JDHT Journal of Dental Hygiene and Therapy
Volume 6, Nomor 2 Tahun 2025, pp. 179-184
ISSN (online): 2723-1607 DOI: 10.36082/jdht.v6i2.2602

EFFECTIVENESS OF CHEWING WATER APOLE AND STARFRUIT IN REDUCING PLAQUE SCORES

Rosmawati[1], Rusmiati[2], Sisca Mardelita[3], Elfi Zahara[4], Risda Alvia Mukhlisa[5]
[1,2,5]Departement of Dental Health, Health Polytechnic of Jambi, Indonesia
[3,4]Departement of Dental Health, Health Polytechnic of Aceh, Indonesia

Info Artikel

Article History:

Received: 21 August 2025
Revised: 29 Sept 2025
Accepted: 7 Oct 2025
Available Online: 15 Oct 2025

Kata Kunci:
water guava, starfruit, plaque

This is an open access article under the CC-BY-SA license.
Copyright © 2025 by Author.
Published by Politeknik Kesehatan Kemenkes Jakarta I

Abstrak

Background: Plaque is a layer attached to the surface of the teeth consisting of microorganisms that grow on the surface of the teeth if someone ignores dental and oral hygiene. Plaque is the main cause of caries and periodontal disease. Efforts are made to prevent or reduce plaque formation with mechanical plaque control, namely by brushing teeth, chemical methods using mouthwash and natural methods, namely by chewing fibrous and juicy fruits. Objective: the effectiveness of chewing water guava and starfruit in reducing plaque scores in students of the Department of Dental Health, Health Polytechnic of Jambi. Method: This study is a quasi-experimental study using a pre-test and post-test design. Sampling used purposive sampling, the sample in this study amounted to 30 students who were divide into 2 groups intervention . Results: in the group chewing water apple fruit the average value of plaque score reduction was (29.9) and the results of the statistical test p-value 0.000 <0.05 in the group chewing star fruit the average value of plaque score reduction was (33.7) and the results of the statistical test p-value 0.000 <0.05 In the independent T-Test test of unpaired differences, the p-Value obtained was 0.017 <0.05, meaning there was a significant difference between chewing using water apple fruit and star fruit. Conclusion: water apple fruit and star fruit are effective in reducing plaque scores. However, star fruit is more effective in reducing plaque scores in students of the Department of Dental Health, Health Polytechnic of Jambi.

Korespondensi Penulis:
Risda
Department Dental Health, Health Polytechnic of Jambi
Email: risdaalvia@gmail.com

Introduction

The Ministry of Health Basic Research Results Health (Riskesdas) 2018, Population of Indonesia suffer disease tooth And mouth Still tall ,common caries 88.8% And prevalence Periodontal disease 74.1% (Ministry of Health, 2018) . According to the World Health Organization (WHO), dental health problems in society are cavities and periodontal disease, in adults found almost 100% and periodontal disease 15-20% (Shireen & S., 2016) .

Dental health is one aspect of overall health that is the result of the interaction between physical, mental, and social conditions (Pujiyati et al., 2025) . What is meant by dental and oral hygiene is the condition of the teeth in the oral cavity in a clean state free from plaque and other dirt on the tooth surface such as debris, tartar, and food residue. Maintaining dental and oral health is not difficult, maintaining dental and oral health is keeping the teeth and mouth clean from food residue and other dirt in the mouth, with the aim of maintaining healthy teeth (Mael et al., 2022) .

Oral hygiene is a condition that indicates a person's oral cavity is free from dirt, such as plaque and calculus. If oral hygiene is neglected, plaque will form on the teeth and spread to the entire surface of the teeth (Prastio et al., 2023) . Plaque is a thin, colorless (transparent) layer that cannot be seen with the naked eye, attached to the teeth and forms colonies or collections consisting of saliva, food debris, dead tissue, fibrinogen, microorganisms and so on (Syahrul et al., 2023). Dental plaque is a soft deposit that sticks to the surface of the teeth consisting of microorganisms that reproduce in an intercellular matrix. At the beginning of plaque formation, there are several bacteria contained in it, namely Streptococcus mutans, Streptococcus sanguis, Streptococcus mitis and Streptococcus salivarius. The bacteria contained in plaque have the enzyme glucosyltransferase which can convert carbohydrates into acids that can cause dental and oral diseases. Fiber-rich foods are foods that have good tooth-cleansing properties (Nabila et al., 2023) . Plaque, which accounts for 75 to 90 percent of the global population, is the cause of caries. Plaque is

formed from soft deposits that form a biofilm and adhere tightly to the surface of teeth, gums, and other hard surfaces in the oral cavity. Other studies have identified plaque as the primary cause of caries and periodontal disease, as it contains pathogenic bacteria whose metabolic products adhere to the surface of teeth and gingiva (Pratiwi & Prasetyowati, 2020) .

Every 100 grams of sweet starfruit contains 91% water, 42 calories of energy, 3% fiber, 10 grams of carbohydrates, 1 gram of protein, 5 mg of calcium, 207 mg of potassium, 11 mg of magnesium, 20 mg of phosphorus, 65 RE of vitamin A, 27 RE of vitamin C, 0.1 mg of vitamin B6, 1 (Sholikhah & Nuryati, 2020) . Star fruit (Averrhoa carambola L.) has a fairly high vitamin C and flavonoid content. The vitamin C content in star fruit is around 35 mg per 100 g (Oktaviani, 2018).

Vitamin C, atau asam askorbat, adalah nutrisi esensial yang diperlukan untuk berbagai fungsi biologis Vitamin C, or ascorbic acid, is an essential nutrient required for various biological functions in the human body. This article is a literature review that explores its role in maintaining overall health, specifically focusing on oral health. Vitamin C acts as a primary antioxidant, protecting cells from damage caused by free radicals and oxidative stress. In the context of oral health, vitamin C plays a crucial role in maintaining healthy gums by stimulating the production of collagen, a key component of connective tissue that supports the structural integrity and strength of gums (Jauharuddin, 2024)

Water apples contain 87 grams of water and 0.9 grams of fiber (Nurasiki & Amiruddin, 2017). One of the compounds in water apples that is good for dental and oral health is flavonoids and tannins. Flavonoids and tannins have antibacterial properties because flavonoids can disrupt bacterial cell wall function through complex formation with extracellular proteins, while tannins can inhibit microbial extracellular enzymes and inhibit oxidative phosphorylation (Ginting et al., 2023).

Wiradona's research results show that chewing starfruit can reduce plaque scores. Starfruit has a fiber content of 0.9 grams per 100 grams and contains 90% water (Wiradona & Prasko, 2018). This is in line with research conducted by (Patrolina et al., 2020) There was a decrease in plaque score in the group that chewed star fruit, the plaque score before chewing star fruit was 0.78 and after chewing star fruit it was 0.65. The resulting difference was 1,445. Pratama's research showed that the average plaque score before consuming water apple fruit was 1,557 and after consuming water apple fruit was 1,443. This is in line with research conducted by From the results of statistical analysis with paired t-test obtained a Mean value of 1.3357, with the known p value (probability value) of the test shows p = 0.0000 Chewing sweet star fruit is effective in reducing plaque scores, because the results of the study showed a significant difference between before chewing sweet star fruit (avverhoa carambola L) and after chewing sweet star fruit (avverhoa carambola L), it is hoped that dental health workers can provide counseling on maintaining dental and oral health including about good and bad foods for dental and oral health (Pratama et al., 2020) .

Efforts to improve dental and oral health can be done by controlling plaque. Plaque control can be done mechanically, chemically and naturally. Daily plaque control is generally done mechanically through brushing teeth and cleaning between teeth with dental floss (flossing). With these limitations, chemical plaque control has begun to be applied such as rinsing with antiseptic fluid. Chemical plaque control has limitations that cannot be applied every day. These limitations make scientific plaque control a companion to mechanical plaque control. Natural plaque control can be achieved by chewing dense, fibrous fruits (Karyadi & Roza, 2021) .

Method

The design of this study was a quasi-experimental study using a pre-test and post-test design. The sample in this study were students of the Jambi Dental Health Department who met the inclusion criteria. The inclusion criteria for this study were students of the Jambi Dental Health Department, a maximum of 3 carious teeth, a calculus index of 0, non-crowded teeth, and not using orthodontics and willing to be respondents, crowded teeth. using orthodontics and not willing to be respondents. The study subjects numbered 30 people who had been prepared according to the predetermined criteria and had been given sufficient information beforehand and had signed an informed consent.

The research subjects were divided into 2 groups, namely Group A and Group B, each group consisting of 15 people. Each group was given water apples and starfruit that had been cut and weighed 100g each. First, the subjects were instructed not to brush their teeth after 9:00 PM WIB, not to brush their teeth in the morning before treatment. Respondents were instructed to eat bread/biscuits of the same size. Then, measuring the initial plaque score with the plaque index with PHPM in both groups. This was done to identify the presence of plaque. The plaque score measurement procedure was carried out with a disclosing solution. It was used by applying the disclosing solution to the surface of the subject's teeth and then the results were recorded. Group A was instructed to eat water apple with 32 chews and group B was instructed to eat star fruit with 32 chews. Next, the plaque scores of both groups were re-examined and recorded on a form. Data analysis used a Paired T-Test to test the difference in the mean plaque score before and after chewing water apple and star fruit. An

Open Access: http://ejournal.poltekkesjakarta1.ac.id/index.php/JKG
Email: jdht@poltekkesjakarta1.ac.id

Independent T-Test to test the difference in plaque scores before and after treatment.techniques.

Result

This research was conducted on 30 dental health students at the Health Polytechnic of the Ministry of Health in Jambi, using purposive sampling as the sampling technique, with the following results:

Table 1. The Effectiveness of Chewing Water Apples on Reducing Plaque Scores Departmen Dental Health, Health Polytechnic Of Jambi

NO	Intervention	N	Average Plaque Score	*P value*
1.	Before Chewing Water Apple	15	34.87	0.000
2.	After Chewing Water Apple	15	4.27	
Plaque Score Reduction			29.9	

The average plaque score in students of the Dental Health Department, the plaque score before chewing water apple fruit was (34.87) while after chewing water apple fruit it decreased to (4.27) with an average decrease in plaque score of (29.9) and the results of the statistical test p-value 0.000 < 0.05 which means there is a significant difference before and after chewing water apple fruit.

Table 2. The Effectiveness of Chewing Star Fruit on Reducing Plaque Scores in Departmen Dental Health, Health Polytechnic Of Jambi

NO	Intervention	N	Average Plaque Score	*P value*
1.	Before Chewing Star Fruit	15	35.07	0.000
2.	After Chewing Water Apple	15	1.80	
Plaque Score Reduction			**33.27**	

The average plaque score in students of the Dental Health Department, the plaque score before chewing star fruit was (35.07) while after chewing star fruit decreased to (1.80) with an average decrease in plaque score of (33.7) and the results of the statistical test p-value 0.000 < 0.05 which means there is a significant difference before and after chewing star fruit.

Table 3. Comparison of the Effectiveness of Chewing Apple Juice and Electric Starfruit on Reducing Plaque Scores in Students of Departmen Dental Health, Health Polytechnic Of Jambi

NO	Fruit Intervention	N	Reduction in Average Plaque Score	*P value*
1.	Water Apple	15	29.9	0.017
2.	Star fruit	15	33.27	

The average value of plaque score reduction in students of the Department of Dental Health, Poltekkes Kemenkes Jambi in the guava chewing group was 29.9, while the average value of plaque score reduction in the starfruit chewing group was greater, namely 33.27.

In the difference test, there was no paired independent T-Test to determine the difference in the effectiveness of chewing water apple and star fruit in reducing plaque scores in students of the Dental Health Department of the Jambi Ministry of Health Polytechnic, a p-value of 0.017 <0.05 was obtained, which means there is a significant difference between chewing using water apple and star fruit.

Discussion

Plaque control can be achieved mechanically, such as brushing and flossing, including chewing fibrous and watery foods, or chemically, such as using mouthwash. Consuming foods containing fiber and water does not stimulate plaque formation, but can act as a natural plaque control (Modjo et al., 2023). Fiber-rich foods, such as fruits and vegetables, can clean the surface of the teeth naturally by indirectly rubbing against the tooth surface. Several studies have shown that chewing hard, rough, and fibrous foods, such as fruits and vegetables, can stimulate saliva flow, thereby increasing food cleaning and reducing food residue in the oral cavity (Nafisah et al., 2025). Water apple is an evergreen medicinal fruit belonging to the family Myrtaceae. The fruit is oblong, pear shaped, and 5–12 cm in length. Color varies from white to light green, green or red to crimson and purple, and from dark purple to black. The common names include jambu semarang, java apple, java rose apple, mountain apple, samarang rose apple, wax jambu, and wax apple. In India, wax apples are found in Kerala, West Bengal, the East Godavari district of Andhra Pradesh, a few parts of Karnataka, and other humid regions. It is a nutritional powerhouse packed with energy, fat, protein, vitamins, and minerals. It has been proven to have several pharmacological effects such as antioxidant, antimicrobial, antifungal, anti-inflammatory, and antidiabetic properties. Water apple fruit is known as a natural or self-cleaning

Open Access: http://ejournal.poltekkesjakarta1.ac.id/index.php/JKG
Email: jdht@poltekkesjakarta1.ac.id

toothbrush (Sulthana et al., 2024). This fruit helps stimulate the gums, increases saliva flow in the mouth, prevents plaque buildup, and cleans the tooth surface (Pratama et al., 2020) . Fiber-rich foods can clean teeth from the causes of caries. Foods like these are types of fruits that contain a lot of water (Nurasiki & Amiruddin, 2017). Water apples contain 87 grams of water and 0.9 grams of fiber.

Sweet starfruit (Averrhoa carambola L.) is a thin-skinned, non-climacteric fruit with a sweet and refreshing taste and high levels of vitamin C. Sweet starfruit has antioxidant and antibacterial properties. Sweet starfruit is an example of a high-fiber food with a fairly high water content. Every 100 grams of sweet starfruit contains 91% water, 42 calories of energy, 3% fiber, 10 grams of carbohydrates, 1 gram of protein, 5 mg of calcium, 207 mg of potassium, 11 mg of magnesium, 20 mg of phosphorus, 65 RE of vitamin A, 27 RE of vitamin C, 0.1 mg of vitamin B6, 1 (Sholikhah & Nuryati, 2020) . The process of chewing sweet starfruit can reduce plaque growth and debris, and can overcome bad breath because chewing stimulates the formation of saliva, thus causing a self-cleansing process. A lot of saliva will make the mouth rich in oxygen so that anaerobic bacteria that cause bad breath can be suppressed (Syauqy & Iskandar, 2022) This study is supported by (Tahulending et al., 2024) showing that based on the results of the study, chewing sweet starfruit (Averrhoa Carambola) and pineapple (Ananas Comosus L Merr) has an effect on reducing plaque because the examination carried out before chewing sweet starfruit (Averrhoa Carambola) obtained an average of 2.2457 and after chewing sweet starfruit (Averrhoa Carambola) obtained an average of 0.9196, a difference in reduction of 1.32609.

The combination of fiber and water in fruits such as starfruit (Nafisah et al., 2025) can stimulate saliva production, thus creating a natural self-cleansing effect on teeth. This self-cleansing process occurs naturally due to the muscle activity involved in breaking down food, which in turn triggers saliva production (Syauqy & Iskandar, 2022) . This muscle activity is a result of the chewing process (Pyo et al., 2021) . Chewing hard foods, such as watercress and starfruit, which are rich in fiber, which have a high water content and a hard texture, requires a long chewing time and contributes to the self-cleaning of tooth surfaces. The mechanical properties of chewing can produce a brush-like effect that can effectively remove dirt from tooth surfaces. Starfruit is more effective in reducing plaque scores because plaque control can be achieved by removing and preventing plaque accumulation. Plaque can be controlled mechanically, namely by brushing teeth, and chemically, namely by rinsing. Prevention of plaque formation can be done using fruits containing epicatechin. Epicatechin acts as an anti-caries agent due to its bactericidal properties. One fruit containing epicatechin is starfruit (Averrhoa carambola L.) (Adnyasari et al., 2023) . The self-cleansing mechanism refers to the natural process of removing food debris from the mouth. The most effective methods for maintaining dental and oral hygiene include regular brushing and consuming fruits high in fiber, water, and hard textures. Hard-textured fruits require prolonged chewing with both sides to aid in the mechanical cleaning process in the oral cavity (Wiradona & Prasko, 2018) . Rough and fibrous foods can make the chewing process take longer. Chewing stimulates saliva flow, which can clean teeth and dilute and neutralize existing acids. Fibrous foods can act like a brush and prevent them from sticking to teeth. Fibrous and juicy fruits contain antibacterial compounds or substances that act as natural plaque cleaners, with the chewing process increasing the intensity and duration of chewing, thereby reducing plaque scores. Thus, chewing fibrous and juicy fruits is effective in reducing plaque scores (Rokot et al., 2023) .

Conclusions and Suggestions

This study shows that chewing water apple (Syzygium aqueum) and starfruit (Averrhoa carambola L.) are both effective in reducing dental plaque scores in students of the Dental Health Department of the Jambi Ministry of Health Polytechnic. However, starfruit proved more effective than water apple. The average plaque score reduction in the water apple group was 29.9, while in the starfruit group it reached 33.27. The results of statistical tests showed a significant difference between the two groups (p=0.017). The high fiber and water content in both fruits plays a role in the self-cleansing process of teeth, so it can be a natural method of plaque control besides toothbrushes and mouthwash.

Reference

Adnyasari, N. L. P. S. M., Syahriel, D., & Haryani, I. G. A. D. (2023). Plaque Control in Periodontal Disease. *Interdental Jurnal Kedokteran Gigi (IJKG)*, *19*(1), 55–61. https://doi.org/10.46862/interdental.v19i1.6093

Ginting, M., Ginting, P., & Apriliana Sari, S. (2023). Study of Antibacterial Activity of Strawberry Leaf Ethanol Extract (Fragaria x ananassa (Weston) Rozier) Against Propionibacterium acnes Bacteria. *Journal of Pharmaceutical and Sciences*, *6*(1), 281–286. https://doi.org/https://doi.org/10.36490/journal-jps.com.v6i1.56

Jauharuddin, A. (2024). Peranan Vitamin C Terhadap Kesehatan Tubuh dan Rongga Mulut. *JoPHIN*, *1*(1), 1–6.

Karyadi, E., & Roza, M. A. (2021). Pengaruh

Mengunyah Buah Apel Manalagi Terhadap Penurunan Indeks Plak Usia 9-12 Tahun. *JIKG (Jurnal Ilmu Kedokteran Gigi)*, *3*(2). https://doi.org/10.23917/jikg.v3i2.12330

Kemenkes. (2018). Laporan Riskesdas 2018. *Laporan Nasional RIskesdas 2018*, *53*(9), 181–222. http://www.yankes.kemkes.go.id/assets/downloads/PMK No. 57 Tahun 2013 tentang PTRM.pdf

Mael, A., Tahulending, A., Yuliana, N. M., Kesehatan, J., Poltekkes, G., Manado, K., Rw, J., Malalayang, M., & Manado, I. I. (2022). Pengaruh konsumsi buah nanas terhadap penurunan plak indeks pada mahasiswa tingkat 1 jurusan kesehatan gigi Poltekkes Kemenkes Manado. *JIGIM (Jurnal Ilmiah Gigi Dan Mulut)*, *5*(2), 66–71. https://doi.org/https://doi.org/10.47718/jgm.v5i2.1890

Modjo, N. F., Anindita, P. S., & Mintjelungan, C. N. (2023). Perilaku Pemeliharaan Kebersihan Gigi dan Mulut pada Pengguna Ortodontik Cekat di Madrasah Aliyah Negeri I Manado. *E-GiGi*, *12*(1), 9–16. https://doi.org/10.35790/eg.v12i1.47932

Nabila, R., Nuraskin, C. A., & Niakurniawati, N. (2023). Mengunyah Buah Apel dapat Menurunkan Indeks Plak. *NASUWAKES: Jurnal Kesehatan Ilmiah*, *15*(2), 119–124. https://doi.org/https://doi.org/10.30867/nasuwakes.v15i2.448

Nafisah, H. W., Purnama, T., & Rikawarastuti, R. (2025). Chewing water apple (syzygium aqueum) as an effort to reduce plaque index. *Journal Center of Excellent : Health Assistive Technology*, *3*(1), 33–36. https://doi.org/10.36082/jchat.v3i1.2219

Nurasiki, C. A., & Amiruddin, A. (2017). Efektifitas Mengunyah Buah Apel dan Buah Bengkoang Terhadap Penurunan Indeks Plak Pada Murid Sekolah Dasar. *AcTion: Aceh Nutrition Journal*, *2*(2), 80. https://doi.org/10.30867/action.v2i2.58

Oktaviani, E. (2018). PENENTUAN KADAR FLAVANOID DAN AKTIVITAS ANTIOKSIDAN FORMULA SERBUK MINUMAN INSTAN EKSTRAK BELIMBING MANIS (Averrhoa carambola L.). *Fitofarmaka Jurnal Ilmiah Farmasi*, *8*(1), 43. https://doi.org/DOI : 10.33751/jf.v8i1.1166

Patrolina, S. K., Manta, S., Manta, R., & Tiurlan, S. (2020). Comparing the Effect of Pineapple Fruit and Star Fruit to Reduce the Dental Plaque in Children Aged 10-12 Years: A Cross Sectional Study. *International Journal of Gastroenterology*, *4*(1), 11. https://doi.org/10.11648/j.ijg.20200401.13

Prastio, A., Arie Wahyudi, I., Benni Setiawan, P., & Gadjah Mada, U. (2023). The Relationship Between Oral Health Knowledge And Oral Health Behavior Among Students Of SMA N 1 Kerinci Kanan under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC4.0). *Jurnal Eduhealth*, *14*(03), 2023. https://doi.org/https://doi.org/10.54209/jurnaleduhealth.v14i3.2450

Pratama, A. T., Prasetyowati, S., & Mahirawatie, I. C. (2020). Efektivitas Mengunyah Buah Jambu Air Hijau Camplong Dan Buah Jambu Air Kusuma Merah Terhadap Penurunan Debris Indeks. *Jurnal Ilmiah Keperawatan Gigi*, *1*(3), 49–56. https://doi.org/https://doi.org/10.37160/jikg.v1i3.549

Pratiwi, N. N., & Prasetyowati, S. (2020). Efektifitas Mengunyah Apel Jenis Anna Dikupas Dan Tanpa Dikupas Terhadap Penurunan Indeks Plak. *Jurnal Kesehatan Gigi (Dental Health Journal)*, *7*(2), 59–64. https://doi.org/https://doi.org/10.33992/jkg.v7i2.1261

Pujiyati, A., Prayitno, A., Saptiwi, B., R, R. C. A., Ramadhani, A. P., Nadjib, I. A., Rafi, M., Pratama, M., & Prameswari, R. (2025). *Upaya Percepatan Penurunan Kejadian Karies dan Plak Gigi melalui Edukasi Kesehatan Gigi dan Mulut Pada Balita di Desa Kedungwaduk, Kabupaten Sragen*. *5*(1), 17–26. https://doi.org/https://doi.org/10.20961/ssej.v5i1.98494

Pyo, C. Y., Kim, T. H., & Kim, D. H. (2021). Association between masticatory muscle activity and oral conditions in young female college students. *Anatomy and Cell Biology*, *54*(4), 479–488. https://doi.org/10.5115/ACB.21.107

Rokot, G. F. Y., Wowor, V. N. S., & Wahyuni, R. (2023). Hubungan Konsumsi Makanan Kariogenik dan Kejadian Karies Gigi pada Anak Usia Sekolah di Desa Wori. *E-GiGi*, *12*(2), 227–232. https://doi.org/https://doi.org/10.35790/eg.v12i2.51343

Shireen, N., & S., R. (2016). Assessment of oral health hygiene among high school girls of Bengaluru city, India. *International Journal of Community Medicine and Public Health*, *3*(8), 2335–2339. https://doi.org/10.18203/2394-6040.ijcmph20162594

Sholikhah, F. I., & Nuryati, S. (2020). Pengaruh Mengunyah Buah Belimbing Manis (Avverhoa carambola L) Terhadap Plak Skor Pada Siswa Kelas VII SMPN 11 Banjarbaru. *Jurnal Terapis Gigi Dan Mulut*, *1*(1), 19–23.

Sulthana, D. S. G., Sapna, B., & Smitha, G. P. (2024). Evaluation of Antibacterial Efficacy of Wax Apple (Syzygium samarangense) Fruit Extracts Against Porphyromonas gingivalis, Fusobacterium nucleatum, and Aggregatibacter actinomycetemcomitans – An In vitro Study.

Journal of Indian Association of Public Health Dentistry, *22*(2), 124–130. https://doi.org/10.4103/jiaphd.jiaphd_229_23

Syahrul, D., Walianto, S., & Suwongto, P. S. (2023). *The Use Of Chlorhexidine Mouthworks Can Reduce The Accumulation Of Dental Plak In Users Of Fixed Orthodontic Devices*. *19*(1), 43–48. https://doi.org/https://doi.org/10.46862/interdental.v19i1.6095

Syauqy, A., & Iskandar, M. M. (2022). Perbandingan pH Saliva setelah Konsumsi Buah Nanas dan Buah Belimbing. *Jmj*, *10*(1), 26–36. https://doi.org/https://doi.org/10.22437/jmj.v10i1.13201

Tahulending, A., Ratuela, Jeineke, E., & Pengaeiang, G. (2024). Efektivitas Mengunyah Buah Belimbing Manis (Averrhoa Carambola) Dan Buah Nanas (Ananas Comosus L.Merr) Terhadap Plak Indeks Pada Siswa Kelas Vii Dan VIII Di SMP Negeri 3 Manganitu Kabupaten Kepulauan Sangihe. *JIGIM (Jurnal Ilmiah Gigi Dan Mulut)*, *2*, 61–70. https://doi.org/https://doi.org/10.47718/jgm.v7i2.2516

Wiradona, I., & Prasko. (2018). Effectiveness Consuming Pineapple (Ananas Comosus) and Star Fruit (Averrhoa Carambola L) Toward Plaque Score. *Jurnal Kesehatan Gigi*, *5*(1), 16. https://doi.org/10.31983/jkg.v5i1.3595