

# IT 시대에서의 자연추출물 사용으로 인한 구강환경 효과연구

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Study on The Oral Health Effects of Natural Extracts Among the IT Age

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요 약

구강세척제의 사용에 의해 나타날 수 있는 알레르기, 치아의 변색, 작열감 등의 화학약제 외 자몽이나 녹차 추출물 등과 같은 식물추출물 등에서도 항균효과, 소취작용 등의 활발한 연구가 진행되고 있다. 이에 본 논문에서는 자연추출물인 *Centella asiatica* 사용하여 구강환경 개선 효과 차이를 알아보려고 실험하였다. 이중맹 검법으로 치면세균막 지수, 치은염 지수, 치주낭 깊이를 측정하고, 그 변화를 파악하여 효과를 확인하였다.

ABSTRACT

The difference of oral environment improvement effect of the test dentifrice was examined by applying the *Centella Asiatica* extract on the oral dentifrice composed by above ingredients. And by using the double blind manner the plaque, gingival index and probing pocket depth were measured and the corresponding changes were set to be verified.

키워드

*Centella Asiatica* Extract, Addition, Preventive Effects, Oral Health  
*Centella Asiatica* 추출물, 첨가물, 예방 효과, 구강 건강

## 1. Introduction

By the improvement of public health the interests on oral health also increased, and according to this trend, studies on substances with effect of prevention of oral diseases were perform as efforts to prevent oral diseases using dentifrice[1].

Also in our country, by the improvement of

national income and living standard the interests on oral health progressively increased, and as among them the interest on dentifrice used in toothbrushing was also high the recent development trend expanded to the level of reventive effects and medicine from the basic functional concept of elimination of foreign substances from the teeth. Especially, the change in basic components of dentifrice as polishing agent, cleaning agent,

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bonding agent and humectant and the diversity of additives were procured, therefore development studies to reduce oral diseases due to plaque is more vitalized nowadays[2]. Also Kim et al[3] verified that the toothbrushing which is only physical is a limited method to eliminate the plaque and scales due to complexity of the oral structure and morphological form of the set of teeth, and therefore many efforts to increase the effects of additives to augment the effects of prevention of oral diseases were performed besides eliminating foreign substances and minimizing the effect of polishing agent[4,5]. Meanwhile, due to the increase of interest on natural extracts, the effects of Centella Asiatica which is the extract of Gotu Kola, well known as the base material of the famous ointment Madecassol were identified and so, now the research on this substance is in progress[6,7].

Therefore in this study, the difference of oral environment improvement effect of the test dentifrice was examined by applying the Centella Asiatica extract on the oral dentifrice composed by above ingredients. And by using the double blind manner the plaque index, gingival index and probing pocket depth were measured and the corresponding changes were set to be verified.

## II. Main subject

### 2.1 Target and Method of the Study

This research was performed from July to September of 2015 and the targets participated after sufficient orientation and explanation on the experiment. The targets were selected from adults of age from 20 to 70 residing in Seoul province who are not taking any medicine and no allergy nor oral diseases through medical and oral examination, in which from total 80 participants, 40 male and 40 female targets were randomized as 40 for comparison group and 40 for experimental

group. The selection and exclusion[8]. criteria of targets are as follows(Table 1).

Table 1. Social-demographic characteries

	Average age	N (%)
Male	37.8	47 (52.2)
Female	32.5	43 (47.8)
Total	35.1	90 (100)

#### [Selection Criteria]

- Favorable overall physical and oral health.
- Targets which their target teeth are natural teeth.
- Targets who may constantly participate in the experiments during the research period.

- Targets who signed on the volunteer consent.

#### [Requisite for Exclusion]

- Person with orthodontic apparatus.
- Person with severe pathological symptom or predisposition within any oral organ.
- Person with 5 or more teeth which require immediate medical treatment.

The toothbrush and paste were controlled to equalize the oral environment of the targets selected by double blind manner. During the period of study the targets were oriented to brush the teeth for 3 times a day and by setting the period for elimination of residual effect as 2 weeks, the oral environment of the targets were equalized in similar levels. At last the study was perform by accepting the prior consent of the targets of the research.

### 2.2 Method of the Study

#### 2.2.1 Plaque Index

For the examination, the targets were oriented to dip the cotton pallet in the disclosing solution and thereby spread it on the target teeth and slightly gargle with water. The plaque index was assessed classifying each tooth according to the average plaque index of Quigley and Hein modified by Turesky et al[9]. Also the target teeth were no.

16, 11, 26, 46, 31, 36 which are total 6 teeth for examination of plaque index.

[ Quigley and Hein's plaque index ]

0 : Water adhesion on plaque.

1 : Dot adhesion on gingival.

2 : Linear adhesion following the gingival form  
( width of 1mm or less )

3 : When plaque is until 1/3 of cervical part.

4 : When plaque is until 2/3 of cervical part.

5 : When plaque is crossing/ surpassing the 2/3 of cervical part.

### 2.2.2 Gingival Index

The degree of gingivitis of the targets were assessed from 0 to 3 points according to the gingivitis evaluation criteria (index) of Loe modified by Talbott et al[10] and the target teeth were no. 16, 11, 26, 46, 31 and 36.

[ Gingival Index ]

0 : No inflammation.

1 : Light gingivitis  
(slight color change and slight edema)

2 : Intermediate gingivitis

3 : Extreme gingivitis

### 2.2.3 Probing Pocket depth

The measurement of probing pocket depth of the targets were performed using the Williams probe method, and the target teeth were selected as no. 21 labial and the no. 46 lingual.

## 2.3 Statistical Analysis

To verify the social and demographic characteristics of the targets, the frequency and average values were calculated and deduced by using the descriptive statistical values. The association analysis of the collected data on plaque index, gingival index and probing pocket depth were post-examined by using the Tukey multiple range test. The level of type 1 error was set as 0.05 to apply as evaluation criteria/standard with statistical

significance, and the statistical analysis was performed using the SPSS statistics package Version 16.0 (SPSS Inc. Chicago, IL, USA).

## III. Result

### 3.1 Change in Plaque Index

The changes in plaque index of the targets after 3 months of use of the experimental dentifrice is as stated in Table 2. In the comparison and experimental group the plaque index decreased by 17.35%, 25.54% each after 3 months control when compared to the initial index. Also there were statistically significant difference between the two groups( $p < 0.05$ ).

Table 2. Change of means of plaque index among groups during 3 months

Group	Base line	Afte1 1M	After 2M	After 3M	$\Delta$ (%)
Control	2.39± 0.93	2.25± 0.76	2.02± 0.80	1.98± 0.69 <sup>b</sup>	0.41 (17.35)
Test	2.35± 0.81	2.11± 0.66	1.96± 0.88	1.75± 0.73 <sup>ab</sup>	0.65 (25.54)

All values are the mean ± standard deviation

\*p-values are determined by one-way ANOVA analysis of among groups.

<sup>a,b</sup>Value with same superscript letter were not statistically significant by Duncan multiple comparison at  $\alpha = 0.05$ .

$\Delta = (\text{baselineM} - \text{TestM}) / \text{baselineM} * 100(\%)$

### 3.2 Change in Gingival Index

The changes in gingival index of the targets after 3 months of use of the experimental dentifrice is as stated in Table 3. In the comparison and experimental group the gingival index decreased by 6.81%, 25.88% each after 3 months of control when compared to the initial index. Also there were statistically significant difference between the two groups( $p < 0.05$ ).

Table 3. Change of means of gingival index among groups during 3 months

Group	Base line	Afte1 1M	After 2M	After 3M	Δ(%)
Control	1.17± 0.31	1.14± 0.32	1.10± 0.34	1.09± 0.31 <sup>b</sup>	0.08 (6.81)
Test	1.31± 0.37	1.28± 0.43	1.15± 0.23	0.97± 0.28 <sup>ab</sup>	0.34 (25.88)

All values are the mean ± standard deviation

\*p-values are determined by one-way ANOVA analysis of among groups.

<sup>ab</sup>Value with same superscript letter were not statistically significant by Duncan multiple comparison at  $\alpha=0.05$ .

$$\Delta = (\text{baselineM} - \text{TestM}) / \text{baselineM} * 100(\%)$$

### 3.3 Change in Probing Pocket Depth

The changes in probing pocket depth of the targets after 3 months of use of the experimental dentifrice is as stated in Table 4. In the comparison and experimental group the probing pocket depth by 5.33%, 16.28% each after 3 months of control when compared to the initial value. Also there were statistically significant difference between the two groups ( $p < 0.05$ ).

Table 4. Change of means of pocket depth index among groups during 3 months

Group	Base line	Afte1 1M	After 2M	After 3M	Δ(%)
Control	2.80± 0.97	2.67± 0.84	2.67± 0.88	2.66± 0.88 <sup>b</sup>	0.34 (5.33)
Test	2.83± 0.91	2.53± 0.82	2.48± 1.22	2.37± 1.05 <sup>a</sup>	0.46 (16.28)

All values are the mean ± standard deviation

\*p-values are determined by one-way ANOVA analysis of among groups.

<sup>ab</sup>Value with same superscript letter were not statistically significant by Duncan multiple comparison at  $\alpha=0.05$ .

$$\Delta = (\text{baselineM} - \text{TestM}) / \text{baselineM} * 100(\%)$$

## IV. consideration

The dentifrice is a detergent supplementarily used to efficiently clean the surface of the teeth during the tooth brushing process. Therefore the basic effects of the dentifrice is the cleaning and polishing of the tooth surface. By these basic effects of the dentifrice the oral health and hygiene is improved and nowadays everyone is experiencing the tooth brushing process at least twice or three times a day, but if the oral health and hygiene may be drastically improved by the tooth brushing in this process, it will prove the usefulness of that dentifrice[11].

Besides these chemical medicaments, nowadays there are performed many active researches on application of vegetal extracts as herbs, grapefruit, green tea on dentifrice, antibacterial effect, deodorant action and improvement of gingivitis[12-14].

In this research the effects which may occur due to the use of dentifrice as allergy, discoloration, burning sensation were also studied, and after three months of study there were no special oral symptoms or adverse reaction verified in the participants who used the dentifrice with Centella Asiatica Compound nor any side effects were verified. The limitation of the study was the regional limitation in selection of targets and therefore the small number of samples to generalize in overall regions. Thus, it is considered that it will be necessary a data collection in different regions for more representative and general comparison, and that the contents of the questionnaire should be supplemented more for concrete and detailed study on the insufficient parts verified throughout this study.

## V. Conclusion

This research consisted in selecting 40 adult male and 40 adultfemale targets for both comparison and experimental group of total 80 persons, and evaluating the difference of oral hygiene improvement effects of the test dentifrice with Centella Asiatica compound by verifying the changes in plaque index, gingival index and probing pocket depth. The collected data was statistically analyzed with SPSS statistics program 16.0 and the results of this research is as follows:

1. In the change in plaque index, in the comparison and experimental group the plaque index decreased by 17.15%, 25.53% each after 3 months control when compared to the initial index. Also there were statistically significant difference between the two groups ( $p < 0.05$ ).

2. In the change in gingival index, in the comparison and experimental group the gingival index decreased by 6.83%, 25.95% each after 3 months of control when compared to the initial index. Also there were statistically significant difference between the two groups ( $p < 0.05$ ).

3. In the change in probing pocket depth, in the comparison and experimental group the probing pocket depth by 5.36%, 16.25% each after 3 months of control when compared to the initial value. Also there were statistically significant difference between the two groups( $p < 0.05$ ).

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