Journal for Educators, Teachers and Trainers
The PROFESIOLab electronic, peer-reviewed, open-access Magazine

ISSN 1989 – 9572

DOI: 10.47750/jett.2022.13.06.045

Knowledge About the Comparative Cytotoxic Effect of Herbal Based Commercial Mouthwashes Using Brine Shrimp Lethality Assay

Mufeetha[1]

Dr Abirami Arthanari[2]*

Dr S Rajeshkumar[3]

Journal for Educators,Teachers and Trainers, Vol. 13 (6)

https://jett.labosfor.com/

Date of reception: 11 Oct 2022

Date of revision: 12 Nov 2022

Date of acceptance: 05 Dec 2022

Mufeetha, Dr Abirami Arthanari, Dr S Rajeshkumar(2022). Knowledge About the Comparative Cytotoxic Effect of Herbal Based Commercial Mouthwashes Using Brine Shrimp Lethality Assay *Journal for Educators, Teachers and Trainers*,Vol. 13(6). 479-484.

---

[1]Undergraduate Student, Saveetha dental college and hospital, Saveetha institute of Medical and technical sciences , Saveetha university, Chennai- 600041 , TN
[2]Senior Lecturer, Dept. Of Forensics odontology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077, TN
[3]Professor, Nanobiomedicine Lab, Centre for Transdisciplinary Research, Dept. Of Pharmacology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077, TN

Journal for Educators, Teachers and Trainers
The LabOSfor electronic, peer-reviewed, open-access Magazine

Journal for Educators, Teachers and Trainers, Vol. 13 (6)
ISSN 1989 – 9572
https://jett.labosfor.com/

Knowledge About the Comparative Cytotoxic Effect of Herbal Based Commercial Mouthwashes Using Brine Shrimp Lethality Assay

Mufeetha[1], Dr Abirami Arthanari[2]*, Dr S Rajeshkumar[3]
[1]Undergraduate Student, Saveetha dental college and hospital, Saveetha institute of Medical and technical sciences , Saveetha university, Chennai- 600041 , TN
[2]Senior Lecturer, Dept. Of Forensics odontology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077, TN
[3]Professor, Nanobiomedicine Lab, Centre for Transdisciplinary Research, Dept. Of Pharmacology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077, TN
*Corresponding Author
Email: 152001071.sdc@saveetha. Com[1], abiramia.sdc@saveetha.com[2], rajeshkumars.sdc@saveetha.com[3]

ABSTRACT
Introduction: Comparison of herbal and commercial mouthwashes is important due to their action in oral health. To determine their action and cytotoxic effect by killing the pathogens present in the oral cavity.
Objective: To prepare two different glass plates containing equally counted nauplies with commercial mouthwash and herbal mouthwash in it.
Materials And Method : Using brine shrimp in Salt water with mouthwashes in two 6X10 plates.
Inclusion Criteria: Alive shrimp nauplii , commercial mouthwash , herbal mouthwash
Exclusion Criteria: No dead nauplii
Result: In the experiment we have found that the commercial mouthwash effect was higher than the herbal mouthwash. The shrimp death was higher in commercial mouthwash.
Conclusion: From this study it is concluded that commercial mouthwash is highly recommended to be used and in future study we can study about the effects of commercial mouthwash. Herbal mouthwash effect was less on nauplus and the death of them.

Keywords: commercial mouthwash , herbal mouthwash, brine shrimp

INTRODUCTION

Active ingredients in commercial brands of mouthwash can include thymol, eucalyptol, hexetidine, methyl salicylate, men- thol, chlorhexidine, gluconate, benzalkonium chloride, cetylpyri- dinium chloride, methylparaben, hydrogen peroxide, domiphen bromide, and sometimes fluoride, enzymes, and calcium.1 Ingre- dients also include water and sweeteners such as sorbitol, sucra- lose, sodium saccharine, and xylitol(1).Sometimes, a significant amount of alcohol is added, as a carrier for the flavor, to provide “bite” and to contribute an antibacterial effect.
Commercial mouthwashes usually contain a preservative such as sodium Ben-zoate to preserve freshness once the container has been opened.(2) Sodium benzoate can be used as an anti-corrosive and preservative in a large variety of personal care products This, verifying commercial mouthwashes are highly effective in killing oral pathogens and has very partial toxic effect. (3)
Andrographis paniculata (AP) is an ancient herb known for its medicinal and therapeutic values.Aqueous extract of AP was used to prepare the herbal mouthwash. (4)The product was tested against selected oral pathogens namely Actinomyces viscosus, Staphylococcus aureus, Streptococcus mutans, Streptococcus sobrinus, and Porphyromonas gingivalis for its antibacterial activity using the agar well diffusion method. (5)Toxicity analysis was carried out and subjected to cytotoxicity screening using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) assay, in vivo study using brine shrimp lethality bioassay, and detection of heavy metals using atomic absorption spectroscopy (AAS).(6) Thus, verifying AP herbal mouthwash is partially effective in common oral pathogens and has a non-toxic effect.

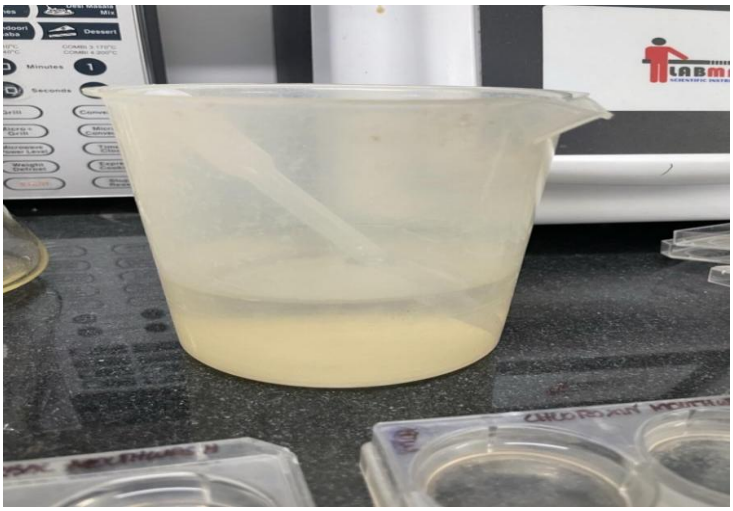
MATERIALS AND METHOD

Brine shrimp lethality assay was performed using the nauplii of a simple zoological organism, Artemia salina according to the study (Aboalola et al., 2020). This method estimates the cytotoxicity activity by measuring

the lethality of the test organism.Artificial seawater was prepared by dissolving 38.2 g of non-iodized sea salt into one liter of distilled water. Artemia salina eggs were hatched in the prepared seawater for 24 h. Ten hatched nauplii were transferred into a Petri dish containing 4.5 L seawater and 500 µL of AP herbal mouthwash. Again Ten hatches nauplii were transferred into a Petri dish containing 500 µL of commercial mouth. The test was placed in an illuminated room for 24 h. Survivors were counted to calculate the lethality percentage by using the formula; Percentage of mortality (%) = No. of dead nauplii / Total no. of nauplii × 100.

RESULT

Dental care liquid, the herbal mouthwash used in this study, uses red ginseng extract as a major ingredient. This nonalcoholic mouthwash also contains various herbs and natural products such as Swertia japonica extract, Camellia Sinensis, Licorice, xylitol, Caramel and menthol. Artemia salina eggs were hatched in the prepared seawater for 24 h. Ten hatched nauplii were transferred into a Petri dish containing 4.5 L seawater and 500 µL of AP herbal mouthwash. Again Ten hatches nauplii were transferred into a Petri dish containing 500 µL of commercial mouth.



The test was placed in an illuminated room for 24 h. Survivors were counted to calculate the lethality percentage by using the formula;

Percentage of mortality (%) = No. of dead nauplii / Total no. of nauplii × 100.

The comparison of Live and dead nauplius in the Petri dish containing the cytotoxicity and effect of commercial and herbal mouth was observed and identified.

As 10 nauplius were present in each tray, that is 10X6 nauplius were given with 2 different mouthwashes . Herbal mouthwash present trays had more live nauplius, that is 8-9 nauplius were alive in each tray. As in commercial mouthwash 1-2 naupliers were barely alive.

DISCUSSION

In this present study we have compared the cytotoxic activity of herbal mouth wash and commercial mouthwash using brine shrimp. As per the ingredients in the commercial mouthwash there are so many effective ingredients that are more helpful in fighting the bacteria in the mouth, such as Alcohol. Helps to dissolve the oils in some of our mouthwashes.(7)

Sorbitol. Provides hydration and sweetness to enhance the flavor.

Sucralose. Provides sweetness to enhance the flavor.

Sodium Benzoate, Benzoic Acid, Sodium Saccharin, Poloxamer 407.(8)

As far as the comparison of both commercial and herbal mouthwashes herbal mouthwashes can be less toxic but generally less effective also . Their ingredients such as ;Alcohol, water, menthol, green mint oil, peppermint oil, sage oil*, tea tree oil, lavender oil, cinnamon cassava oil, clove oil, lime, linalool, cinnamon , eugenol, contains 85 % alcohol by volume.(9)A non-alcoholic mouthwash such as Pronamel Daily Mouthwash, however, offers several benefits for your smile. Developed with dentists, Pronamel Daily Mouthwash can help protect your teeth against tooth decay* by supporting the re-hardening of tooth enamel.(10)

Three of the most commonly used essential oils in natural mouthwash and other natural mouth care products are peppermint, cinnamon and lavender. (11)Research has proven the efficacy of their antibacterial, antimicrobial, and anti-inflammatory properties. (12)Current research suggests that herbal mouthwashes are as effective as non-herbal mouthwashes for reducing dental plaque in the short term; however, the evidence is based on low-quality trials. But in this study we observed that there is very little efficacy .(7)

Chlorhexidine(commercial)is the most often prescribed oral mouth rinse, used to reduce the number of bacteria in the mouth. (13)Used as directed by your dentist, Chlorhexidine can reduce certain gum disease-causing bacteria to an almost undetectable level.You can also find rinses, such as LISTERINE® TOTAL CARE Anticavity Mouthwash and LISTERINE SMART RINSE® Anticavity Mouthwash that contain tooth-protecting fluoride to keep your teeth strong and fight off cavities(4).Unlike regular mouthwash, which destroys the balance of microbes in the mouth and often inflames, irritates or harms oral tissues, hydrogen peroxide mouthwash benefits the oral environment.Gargling hydrogen peroxide may be an effective way to sooth a sore throat, disinfect your mouth, and whiten your teeth. Just make sure you dilute it first, and try not to swallow any in the process. If you're hoping to whiten your teeth, try to gargle consistently for several months for the best results. Commercial mouthwashes which give faster results . (14)

The fact that dental professionals choose peroxide over saltwater should tell you one thing: saltwater gargles are fine in a pinch, but hydrogen peroxide rinses are actually preferable. Peroxide rinses mix water with 3% hydrogen peroxide to help clean, brighten, and prevent gum damage.(15)

There are some risks associated with gargling with hydrogen peroxide. Swallowing hydrogen peroxide can irritate the tissues in your throat; swallowing undiluted hydrogen peroxide can even burn the organs of your digestive tract and cause bleeding there. Even with some side effects in commercial mouthwashes with high germ fighting ingredients yet used in the proper way can be controlled and be effective for germ killing . (16)

Therefore, the aim of this study was to evaluate, in Vitro, the cytotoxicity and efficacy of two kinds of mouthwash respectively commercial and herbal mouthwash and their properties against oral bacteria.

CONCLUSION

In general mouthwashes have been used in daily practice among people. From this study it is concluded that commercial mouthwash is highly recommended to be used as it contains many effective uses and action in oral health . And in future studies we can study the effects of commercial mouthwash. Herbal mouthwash effect was less on nauplius and the death of them.

Source Of Funding

- The present study was supported by the following agencies.
- Saveetha Institute of Medical and Technical Sciences (SIMATS)
- Saveetha Dental College and Hospitals
- Saveetha University
- The Master Linque Automation.

Conflict Of Interest

All the authors declare that there was no conflict of interest in present study.

ACKNOWLEDGEMENT
We sincerely thank Saveetha institute of technical and medical sciences for their constant support and encouragement

Authors Contribution
Mufeetha manuscript preparation.
Study designing, data collection, analysis interpretation.

REFERENCE
1. Wynn SG, Fougere B. Veterinary Herbal Medicine [Internet]. Elsevier Health Sciences; 2006. 736 p. Available from: https://books.google.com/books/about/Veterinary_Herbal_Medicine.html?hl=&id=iLbZDzumqt0C
2. Hussain SF, AL-Bayaty FH, Abdul Rahim NR, Abdulla MA, Belgum H bt. Comparison of Antibacterial Effect of New Herbal Mouth (Miswak) Wash With Different commercial Mouth Washes on Dental Biofilm From Orthodontic Ligatures –In Vitro Study [Internet]. Vol. 4, The Open Conference Proceedings Journal. 2013. p. 268–268. Available from: http://dx.doi.org/10.2174/2210289201304010268
3. Stankovic MS. Medicinal Plants and Natural Product Research [Internet]. MDPI; 2020. 232 p. Available from: https://books.google.com/books/about/Medicinal_Plants_and_Natural_Product_Res.html?hl=&id=dF3QDwAAQBAJ
4. Odumosu PO, Okwori VA, Chris-Otubor GO. Quality assessment and antibacterial properties of a commercial clove sample and copper sulphate as ingredients of an herbal mouth wash [Internet]. Vol. 9, GSC Biological and Pharmaceutical Sciences. 2019. p. 032–8. Available from: http://dx.doi.org/10.30574/gscbps.2019.9.1.0178
5. Lavu V. 08 / The reduction in microbial content of aerosol during ultrasonic scaling following the addition of chlorhexidine/ herbal mouth wash in water source of an ultrasonic scaler- A double blind randomized placebo controlled interventional study [Internet]. Available from: http://dx.doi.org/10.26226/morressier.5ac383202afeeb00097a430b
6. S P, Parvathy S. Antibacterial activity of herbal mouth wash against clinical isolates of oral bacteria [Internet]. Vol. 02, Advances in Biomedicine and Pharmacy. 2015. Available from: http://dx.doi.org/10.19046/abp.v02i01.07
7. Abullais SS, Patel SI, Asiri EA, Jathmi AAA, Alkhayri AH, Mousa YM, et al. Comparative Evaluation of 3 Commercial Mouthwash Formulations on Clinical Parameters of Chronic Gingivitis. Med Sci Monit [Internet]. 2022 Sep 2;28:e937111. Available from: http://dx.doi.org/10.12659/MSM.937111
8. S ABDACR, Amrithaa B, Cecil A, Rajeshkumar S. A Comparative Antimicrobial Potential Of Camellia Sinensis And Vachellia Nilotica Formulation Based Mouthwash And Commercial Mouthwash [Internet]. Journal of Pharmaceutical Negative Results. 2022. p. 704–12. Available from: http://dx.doi.org/10.47750/pnr.2022.13.s09.79
9. Deviyanti S, Herawati M, Ferhad A. ANTIMICROBIAL POTENCY of Stevia rebaudiana Bertoni as HERBAL MOUTHWASHES AGAINST CARIOGENIC BACTERIAL Streptococcus mutans [Internet]. Vol. 2, ICCD. 2019. p. 317–21. Available from: http://dx.doi.org/10.33068/iccd.vol2.iss1.207
10. Mohammad K. Children's Mouthwash; Commercial Product or Oral Health Guarantor [Internet]. Vol. 3, Modern Approaches in Dentistry and Oral Health Care. 2018. Available from: http://dx.doi.org/10.32474/madohc.2018.03.000164
11. Malik SA, Halloli C, Shetty S, Tubaki R. ANTIMICROBIAL EFFECT OF HERBAL VERSUS CHEMICAL MOUTHWASHES IN PATIENTS UNDERGOING ORTHODONTIC TREATMENT [Internet]. Vol. 9, Indian Journal of Scientific Research. 2019. p. 63–7. Available from: http://dx.doi.org/10.32606/ijsr.v9.i2.00011
12. Boneta ARE, Elías Boneta AR, Galán Salás RM, Mateo LR, Stewart B, Mello S, et al. Efficacy of a mouthwash containing 0.8% arginine, PVM/MA copolymer, pyrophosphates, and 0.05% sodium fluoride compared to a commercial mouthwash containing 2.4% potassium nitrate and 0.022% sodium fluoride and a control mouthwash containing 0.05% sodium fluoride on dentine

hypersensitivity: A six-week randomized clinical study [Internet]. Vol. 41, Journal of Dentistry. 2013. p. S34–41. Available from: http://dx.doi.org/10.1016/j.jdent.2012.11.004

13. Aarthy CS, Gadde S, Madankumar P. Effectiveness of probiotic and herbal mouthwashes on gingival health among children with intellectual disability: An interventional study [Internet]. Vol. 9, International Journal of Community Dentistry. 2021. p. 129. Available from: http://dx.doi.org/10.4103/ijcd.ijcd_15_21
14. Sharma R, Hebbal M, Ankola AV, Murugaboopathy V, Shetty SJ. Effect of Two Herbal Mouthwashes on Gingival Health of School Children [Internet]. Vol. 4, Journal of Traditional and Complementary Medicine. 2014. p. 272–8. Available from: http://dx.doi.org/10.4103/2225-4110.131373
15. Khoshbakht Z, Khashabi E, Khodaie L, Torbati MA, Lotfipour F, Hamishehkar H. Evaluation of Herbal Mouthwashes Containing Zataria Multiflora Boiss, Frankincense and Combination Therapy on Patients with Gingivitis: A Double-Blind, Randomized, Controlled, Clinical Trial [Internet]. Vol. 8, Galen Medical Journal. 2019. p. 1366. Available from: http://dx.doi.org/10.31661/gmj.v8i0.1366
16. Bansal S, Kaur A. Herbal and Chemical Mouthwashes in Pediatric Population: A Scoping Review [Internet]. Vol. 4, Journal of South Asian Association of Pediatric Dentistry. 2021. p. 155–61. Available from: http://dx.doi.org/10.5005/jp-journals-10077-3075