

## 11. Fundamental research on oral cleanser using deep ocean water

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### 1. Introduction

Diverse types of bacteria live in the mouth. The occurrence and growth of bacteria can cause various periodontal diseases, which can be inhibited through tooth brushing or mouth washes. Salt is mainly used in natural mouth washes. Sodium (Na), which is the main ingredient of salt, has anti-inflammatory, sterilizing, and antiseptic actions and magnesium (Mg) has anti-inflammatory effects to inhibit the actions of histamine and stabilize the eosinophil count. Histamine accelerates inflammation in the mouth, and inflammation in the mouth causes halitosis.

Since deep ocean water contains sodium (Na) and magnesium (Mg), it is judged to be effective in inhibiting inflammation even without adding salt thanks to the anti-inflammatory and bacterial effects by sodium (Na) and histamine action inhibiting effects of magnesium (Mg). Therefore, this study is intended to observe the bacterial inhibitory efficacy of mouth washes containing deep ocean water.

### 2. Methods

In the present experiment, mouth washes prepared with deep ocean water (raw water) and distilled water, respectively, were compared with each other with 40 men and women in their 20s. To compare the effects of mouth washes, we used a method of collecting and culturing bacteria in the mouth and a method of measuring the degree of halitosis in the mouth.

Mouth washes were prepared by mixing deep ocean water and purified water at a ratio of 1:5 plus baking soda, xylitol, and menthol for experimental group 1, by mixing deep ocean water and purified water at a ratio of 1:10 plus baking soda, xylitol, and menthol for experimental group 2, and by mixing purified water with baking soda, xylitol, and menthol for the control group.

### 3. Conclusion

#### 1) Microorganism test

Fluids in the mouth before and after using mouth washes were diluted to 1,000 times to

culture the microorganisms in the fluids and according to the results, in the control group, the average value of microorganisms decreased by 50% from 290 CFU to 145 CFU in some of the subjects while increased by about 21% from 154 CFU to 195 CFU in other subjects. In experimental group 1, the average value of microorganisms increased by about 36.9% from 147 CFU to 233 CFU and no decrease was shown. In experimental group 2, the average value of microorganisms decreased by about 70.6% from 586 CFU to 172 CFU in some of the subjects while increased by about 58.3% from 111 CFU to 266 CFU in other subjects. In experimental group 3, the average value of microorganisms decreased by about 47.7% from 398 CFU to 208 CFU in some of the subjects while increased by about 38.4% from 242 CFU to 393 CFU in other subjects. The largest decrease was shown by experimental group 2 and the smallest decrease was shown by experimental group 3. On the contrary, the largest increase was shown by experimental group 2, while the smallest increase was shown by the control group.

Also, the largest numbers of subjects in experimental group 3 and the control group showed decreases and the largest number of subjects in experimental group 1 showed increases.

#### 2) Halitosis test

Halitosis was measured using a Tanita halitosis measuring instrument. According to the results of halitosis tests, the degree of halitosis decreased in both the control group and the experimental groups. Halitosis reduction was the largest in experimental group 2 (1:10). All other experimental groups, that is, experimental group 1 (1:5) and experimental group 3 (1:20) showed larger reductions than the control group.

Therefore, if the reverse osmotic membrane method is used to reduce the amount of minerals, which inhibit the softening of deep ocean water and promote the growth of microorganisms, the effects of mouth washes made using deep ocean water will be increased.