

**THE CHEMISTRY OF A SMILE: WHY THE COMPOSITION OF SALIVA IS MORE  
IMPORTANT THAN EXPENSIVE PASTA**

**Baymuradova Lobar Rajabovna**

Asia International University

e-mail: lobar.baymuradova@gmail.com

**Abstract**

Saliva is a complex biological fluid produced by the salivary glands, consisting mainly of water (99%) and dissolved organic (proteins, enzymes, mucus) and inorganic substances (mineral salts), which performs vital functions: participates in digestion (breaks down carbohydrates), protects teeth from caries, moisturizes the oral cavity helps with swallowing and contains bactericidal components to fight germs. .

**Keywords**

Saliva, caries, demineralization, remineralization, pellicle, acids, pH level

Saliva is not just "water" in your mouth, but a powerful multi—level system for protecting your teeth. She works as a personal dentist who is on duty 24/7. Let's analyze the composition of saliva in more detail and systematically. This will help to understand why it is called "blood filtrate" — after all, almost everything that is in saliva gets there from the vessels that feed the salivary glands.

The whole team can be divided into three large groups:

1. Water (99.4 – 99.5%) It serves as a solvent for all other substances, ensuring their delivery to the teeth and mucous membrane.

2. Mineral (inorganic) substances. These are the electrolytes that maintain the chemical balance in the mouth: calcium and phosphates. Normally, saliva is oversaturated with these ions. This allows them to "integrate" into the enamel (remineralization). Bicarbonates: the main alkaline component. They neutralize acids, preventing the dissolution of enamel. Chlorides: activate enzymes (e.g. amylase). Fluorides: even in small doses, they accelerate the restoration of teeth.

3. Organic substances (proteins and other compounds) are what make saliva a "living" protective environment. Mucin: a slimy substance that glues food into a lump and creates a protective film on the teeth. It is important to mention that saliva proteins (mucins and glycoproteins) settle on the teeth, forming a pellicle. This is the thinnest film that protects the enamel from the direct effects of acids. Controls which bacteria can "stick" to the tooth and which ones can't.

Enzymes: alpha-amylase - begins to break down starch. Lysozyme is a "natural antibiotic" that destroys the walls of harmful bacteria.

Protective proteins: Lactoferrin: Removes iron from bacteria, making them unable to reproduce. Cialin: a protein that helps to quickly raise the pH level after eating. Statterins: prevent calcium from precipitating (so that tartar does not form too quickly).

Metabolic products: urea, ammonia, creatinine. Their increased content in saliva can sometimes indicate kidney problems.

The composition of saliva is very important for a dentist. In medicine, there is a concept of "critical pH of saliva." If the pH drops below 5.5, minerals begin to be washed out of the tooth (demineralization). If the saliva composition is normal, it quickly returns the pH to 6.8–7.4, saving the enamel.

The average healthy adult produces 0.5 to 2 liters of saliva per day. If you average it out, it's about 1.2–1.5 liters — imagine a standard plastic bottle. Over the course of a lifetime, a person produces about 25 000 – 35 000 liters of saliva. However, this process is extremely uneven throughout the day.

How is the "schedule" of production distributed?: Peak activity (food): When we eat or even just smell a delicious smell, the rate of salivation increases 10 times. Chewing is the most powerful stimulant. Resting state: Saliva is released at a rate of about 0.3–0.5 ml per minute outside of meals. This is enough to keep the mucous membrane hydrated. Night mode: During sleep, the output drops to almost zero. That is why we wake up with a feeling of dry mouth and "stale" breathing (bacteria take advantage of the lack of antiseptic treatment).

The volume of saliva depends on the following factors:

1. Water balance: if you drink little water, the body goes into economy mode, and saliva becomes noticeably less.

2. Age: by old age, the amount of saliva produced usually decreases, which often leads to problems with gums and teeth.

3. Psychosomatics: severe stress or fright "turns off the faucet" (the famous "dry throat" from fear).

4. Chewing load: People who eat solid foods (vegetables, meat) produce more saliva than those who like mashed potatoes and smoothies.

Over the course of a lifetime, a person produces about 25 000 – 35 000 liters of saliva.

The link between saliva and tooth decay is a constant "chemical warfare". Caries occurs when the mechanisms of destruction (acid) begin to defeat the mechanisms of protection (saliva). Imagine that the surface of a tooth is a battlefield where two opposing processes are constantly taking place.:

1. Demineralization and remineralization. These are the main scales of our dental health. Demineralization is the path to tooth decay. When you eat sugar, the bacteria release acid. This acid leaches calcium and phosphorus from the enamel. If there is not enough saliva or it is too acidic, micropores form in the tooth. Remineralization is the protection of saliva. Saliva, saturated with calcium and phosphate ions, acts as a "liquid filling". It rushes to these pores and "seals" them, returning the minerals to their place. It is important to know that caries at the stage of the "white spot" is the only stage that can be reversed only through saliva resources and proper hygiene.

2. Protective barrier: pellicle. A few minutes after brushing your teeth, saliva proteins form a thin film on the enamel — a pellicle. It serves as an "armor" that prevents acid from directly contacting the enamel. However, it is to this film that bacteria attach over time. Therefore, it is important to update this layer by peeling off the old plaque.

3. The speed of purification. Saliva works as a natural cleanser. The higher the rate of salivation, the faster sugar and acids are removed from the oral cavity. If saliva is too viscous or not enough, sugar stays on the teeth longer, and the risk of caries increases significantly.

Here are the main mechanisms of how saliva fights tooth decay:

1. Mechanical cleansing. The simplest but most important function. Saliva physically washes away food debris and soft plaque from the surfaces of teeth. The less "food" the bacteria have left, the less acid they produce.

2. Acid neutralization (Buffer tank). Bacteria (for example, *Streptococcus mutans*) process sugar and release acid, which corrodes the enamel. Saliva contains bicarbonates and phosphates, which neutralize these acids.

3. Remineralization. Tooth enamel is constantly losing minerals under the influence of acids. Saliva literally "repairs" these micro-injuries.:

4. Antibacterial shield. Saliva contains specific enzymes and proteins that provide this function.

If there is little saliva (a condition called xerostomia), the risk of tooth decay increases exponentially. This often happens due to dehydration, side effects of medications (antidepressants, antihypertensive drugs), and mouth breathing habits.

### **Conclusion**

To summarize, saliva is the main natural barrier to tooth decay. Its role is not just auxiliary, but fundamental: without normal salivation, teeth would collapse in a matter of months, even if cleaned.

Final conclusion: 3 lines of defense

Chemical protection (neutralization). Saliva works as an antidote. Bacteria produce acid, and saliva (thanks to bicarbonates) turns this aggressive environment into a neutral one, stopping the dissolution of the enamel.

Biological protection (cleansing and antiseptics). It constantly "vacuums" the oral cavity, removing the remnants of carbohydrates, and suppresses the growth of pathogenic flora with the help of lysozyme and immunoglobulins.

Physical regeneration (Remineralization). Saliva constantly delivers calcium and phosphorus ions to those areas where the acid has already begun to make micro-holes, actually "healing" caries at the earliest stages.

The development of caries is always an imbalance. If you consume sugar too often, even the most "high-quality" saliva will not have time to restore the pH balance and return minerals to the enamel.

### **REFERENCES**

1. Kuzieva, M., Akhmedova, M., & Khalilova, L. (2025). MODERN ASPECTS OF CHOICE OF MATERIAL FOR ORTHOPEDIC TREATMENT OF PATIENTS IN NEED OF DENTALPROSTHETICS. *Modern Science and Research*, 4(1), 322-333.
2. Kuzieva, M., Akhmedova, M., & Khalilova, L. (2025). GALVANOSIS AND ITS DIAGNOSTIC METHODS IN THE CLINIC OF ORTHOPEDIC DENTISTRY. *Modern Science and Research*, 4(2), 203-212.
3. Kuzieva, M. A. (2023). Clinical and Morphological Criteria of Oral Cavity Organs in the Use of Fixed Orthopedic Structures. *Research Journal of Trauma and Disability Studies*, 2(12), 318-324. 458 ResearchBib IF- 11.01, ISSN: 3030-3753, Volume 2 Issue 3
4. Abdusalimovna, K. M. (2024). THE USE OF CERAMIC MATERIALS IN ORTHOPEDIC DENTISTRY. (Literature review). *TADQIQOTLAR*, 31(3), 75-85.
5. Abdusalimovna, K. M. (2024). CLINICAL AND MORPHOLOGICAL FEATURES OF THE USE OF METAL-FREE CERAMICSTRUCTURES. *TA'LIM VAINNOVATSION TADQIQOTLAR*, 13, 45-48.
5. Abdusalimovna, K. M. (2024). THE ADVANTAGE OF USING ALL-CERAMIC STRUCTURES. *TA'LIM VA INNOVATSION TADQIQOTLAR*, 13, 49-53. 1286 ResearchBib IF- 11.01, ISSN: 3030-3753, Volume 2 Issue 6
6. Abdusalimovna, K. M. (2024). Clinical and Morphological Features of the Use of Non Removable Orthopedic Structures. *JOURNAL OF HEALTHCARE AND LIFE*

- SCIENCE RESEARCH, 3(5), 73-78. 800 ResearchBib IF- 11.01, ISSN: 3030-3753, Volume 2 Issue 4 1285 ResearchBib IF- 11.01, ISSN: 3030-3753, Volume 2 Issue 5
7. Kuzieva, M. A. (2024). CARIOUS INFLAMMATION IN ADOLESCENTS: CAUSES, FEATURES AND PREVENTION. European Journal of Modern Medicine and Practice, 4(11), 564-570.
  8. ISSN NUMBER:2751-4390 IMPACT FACTOR:9,08 Kuzieva, M. A. (2024). Malocclusion–Modern Views, Types and Treatment. American Journal of Bioscience and Clinical Integrity, 1(10), 103-109.
  9. KUZIEVA, M. A. (2024). MODERN ASPECTS OF MORPHO-FUNCTIONAL DATA AND TREATMENT OF AGE-RELATED CHANGES IN THE MAXILLOFACIAL REGION. Valeology: International Journal of Medical Anthropology and Bioethics, 2(09), 126-131.