

Antimicrobial Study of Dental Caries Using Different Dilutions of Hecla Lava and Plantago Major

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Abstract

Aim: Level of effectiveness of homoeopathic dilutions and mother tinctures of Hecla lava and Plantago major in dental caries.

Methods: This study was conducted from the Alva's centre for research and nanotechnology lab. We included children's and adults of both sexes, who having caries. The caries sample was collected by an expert dental physician using with sterilized cotton swab in the site of caries and preserved in a sterilized test tube in normal temperature. Then gram staining technique was performed to identify the gram positive and gram-negative organisms. After identification of organisms, the biochemical characterisation of bacterial isolates was performed by doing citrate test, methyl red test, oxidase test, catalase test. The antimicrobial activity was evaluated by well diffusion method.

Results: Homoeopathic medicines show maximum zone of inhibition in different potencies and mother tinctures.

Conclusion: Homoeopathic medicines are more effective than allopathic medicines. Based on the antimicrobial activity against oral pathogens, homoeopathic drugs showed good inhibition and acted on most of the oral microbes.

Keywords: Dental Caries; Hecla Lava; Plantago Major

Introduction

Dental caries is defined as "A multifactorial, transmissible, infectious, oral disease primarily by complex interaction of cariogenic oral flora with fermentable dietary carbohydrates on the tooth surface over time". The plaque is the essential forerunner of caries and therefore the sites on the tooth surface which encourage plaque retention and stagnation are particularly prone to progression of lesions [1].

Dental caries is an ecological disease in which diet, host, and multifactorial flora interact with each other in a specific period of time in such a way which increases demineralization of the tooth structure with resultant caries. Dental caries does not occur if the oral cavity is free of pathogenic bacteria [2].

Dental caries is a problem mainly consist of bacterial plaque and oral microbes. The dental caries was identified as tooth decay, caused by the bacteria such as *Streptococcus mutans*, *Lactobacillus*, *Staphylococcus*, *Enterobacteria* species.

Hecla lava and Plantago were well indicated remedy for dental caries. Hecla lava has been prescribed Homoeopathically based on the clinical symptoms like caries of teeth, neuralgia with diseases of jaw bones, diseases of right upper jaw, caries of the bones and ulcers on

gums, etc [3]. Homoeopathic medicine Plantago is indicated in conditions like toothache and bleeding of gums, neuralgic pains of teeth, toothache with salivation, aching in decaying teeth or shooting up left side of face, etc [4].

Nowadays the caries is increased in society because of the less awareness of proper oral cleaning and irregular food habits. Homoeopathic medicines have a great power to reduce the incidence of dental caries and it also prevent the tooth decaying at early stages. As the homoeopathic medicines are given in minimum dosage and without any side effects to the patients, it can be used in early stages of caries to prevent the progression.

Methods

Design

This is an antimicrobial study; oral dental caries swab was used.

Methodology

Collection of samples

The swabs were collected under sterile condition from Department of Dentistry, Alva's Health Centre, Moodbidri and was shifted carefully to Alva's Centre for Research and Nanotechnology Lab.

The Homoeopathic medicines Plantago Q, 200 and Hecla Lava 30, 1M are collected from Schwabe Homoeopathic pharmaceuticals, New Delhi.

Inoculation of sample in nutrient agar media

The samples collected from Alva's Dental Department were inoculated in nutrient agar media and incubated at 37°C for 24 hours. The isolated colonies were collected and been inoculated into nutrient broth media for further studies.

Gram staining

The gram staining technique was performed to identify the gram positive and gram-negative organisms. Smears were prepared for all the selected bacterial cultures on glass slides [5].

Steps of gram staining

Prepared smear of the selected bacterial colony on a glass slide were placed on the staining rods. Covered the smear with crystal violet stain for 1 minute after which it was washed carefully with the distilled water. Then the smear was flooded with gram's iodine solution for 1 minute. After draining off the iodine, washed the slide again in distilled water. Flood the slide with the decolorizing agent then wait for 20 - 30 second and immediately wash with distilled water. Counterstain with safranin for 1 minute and washed it in distilled water until no colour appears in the effluent and then blot dried with absorbent paper. After gram staining technique all the slides were examined using oil immersion microscope.

Biochemical characterisation of bacterial isolates

The biochemical characterisation of bacterial isolates was performed by doing citrate test, methyl red test, oxidase test, catalase test. Citrate utilization test were performed by inoculate Simmons citrate agar lightly on the slant by touching the tip of a needle to a colony that is 18 - 24 hours old and incubate at 35°C to 37°C for 18 - 24 hours. Methyl red test was done by inoculate two tubes containing MR-VP broth with a pure culture of the microorganisms under investigation and incubate at 35°C for 24 hours. Add about 5 drops of the methyl red indicator solution to the first tube and observe the changes. Oxidase test were performed by an oxidase disc was placed in the middle of the glass slide and 4 - 5 drops of selected bacterial colony is added to the disc. And waited for the colour changes. Catalase test was done

by transfer a small amount of bacterial colony to a surface of clean, dry glass slide using a loop or sterile wooden stick. Place a drop of 3% H₂O₂ on the slide and mix well. The positive result is the rapid evolution of oxygen.

Antimicrobial assay

The antimicrobial activity was evaluated by well diffusion method. The organism was swabbed on the Muller Hinton agar plates. The wells were made into the inoculated plates accordingly to the concentration of extracts with the help of sterile cork bores. The homoeopathic mother tincture, 200 potencies of Plantago and 30, 1M potencies of Hecla lava were added to the wells in a concentration of 10 microliter. Amoxicillin and Penicillin G disc were placed as a standard. The plates were incubated at 37°C for 24 hrs. And zones were measured after incubation.

Result

From the culture plates eight colonies were isolated. And they are identified based on its morphology, and biochemical test of isolates were tested according to the Bergey’s manual of bacteriology. The morphology and biochemical properties of 8 isolates are as follows.

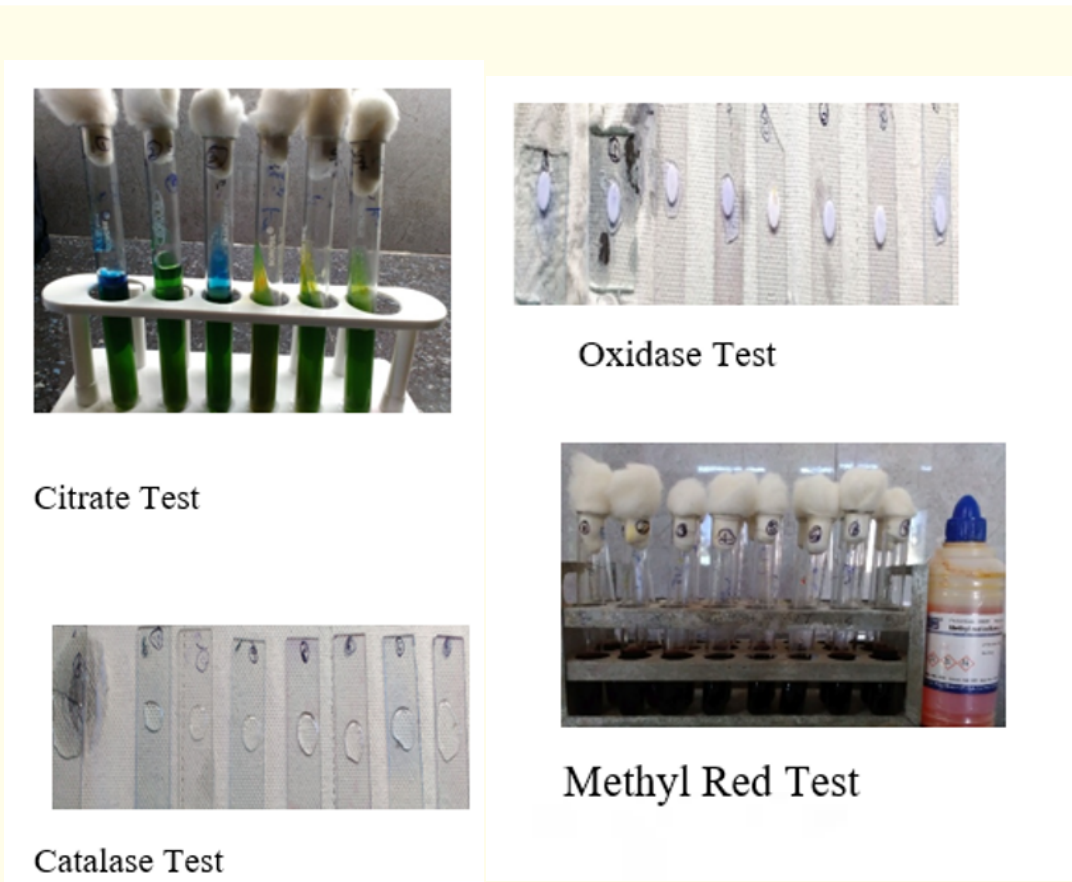


Figure 1

Test	Isolate 1	Isolate 2	Isolate 3	Isolate 4	Isolate 5	Isolate 6	Isolate 7	Isolate 8
Morphology	Cocci	Cocci	Cocci	Rod	Cocci	Cocci	Cocci	Cocci
Simple Gram Staining	Purple	Light pink	Light pink	Purple	Purple	Purple	Purple	Purple
Citrate Test	+	-	+	-	-	-	-	-
Methyl Red Test	+	+	+	+	+	+	+	+
Oxidase Test	+	+	+	+	-	-	-	+
Catalase Test	+	-	-	-	-	-	-	-

Table 1

Antimicrobial activity of homoeopathic drugs against oral pathogens

The Antimicrobial activity was tested on the common oral pathogens like MTCC 497 and MTCC 307 and other common organisms like *E. coli*, *Pseudomonas* and *Klebsiella*.



Figure 2

Result showing antimicrobial study of common oral pathogen and other common organisms

Sl. no	Organism	Plantago Mother tincture	Plantago 200	Hecla lava 1M	Hecla lava 30	Amoxicillin	Penicillin G
1	MTCC 497	Nil	Nil	Nil	Nil	Nil	Nil
2	MTCC 307	0.4 mm	0.6 mm	0.6 mm	0.8 mm	Nil	Nil
3	<i>E. coli</i>	Nil	1.2 cm	0.9 mm	1 cm	1 cm	0.6 mm
4	<i>Pseudomonas</i>	0.6 mm	0.7 mm	1 cm	1.3 cm	1 cm	0.5 cm
5	<i>Klebsiella</i>	0.4 mm	0.3 mm	0.3 mm	0.3 mm	Nil	Nil

Discussion and Conclusion

The swab was collected from infected area of teeth with the help of sterile cotton swab into the sterile test tubes from the Department of Dentistry, Alva’s Health Centre, Moodbidri, were selected as per the inclusion criteria and was shifted to Alva’s Centre for Research and Nanotechnology Lab. The Homoeopathic medicines Plantago Q, 200 and Hecla Lava 30, 1M are collected from Schwabe Homoeopathic pharmaceuticals. Conclusions were made after antimicrobial study. The following conclusions were drawn from the study as follows:

- MTCC 497- No medicine is acted on this organism.
- MTCC 307- Hecla lava 30 gives good result and antibiotics are not gives any result.
- *E. coli*- Plantago 200 has a good result but Plantago mother tincture is not having any result.
- *Pseudomonas*- Among *Pseudomonas* Hecla 30 shows maximum zone of inhibition and penicillin G gives minimum zone of inhibition.
- *Klebsiella*- Plantago mother tincture gives good result and the antibiotics are not acting on *Klebsiella* based on this study.

Among these all results Homoeopathic medicines shows maximum zone of inhibition in different potencies and different medicines [6-9].

Bibliography

1. Nisha Garg and Amit Garg. Textbook of operative dentistry, third edition (2008).
2. Ramya Raghu and Raghu Srinivasan. Clinical operative dentistry principles and practice (1995).
3. John Hentry Clarke. A Dictionary of practical Materia medica-Volume I (1902).
4. WM Burt. Heclalava reaserch papers (1896).
5. PT Kalaichelvan. Microbiology and biochemistry a laboratory manual.
6. William Boericke. Homoeopathic Materia medica.
7. Constantine Hering. The Guiding symptoms of our Materia medica.
8. Wikipedia.
9. John Hentry Clarke. A Dictionary of practical Materia medica-Volume III.

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