botanical Survey of India, Pune, Maharashtra, India) BSI/WC/Tech/2008/1059.<sup>26</sup>

The microbial inhibition assay was performed by standard norms and protocol by using the agar well diffusion method. Five different concentrations of *Artemisia pallens* (Davana) extract and 0.2% chlorhexidine as a gold standard was evaluated for their antimicrobial properties (Zone of Inhibition) in triplicate against streptococcus mutans serotype c (ATCC 25175). Adequate amount of Mueller Hinton Agar was evenly distributed over the surface of 15 cm diameter petridish to a thickness of 5 mm and was allowed to solidify under aseptic conditions.

- The test samples of strains of *Streptococcus mutans* serotype c (ATCC 25175) were inoculated with a sterile spreader on the surface of solid Mueller Hinton Agar medium in plates.
- Standard wells were made in the plates with the help of a cupborer (8.0mm).
- The test materials *Artemisia pallens* (Davana) extract and 0.2% chlorhexidine was inserted in the well of agar plates inoculated with *Streptococcus mutans* serotype c (ATCC 25175).
- The well was filled with 200,400,600,800 and 1000µg /well concentrations of the extract and plates were incubated at  $37 \pm 0.1^\circ$  C for 24 hours.
- The same procedure was followed for four other different concentrations and minimum inhibitory concentration (MIC) was evaluated.
- After incubation, the plates were observed for zone of inhibition and the diameters of these zones were measured in millimeters by using bacterial inhibition zone reading scale.
- All the tests were performed under sterile conditions.

#### **Results:**

The present in-vitro study was undertaken to evaluate and compare the antimicrobial properties of five different concentration of *Artemisia Pallens* extracts (Davana) against *Streptococcus mutans* serotype c (ATCC 25175). The antimicrobial activity was evaluated by measuring the zones of inhibition produced by five different concentrations of extracts of *Artemisia Pallens* plant.

**Table No. 1 Average zone of inhibition of five different concentrations of plant extract of *Artemisia Pallens* against *S. mutans* serotype c (ATCC 25175)**

Sample No.	Test Organism	Extract Details	Zones of inhibition (in mm) against <i>S. mutans</i>
1	S.Mutans	Davana-ACE200 µg	NI
2	S.Mutans	Davana-ACE400 µg	1mm
3	S.Mutans	Davana-ACE600 µg	1.5mm
4	S.Mutans	Davana-ACE800 µg	2mm
5	S.Mutans	Davana-ACE100 0 µg	3.5mm
6	Standard	Chlorhexidine	4mm

**Discussion:**

Natural products have been used as traditionally for thousands of years for treatment of several diseases in many parts of the world. They have been utilized as a chief source of advanced and efficient therapeutic agents throughout the mankind history.<sup>3</sup> There are many study reports in which several plants and their extracts were previously studied and were found to have noteworthy healing properties.<sup>4</sup> Medicinal plants are pluripotent in nature and hence offer a great therapeutic umbrella for the health of the mankind. Furthermore, the number of patients getting herbal therapy is expanding exponentially relating to its cost effective kind, cultural satisfactoriness, biocompatibility and marginal adverse health effects.<sup>5</sup> With this requirement for plant centered therapeutics is boosting in both developed and developing countries.<sup>5</sup> Hence medicinal plants now form the most important source for prospecting of new bioactive molecules.

From the plant family Asteraceae, comes an important medicinal plant, *Artemisia pallens* Wall. It is known in Sanskrit as Maachi Patrum. Native to the south India, especially to the states of Andhra Pradesh, Karnataka, Tamilnadu, and Maharashtra.<sup>6</sup> It is known as "davanamu" in Telugu, "davanam" in Tamil, and "davana" in Kannada. Leaves are very petite, bluish green with yellow flowers. It is commercially cultivated for its aromatic leaves and florae which are used to make perfumes and fragrance oil. It has two diverse morphological kinds, one where the plants are small in stature and flowering comes early, and the other having taller plants and flowering occurs later. It flourishes from seeds and cuttings and extends ripeness in four months. The plant is woody in the lower part of the stem, but with yearly branches. The leaves of the plant are pondered sacred and are presented to Lord Ganesha. *Artemisia pallens* is a favored food for the larvae of many of butterfly species.<sup>7</sup>

#### **Conclusion:**

This study evaluated the bacterial growth inhibition of the derived acetone extracts of *Artemisia Pallens plant*. The concentration used for extract of the plant was 200,400,600,800 and 1000µl/ well on agar plates inoculated with *Streptococcus mutans*, serotype C ATCC (25175).

The results of this study, have confirmed this as the active component of the active component of the herbal extract has definite antimicrobial activity, comparable to the "gold standard".

#### **References:**

1. Chung JY, Choo JH, Lee MH, Hwang JK. Anticariogenic activity of macelignan isolated from *Myristica fragrans* (nutmeg) against *Streptococcus mutans*. *Phytomed*.2006; 13: 261–66.
2. Rijkom HM, Truin GJ, Hof MA. A metaanalysis of clinical studies on the caries-inhibiting effect of chlorhexidine treatment. *J Dent Res*. 1996; 75(2): 790-95.
3. Southern EN. The comparative effects of 0.12% Chlorhexidine and herbal oral rinse on dental plaque induced gingivitis. *Int J Dent Hyg*. 2006 Jan; 80(1): 116- 23.
4. Kumar J V, Green EL. Recommendations of fluoride use in children. *NY State Dental Journal* .1998;64:40-7.
5. Haffajee AD, Yaskell T, Scoransky SS. Antimicrobial effectiveness of an herbal mouthrinse compared with an essential oil and a chlorhexidine mouthrinse. *J Am Dent Assoc* 2008.
6. Ekor M. The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. *Front. Pharmacol*. 2013; 4: 177.
7. Chuvhan A. *Microbes: health and environment*. I. K. International Pvt Ltd. 2006 Jan 01; Page 62.