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## **ВПЛИВ АНОЛІТНОЇ І КАТОЛІТНОЇ ВОДИ НА МІКРОБІОМ РОТОВОЇ ПОРОЖНИНИ**

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**THE EFFECT OF ANOLYTE AND CATHOLYTE WATER ON THE MICROBIOME OF THE ORAL CAVITY**

The oral cavity microbiome is a complex ecosystem with a significant number of microorganisms that perform a wide range of functions, from maintaining oral hygiene to influencing overall human health. In recent years, a biotechnological approach to studying microbiomes has allowed for a more detailed exploration of microbial communities and their interactions with their host. Catholytes and anolytes are among the potential tools for influencing the oral cavity microbiome. In this study, we analyzed the results of biotechnological aspects of the impact of catholytes and anolytes on the oral cavity microbiome.

Anolyte, also known as "dead water," has a pH of less than 6 and, according to the parameters of acute toxicity when ingested into the stomach or applied to the skin, belongs to Class 4 of slightly hazardous substances according to State Standard 12.1.007-76. It possesses minimal toxicity within this class. When inhaled with an oxidant content of 0.02% and a total mineralization of 0.25-0.35%, dead water does not have an explosive effect on the respiratory organs or mucous membranes of the eyes. When taken internally, it does not exhibit immunotoxic effects or increase the level of chromosomal aberrations in bone marrow cells, thus lacking cytogenetic activity. Upon heating to 400 degrees Celsius, the biocidal activity of "dead water" increases by 30-100% (V.M. Bahir et al., 2001).

Catholyte, also known as "living water," has a pH greater than 7.5 and a negative redox potential. This water is electron-donating in nature. Its bactericidal effect is observed against enterobacteria. Enterococci and Group B streptococci exhibit resistance to it, while gram-negative microorganisms are only affected in a bacteriostatic manner. According to the inventors, "living water" is a solution with enhanced electron-donating properties, and when it enters the bloodstream, it enhances the electron-donating background by several tens of millivolts. Scientists provide information about the mechanisms of action of catholyte, including acceleration of the regeneration processes through stimulation of DNA synthesis, immunomodulatory effects, enhancement of liver detoxification function, stabilization of cell membrane permeability, normalization of cellular energy potential, and increased cellular energy supply through stimulation and maximal coupling of respiration and oxidative phosphorylation processes.

Based on the materials published in the proceedings of the Second and Third International Symposia on "Electrochemical Activation in Medicine, Agriculture, Industry" and the monographs by Prylutskyi V.I. and Bahir V.M., it can be asserted that both "living" and "dead" water have therapeutic effects.

"Dead water" or anolyte, has antibacterial, antiviral, antifungal, anti-allergic, anti-inflammatory, anti-edematous, anti-itching, and drying effects. It can exert cytotoxic and antimetabolic effects without causing harm to human tissue cells. The biocidal substances in electrochemically activated anolyte are not toxic to somatic cells because they are represented by oxidants similar to those produced by cells of higher organisms (V.M. Bahir et al., 2001).

On the other hand, "living water" has antioxidant, immune-stimulating, and detoxifying properties. It normalizes metabolic processes by increasing ATP synthesis and altering

enzyme activity. It stimulates tissue regeneration by promoting DNA synthesis and cell growth and division through enhanced mass transfer of ions and molecules across cell membranes. It improves trophic processes and blood circulation in tissues, enhancing overall tissue health and function.

Research on the biotechnological aspects of the impact of catholytes and anolytes on the oral microbiome is a relevant topic for biomedical investigations. One such study was published in the journal "BMC Oral Health" in 2020. The study involved 20 volunteers with benign hyperplasia of the transitional epithelium of the oral mucosa. They were divided into two groups: an experimental group (10 individuals) who received a catholyte solution for local application in the oral cavity, and a control group (10 individuals) who received a placebo. The results of the study showed that the use of catholyte in the oral cavity led to a reduction in the quantity of microorganisms in the oral cavity. Specifically, a decrease in the quantity of *Streptococcus mutans*, which is the main microorganism contributing to the development of dental caries, was observed. At the same time, the quantity of *Lactobacillus acidophilus* and *Bifidobacterium bifidum*, which are beneficial microorganisms, remained at the same level as the control group. The obtained results indicate the possibility of using catholytes and anolytes to reduce the quantity of pathogenic microorganisms in the oral microbiome while preserving the balance of microorganisms. The study showed that catholytes and anolytes do not affect microbial communities in a continuous mode but can decrease the quantity of pathogenic microorganisms when used as an oral rinse. It was also found that the effectiveness of catholytes and anolytes depends on their concentration and duration of use.

The topic of using anolyte and catholyte water to influence the oral cavity microbiome is relevant and is the subject of our further research, utilizing one of the elements in creating catholyte water - the thermos-ionizer-hydrogen water generator "Living Water" [1].

Literary sources:

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