

Antimicrobial Activity of Tooth Powder Containing Hekla Lava and Calendula

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Aim And Objective

To study anti microbial activity of tooth powder containing Hekla lava and calendula.

Background

Homeopathy medicine is always a cheaper alternate and called as poor mans medicine.

Hekla lava with calendula is available as a tooth powder in the market. It is a homeopathy remedy used in treating gingivitis and loose sockets which are the major problems in old age patients. It's properties can be explored as a intracanal medicament in root canal treatment as well.

Materials And Methods

Hekla lava with calendula powder, chlorhexidine gel and calcium hydroxide are obtained. The antibacterial activity of Hekla lava with calendula was tested against the odontogenic bacteria such as Streptococcus mutans and Enterococcus. They were subjected for the anti microbial activity by agar well diffusion method.

Results

In our study, we have found that the tooth powder containing hekla lava and calendula have considerable antimicrobial effects, which are compared with chlorhexidine and calcium hydroxide, which are already in practice.

Conclusion

The study reveals that the tooth powder hekla lava with calendula has a good anti microbial effect against mutans and enterococcus, which can be used in treating various dental problems.

INTRODUCTION

The most common forms of human periodontal disease are gingivitis and periodontitis. Gingivitis is defined as an inflammation of the gingiva. The gingiva is all soft tissue surrounding the tooth coronal to the crest of alveolar bone and to a varying extent lateral to the bone, extending to the mucogingival junction. In gingivitis, the junctional epithelial tissue at the base of the gingival crevice migrates down the root of the tooth with the result of the formation of a periodontal pocket⁽¹⁾. The initiation and progression of periodontal diseases is attributed to the presence of elevated levels of pathogenic bacteria within the gingival crevice. Any of several hundred bacterial species may inhabit the gingival crevice; however, only a few play a significant role in the aetiology of the various periodontal diseases. Prevention of gingivitis by daily and effective supragingival plaque control via brushing the teeth and dental floss is necessary to arrest a possible progression to periodontitis^(2,3).

Although mechanical plaque control methods have the potential to maintain adequate levels of oral hygiene, clinical experience and population-based studies have shown that such methods are not being employed accurately by a large number of people. Therefore many chemoprophylactic agents such as oils, powders have been developed to control the bacterial plaque⁽⁴⁾. Hekla lava is a tooth powder which is a fine ash from mount hekla, an Iceland volcano. It offers support in issues of dental sensitivity, gum abscess, caries of the bone, tooth decay. It can be used as intracanal medicament in root canal treatment, since it contains large amount of sulphur, silica, lime, magnesia, ferrous oxide and fluoride⁽¹⁰⁾. Calendula is an annual plant of the family asteraceae⁽⁷⁾. The following chemical components are found in calendula

sesquiterpenes, flavonoid glycosides, triterpene saponins, triterpene alcohols, flavonoids, carotenoids, xanthophylls, phenolic acids, steroids, mucilage, tocopherol, and calenduline⁽¹⁵⁾. Thus the extract from this flower is used widely as a antimicrobial agent^(5,6). Hekla lava powder has anti inflammatory effect which helps in repair the loose sockets, gingivitis, chronic periodontitis etc⁽¹¹⁾. Hekla's ash is not really ash at all, but tephra, "a lightweight material containing silica, like a very small grain of sand containing bubble cavities which have dissolved acidic salts attached to the surface as a precipitation". This tephra is known to have great healing properties⁽¹²⁾. The objective of this study is to demonstrate the anti microbial activity of tooth powder containing Hekla lava and calendula.

MATERIALS AND METHODS

Hekla lava powder, chlorhexidine gel and calcium hydroxide are obtained. Standard strain of streptococcus mutans and Enterococcus were cultivated on BHI agar. Broth suspension were prepared with saline matching turbidity equal to 0.5 Mc Furland standard. Using a swab the suspension was spread on the Mueller-Hinton agar as a lawn culture. Five wells are cut in the media with the help of sterile steel metal tube. Then the material to be tested was added to the wells and incubated for 24 hours at 37 ° c aerobically. After 24 hours of incubation the zone of inhibition is measured in mm and tabulated. The values of Hekla lava are compared with chlorhexidine and calcium hydroxide. The zone of inhibition of hekla lava showed a significant value with chlorhexidine and calcium hydroxide. Thus Hekla lava can also be used as a medicament for treating gingivitis, periodontitis, loose sockets and also as a intracanal medicament after root canal treatment.

Agar well diffusion method**Table 1.** showing zone of inhibition against enterococcus

S.no	Group 1 Hekla lava (Zone in mm)	Group 2 Chlorhexidine (Zone in mm)	Group 3 Hekla lava with chlorhexidine (Zone in mm)	Group 4 Calcium hydroxide (Zone in mm)	Group 5 Calcium hydroxide With chlorhexidine (Zone in mm)	Group 6 Hekla lava With calcium hydroxide (Zone in mm)
1	16	19	18	22	21	19
2	16	18	17	23	21	20
3	17	19	18	22	21	20
4	16	18	18	22	22	21
5	17	19	17	24	21	20
MEAN	16.4	18.6	17.6	22.6	21.2	20

Agar well diffusion method**Table 2.** Showing zone of inhibition against mutans

S.no	Group 1 Hekla lava (Zone in mm)	Group 2 Chlorhexidine (Zone in mm)	Group 3 Hekla lava with chlorhexidine (Zone in mm)	Group 4 Calcium hydroxide (Zone in mm)	Group 5 Calcium hydroxide With chlorhexidine (Zone in mm)	Group 6 Hekla lava With calcium hydroxide (Zone in mm)
1	14	18	17	20	14	22
2	17	18	15	21	16	23
3	18	18	15	19	18	24
4	16	18	18	20	17	23
5	16	18	16	20	18	23
MEAN	16.2	18	16.2	20	16.6	23

SUMMARY

The zone of inhibition of hekla lava ,chlorhexidine,hekla lava with chlorhexidine, calcium hydroxide, calcium hydroxide with chlorhexidine and hekla lava with calcium hydroxide for enterococcus and mutans are given in the table 1 and table 2.

DISCUSSION

Hekla lava is a fine ash obtained from mount. Hekla, situated in reykjavik. It is a homeopathy remedy which has the power to treat many oral problems such as gingivitis, abscess of the gums, tooth ache etc. It can also be used as a medicament after the extraction of third molar.

Calendula is a european plant which has a antimicrobial activity ^(8,9). Since the powder contains fluoride and silica they can also be used to treat dental caries. Hekla Lava acts upon the jaw and is an important remedy for dental sensitivity, gum abscess, and tooth decay. Hekla Lava is also used to relieve abscess with facial swelling. Hekla Lava lessens swollen glands. Hecla lava is considered a small remedy in the Materia Medica ⁽¹²⁾. Hekla Lava is also helpful for a variety of bone issues. Hekla Lava can be tried in cases of bunions. Bunions occurs when one of the bones in the toes, usually the big toe, begins to grow in toward the other toes with a boney bump at the site. Chlorhexidine has high pH and causes irritation and sometimes staining in teeth. Chlorhexidine also cause an increase in supra gingival calculus. Calcium hydroxide has a wide range of antimicrobial activity but it is less effective among enterococcus and its action on microbial bio films is controversial ⁽¹⁶⁾. To avoid these problems Hekla lava can

be used which is a natural remedy and contains minerals ,where there is no side effects .Hekla lava is also available as a dental cream. The benefits of this powder are Fights infections in oral cavity, strengthens gum, checks bleeding, rectifies tooth decay, helpful in gingivitis, prevents caries, neuralgia and pyorrhea, fights bad breath, whitens teeth, provides freshness in mouth being herbal in nature so has no side effects and safe for children ⁽¹⁷⁾ . Many studies reveal that hekla lava and calendula have anti microbial activity against various micro organisms.

Iauk et al., demonstrated that the calendula possess a high degree of anti-microbial activity against 18 different strains of anaerobic and facultative aerobic periodontal bacteria in vitro, suggesting that it may have an inhibitory effect on the bacteria causing pathogenesis of the supporting structures of the tooth ⁽¹³⁾ .

Zilda Cristaine et al.'s (2008), in vitro study, showed calendula to possess antifungal activity comparable to nystatin against different species of Candida including those causing oral candidiasis ⁽¹⁴⁾ .

In our study the tooth powder showed a significant value which are compared with chlorhexidine and calcium hydroxide.

CONCLUSION

The result of the present work has revealed that enterococcus and mutans shown appreciable susceptibility with the Hekla lava tooth powder. Many active bio constituents of hekla lava and calendula constitute potential qualities in its curative action. Thus the tooth powder has anti microbial effect which can be used in treating various

oral problems. It is the next better agent to calcium hydroxide in treating the intra canal infection. In the present study it is proved that the Hekla lava powder has got the definite antimicrobial activity against Streptococcus mutans and Enterococci. Combination of Hekla lava – calendula powder with calcium hydroxide has shown the highest inhibitory zone with Streptococcus mutans the organism initiates most of the odontogenic complications. Calcium hydroxide does not have an anti inflammatory effect. But when calcium hydroxide mixed with hekla lava powder will have a good anti inflammatory effect which can be used in relieving pain^(18,19).

REFERENCE

1. Committee Report, Section 5, Pathogenesis of Periodontal Disease, in International conference on Research in the Biology of Periodontal Disease, Chicago: University of Illinois, 1977, pp. 301-304.
2. Bakdash B. Current patterns of oral hygiene product use and practices. *Periodontol* 2000. 1995;8:11-4.
3. Löe H, Theilade E, Jensen SE. Experimental gingivitis in man. *J Periodontol*. 1965;36:177-87.
4. De Paola LG. Chemotherapeutic inhibition of supragingival dental plaque and gingivitis development. *J Clin Periodontol*. 1989;16:311-5.
5. Lauten JD, Boyd L, Hanson MB, Lillie D, Gullion C, Madden TE. A clinical study: Melaleuca, Manuka, Calendula and green tea mouth rinse. *Phytother Res*. 2005;19:951-957.
6. Iauk L, Lo Bue AM, Milazzo I, Rapisarda A, Blandino G. Antibacterial activity of medicinal plant extracts against periodontopathic bacteria. *Phytother Res*. 2003;17:599-604.
7. Radulescu V, Doneanu C, Loloiu T. CGC investigation of chemical composition of *Calendula officinalis*. *Revue Roumaine de Chimie*. 2000;45:271-275.
8. Danielski L, Campos LMAS, Bresciani LFV, Hense H, Yunes RA, Ferreira SRS: Marigold (*Calendula officinalis* L.) oleoresin: Solubility in SC-CO₂ and composition profile. *Chem Eng Process* 2007, 46(2):99-106.
9. Iauk L, Lo Bue AM, Milazzo I, Rapisarda A, Blandino G: Antibacterial activity of medicinal plant extracts against periodontopathic bacteria. *Phytother Res* 2003, 17(6):599-604.
10. www.shi.ch/english/hekla_lava.pdf.
11. Mohamed Aleem, The Rhythm of Volcano, Homoeopathic Links, No. 1-Vol. 7, 1994.
12. blog.hmedicine.com/homeopathy-and-homeopathic-medicine/blog/?Tag=hekla%20lava.
13. Turesky S, Gilmore ND, Glickman I. Reduced plaque formation by chloromethyl analogue of vitamin C. *J Periodontol*. 1970;41:41-3.
14. Zilda CG, Claudia MR, Sandra RF. Antifungal activity of the essential oil from *Calendula officinalis* L growing in Brazil. *Braz J Microbiol*. 2008;39:61-3.
15. Ramos A, Edreira A, Vizoso A, Betancourt J, López M, Décalo M. Genotoxicity of an extract of *Calendula officinalis* L. *J Ethnopharmacol*. 1988;61:49.
16. McGurkin-Smith R, Trope M, Caplan D, Sigurdsson A. Reduction of intracanal bacteria using GT rotary instrumentation, 5.25% NaOCl, EDTA, and Ca(OH)₂. *Journal of Endodontics* 2005; 31: 359-63.
17. www.herbalcureindia.com/products/natural-toothpaste.htm.
18. Witherspoon DE. Vital pulp therapy with new materials: new directions and treatment perspectives permanent.
19. Fuks AB et al. Vital pulp therapy with new materials for primary teeth: new directions and treatment perspectives. *Pediatr Dent*. 2008 May-Jun; 30(3): 211-9.