



The Effectiveness of MAGIFresh Mouthwash on Halitosis in Children

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ABSTRACT

Halitosis in children is a common problem that can affect their social and psychological well-being. While many interventions exist, there is a growing demand for natural and effective solutions. This study aimed to evaluate the clinical effectiveness of MAGIFresh, a novel herbal mouthwash containing Manalagi apple peel (*Malus sylvestris* Mill.) extract, in reducing halitosis in children. A quasi-experimental study with a one-group pretest-posttest design was conducted on 63 elementary school students. Halitosis levels were measured using a 0-5 organoleptic scale before and 30 minutes after rinsing with the mouthwash. The collected data were analyzed using the non-parametric Wilcoxon Signed-Rank Test. The results showed a statistically significant reduction in halitosis scores after the intervention ($p < 0.001$). The mean organoleptic score decreased from 0.74 in the pretest to 0.07 in the posttest. The findings concluded that MAGIFresh mouthwash was highly effective in reducing halitosis in children.

INTRODUCTION

Oral health is an integral part of a child's overall health that affects their growth and development. One common yet often overlooked issue is halitosis, or bad breath, which can have a significant impact on children's psychological well-being and social interactions (Aljudaibi et al., 2025). Halitosis is defined as unpleasant breath odor originating from the oral cavity or respiratory tract. Its prevalence among children is quite significant globally, indicating that it is a common problem (AlMadhi et al., 2021); for instance, a study by Motta et al., (2011) on children aged 3-14 found that over 76% of participants exhibited some level of mouth odor, underscoring the widespread nature of the issue. In Indonesia, based on the results of the 2023 Indonesian Health Survey (SKI) (BKPK Kementerian Kesehatan Republik Indonesia, 2023), the proportion of dental and oral problems reached 46.5%, indicating a high risk factor for halitosis, thus requiring effective intervention.

The causes of halitosis in children are multifactorial. Approximately 90% of cases are caused by intraoral factors, such as poor oral hygiene, dental caries, gum disease (gingivitis), and the activity of anaerobic bacteria that break down food debris and produce odor-causing sulfur compounds (Motta et al., 2011). Therefore, efforts to treat halitosis focus on eliminating the main causes. Maintaining oral hygiene by brushing teeth regularly is key, and the use of mouthwash can be an effective additional therapy to control plaque and reduce odor-causing bacteria (Kumar et al., 2023)

As public interest in natural products considered safer increases, the development of mouthwash from herbal extracts has become a promising alternative. One highly promising natural ingredient is Manalagi apple peel. Previous research has demonstrated that Manalagi apple peel extract has significant antibacterial effects against *Streptococcus mutans*, the primary bacteria responsible for dental caries (Emini Emini et al., 2023). Based on this potential, the MAGIFresh mouthwash was developed.

A series of studies have been conducted to test the formulation of MAGIFresh mouthwash. The results show that this product is not only effective in helping to clean dental plaque (Emini et al., 2023), but also has sensory characteristics (taste, aroma, color) that are liked and well accepted by children (Emini et al., 2024). However, as illustrated in the research progression, while the product's underlying mechanisms (antibacterial action and plaque reduction) and its acceptability have been established, a critical research

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gap remains there is no direct clinical evidence proving its effectiveness specifically against halitosis. The previous findings strongly suggest potential, but they do not confirm the final clinical outcome. Therefore, based on these initial findings, this study is a crucial next step to bridge that gap. This study aims to specifically evaluate the clinical effectiveness of using MAGIfresh mouthwash in reducing halitosis levels in children, to complement existing scientific data and directly prove its benefits as a safe and effective solution.

METHOD

This study used a quasi-experimental design with a one-group pretest-posttest approach. The MAGIfresh mouthwash product used in this study was formulated from Manalagi apple peel extract (*Malus sylvestris* Mill.) processed through maceration using ethanol solvent to obtain antibacterial active substances. The research sample consisted of 63 fifth-grade students from SDIT Al Hidayah, East Cilandak selected through purposive sampling based on inclusion and exclusion criteria. Research data collection was conducted in September 2024. The procedure began with measuring the initial halitosis level (pretest) using a 0-5 organoleptic scale by trained examiners, a standard method also applied in recent clinical studies to assess oral odor in adolescents and young adults (Luca et al., 2025). After the pre-test, each respondent was instructed to rinse their mouth with 10 ml of MAGIfresh mouthwash for 30 seconds. A re-ed 30 minutes after the intervention to assess changes in halitosis scores.

Data analysis was performed to test the effectiveness of the product. First, a normality test was performed using the Shapiro-Wilk Test, which showed that the halitosis score data was not normally distributed ($p < 0.05$). Based on these results, hypothesis analysis to compare the difference in halitosis scores before and after treatment used a non-parametric statistical test, namely the Wilcoxon Signed-Rank Test. The significance level (α) was set at 0.05, where the difference was considered statistically significant if the p-value obtained was less than 0.05.

RESULT

The 25% apple peel extract mouthwash is named MAGIfresh (Manalagi Fresh). The composition of the mouthwash in this study is as follows:

Table 1 : Composition of mouthwash formulations in the study

Ingredient	Composition
Manalagi Apple Peel Extract	25 g
Peppermint Oil	0,4 mL
Sodium Benzoate	0,4 g
Glycerin	1 mL
Tween 80	1 mL
Saccharin	0,1 g
Distilled Water	Ad to 100 mL



Picture 1: MAGIfresh mouthwash product with 25% apple peel extract

Table 2. Sample Distribution:

Jenis kelamin	N	%
Male	28	44,44
Female	35	55,56
Total	100	100

Based on Table 1, it is known that the majority of samples were female, totaling 35 people (55.56%)

Table 3. Frequency Distribution of Pre-test Halitosis Categories Using MAGIfresh Mouthwash

Kriteria	N	%
No odor	16	25,4
Doubtful smell	47	74,6
Total	63	100

Based on Table 2, it is known that the majority of samples had halitosis before rinsing with MAGIfresh on the questionable odor criterion, namely 47 people (74.6%)

Table 4. . Frequency Distribution of Halitosis Categories Post-test MAGIfresh Mouthwash

Kriteria	N	%
No odor	58	92,06
Doubtful smell	5	7,94
Total	63	100

Based on Table 3, it is known that the majority had halitosis after rinsing with MAGIfresh on the criterion of no odor, namely 58 people (92.06%).

Next, the data will be tested for normality using the Shapiro-Wilk test, with the following results:

Table 5. Results of the Shapiro-Wilk normality test

Group	<i>p</i> -value
Pre-test Halitosis	0,000
Post-test Halitosis	0,000

Note: *normal ($p > 0,05$)

Based on Table 4, it is known that the normality test results for all variables are < 0.05 , so it can be concluded that all data are not normally distributed. Therefore, the statistical test analysis of the differences between paired variables that will be used is a non-parametric analysis using the Wilcoxon test.

Table 6. Wilcoxon Test for Halitosis Pre- and Post-MAGIfresh Mouthwash Tests

Kriteria	Mean	Min-Max (SD)	<i>p</i> -value
Pre-test	0,74	0±1 (0,44)	0,000
Post-test	0,07	0±1 (0,44)	

Based on Table 5, it is known that the average value after rinsing with MAGIfresh decreased to 0.07 from the previous 0.74. The Wilcoxon test analysis obtained a value of 0.000 (< 0.05). Thus, it is concluded that there is a statistically significant difference between the pre-test and post-test halitosis values

DISCUSSION

The results of this study clearly show that rinsing with MAGIfresh mouthwash is significantly effective in reducing halitosis levels in children. Statistical analysis (Wilcoxon test) proves that there is a very significant difference ($p < 0.05$) between halitosis scores before and after treatment. The drastic decrease in the average score from 0.74 to 0.07 and the shift of the majority of respondents from the "questionable odor" category (74.6%) to "no odor" (92.1%) is strong evidence of the clinical effectiveness of this product.

The effectiveness of MAGIfresh can be explained through the mechanism of action of its main active ingredient, namely Manalagi apple peel extract (*Malus sylvestris* Mill.). This finding is in line with a series of previous studies showing that Manalagi apple peel extract has a potent antibacterial effect against *Streptococcus mutans* (Emini Emini et al., 2023). Apple peel is rich in bioactive compounds such as flavonoids and tannins, which are known to inhibit the growth of bacteria that cause bad breath. Other studies also confirm that various herbal extracts with similar content are effective in suppressing oral bacteria. For example, a literature review by Agustin (2022) concluded that herbal mouthwashes containing flavonoids, saponins, and tannins have been proven effective in treating halitosis by suppressing the growth

of VSC-producing bacteria (AD et al., 2022). Thus, the antibacterial action of apple peel extract in MAGIfresh directly targets the microbiological root cause of bad breath.

Furthermore, the effectiveness of MAGIfresh comes not only from its antibacterial properties, but also from its ability to reduce dental plaque, as has been proven in previous studies (Emini et al., 2023). Plaque is a biofilm where bacteria multiply. By reducing plaque accumulation, MAGIfresh eliminates the ideal environment for anaerobic bacteria, thereby indirectly preventing the production of VSCs. The relationship between oral hygiene, plaque, and halitosis is fundamental in dental science. Effective oral hygiene, specifically that which includes plaque reduction through practices such as tooth brushing, tongue cleaning, and the use of mouthwash, directly correlates with a significant decrease in the levels of volatile sulfur compounds (VSCs), the primary cause of halitosis. Various studies indicate that a combination of mechanical and chemical oral hygiene methods can reduce VSCs by up to 80%, with tongue cleaning identified as a key factor in reducing biofilm and odor-causing bacteria. This reduction in VSC levels is directly proportional to a decrease in halitosis scores, thereby reinforcing that comprehensive oral hygiene is effective in managing the problem of bad breath (Aung et al., 2015; Erawati et al., 2023). Therefore, MAGIfresh's ability to combat bad breath is the result of a dual action: inhibiting bacteria and reducing plaque.

The clinical significance of these findings is the availability of a safe, natural mouthwash alternative that is well accepted by children. Many commercial products contain alcohol or chemicals such as chlorhexidine, which are less than ideal for routine use in children due to their potential side effects. MAGIfresh, which is based on herbal extracts, offers a solution with lower risks. Another crucial aspect is the acceptance of the product by children. Previous research has confirmed that MAGIfresh has organoleptic characteristics (taste, aroma, color) that children like (Emini et al., 2024)). This acceptance factor is very important because, as emphasized by Medeiros & Garruti (2018), taste (palatability) is one of the main determinants of successful therapy in children. Unpleasant formulations are often rejected, which can ultimately lead to treatment failure and reduced treatment effectiveness (de Medeiros & Garruti, 2018).

The use of herbal mouthwash as an alternative in managing bad breath in children is gaining increasing attention in recent research. A study conducted by (Amin & Arman, 2025) showed that a mouthwash formulation containing Honje Laka flower (*Etlingera hemisphaerica*) extract and basil leaf (*Ocimum basilicum*) essential oil effectively inhibited the growth of *Streptococcus mutans*, one of the primary causes of bad breath. The antibacterial activity of this herbal combination was able to reduce the bacterial population that plays a role in plaque formation and the production of odor-causing compounds, thereby significantly decreasing the intensity of halitosis. Furthermore, the herbal mouthwash demonstrated good physical and chemical stability during storage and was well-accepted sensorially by users, making it a safe and effective natural option for children's oral care (Amin & Arman, 2025).

Additionally, the benefits of herbal plants such as basil (*Ocimum americanum*), Indonesian bay leaf (*Syzygium polyanthum*), and betel leaf (*Piper betle*) in treating halitosis. Active compounds such as flavonoids, tannins, and essential oils contained in these plants have antibacterial activity that can suppress the growth of odor-causing bacteria in children. The use of this natural-based mouthwash is not only effective in reducing bad breath but also has the potential to minimize side effects often associated with chemical mouthwashes, such as irritation or a burning sensation. Therefore, herbal mouthwash represents a sustainable alternative that supports children's oral hygiene in a safe and environmentally friendly manner (Andani & Sumiwi, 2022).

CONCLUSION

Based on the results of the study, it can be concluded that rinsing with MAGIfresh mouthwash is significantly effective in reducing halitosis levels in children. This is evidenced by a decrease in the average halitosis score from 0.74 before treatment to 0.07 after treatment, with a statistical significance value of $p=0.000$. The effectiveness of this product, which is derived from Manalagi apple peel extract, demonstrates its potential as a safe and natural solution for treating bad breath in children.

Therefore, MAGIfresh is recommended for parents and dental health professionals as an alternative herbal product for maintaining children's oral health. For further research, it is recommended that a method be developed using a control group for comparison, a longer research period to observe long-term effects, and the use of objective measurement instruments such as halimeters to strengthen clinical evidence of the product's effectiveness.

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REFERENCES

- AD, E. M., Setiadhi, R., & Sugiaman, V. K. (2022). Pengaruh Obat Kumur Herbal Dengan Kandungan Zat Aktif Flavonoid, Saponin, Dan Tanin Terhadap Halitosis. *Ocean Biomedicana Journal*, 5(2)
- Aljudaibi, R., Mubarak, S., & Baseer, M. A. (2025). Parental Perception of Oral Halitosis in Their Children and Its Effect on Oral Health-Related Quality of Life: A Cross-Sectional Study. *Patient Preference and Adherence*, 1133–1145.
- AlMadhi, N. A., Sulimany, A. M., & Alzoman, H. A. (2021). Halitosis and Associated Risk factors in children: a cross-sectional study. *The Journal of Contemporary Dental Practice*, 22(1), 51–55.
- Amin, S., & Arman, S. A. (2025). Formulasi Dan Evaluasi Mouthwash Mengandung Ekstrak Bunga Honje Laka (*Etlingera Hemisphaerica*) Dan Minyak Atsiri Daun Kemangi (*Ocimum Basilicum*): Studi Tentang Aktivitas Antimikroba Terhadap *Streptococcus Mutans*. *Journal of Public Health Science*, 2(1), 59–65.
- Andani, M., & Sumiwi, , Sri A. (2022). Review Artikel: Beberapa Tanaman Berkhasiat Untuk Mengatasi Halitosis (Bau Mulut). *Farmaka*, 20(3).
- Aung, E. E., Ueno, M., Zaitso, T., Furukawa, S., & Kawaguchi, Y. (2015). Effectiveness of three oral hygiene regimens on oral malodor reduction: a randomized clinical trial. *Trials*, 16(1), 31.
- BKPK Kementerian Kesehatan Republik Indonesia. (2023). *Survei Kesehatan Indonesia (SKI) 2023 Dalam Angka*. BPKP Kementerian Kesehatan.
- De Medeiros, M. dos S. G., & Garruti, D. dos S. (2018). *Palatability studies of oral formulations: an overview about drug acceptance in pediatrics*.
- Emini, E., Erwin, E., Widiyastuti, R., & Yusmaniar, Y. (2023). Evaluation Of Magifresh Mouthwash Manalagi Apple Peel Extract. *JDHT Journal of Dental Hygiene and Therapy*, 4(2), 173–177.
- Emini, E., Erwin, E., Widiyastuti, R., & Yusmaniar, Y. (2024). Organoleptic Evaluation Of Magifresh Mouthwash Manalagi Apple Peel Extract For Children. *JDHT Journal of Dental Hygiene and Therapy*, 5(2), 166–169.
- Emini Emini, Erwin Erwin, Rini Widiyastuti, & Yusmaniar. (2023). Antibacterial Effects Of Manalagi Apple Peel Extract Mouthwash. *Jurnal Kesehatan Gigi*, 10(1), 15–21. <https://ejournal.poltekkes-smg.ac.id/ojs/index.php/jkg/article/view/9269>
- Erawati, S., Idamawati, I., & Wijaya, H. (2023). Relationship Between Halitosis Level and Oral Hygiene in High School Student. *Jurnal Penelitian Pendidikan IPA*, 9(SpecialIssue), 1083–1088.
- Kumar, A. S., Hiremath, M. C., Srinath, S. K., & Nayak, R. J. (n.d.). *Mouth-rinses for children—A narrative review*.
- Luca, M. M., Buzatu, R., & Bumbu, B. A. (2025). Comparative Analysis of Halitosis in Adolescents and Young Adults with Removable Retainers, Fixed Retainers, or No Orthodontic Treatment: A Cross-Sectional Study with Salivary pH Subgroup Analyses. *Journal of Clinical Medicine*, 14(10), 3560.
- Motta, L. J., Bachiega, J. C., Guedes, C. C., Laranja, L. T., & Bussadori, S. K. (2011). Association between halitosis and mouth breathing in children. *Clinics*, 66, 939–942.