THE EFFECT OF "AWUR" TEA ON THE POPULATION OF STREPTOCOCCUS MUTANS LEVEL IN PLAQUE

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Abstract
The Directorate of Oral Health of The Indonesian Ministry of Health has stated that 90% of population is suffering from dental caries. Dental caries presents a tremendous challenge to the dental profession Streptococcus mutans harbored in the dental plaque is thought to be the main agent to caries prevalence. Objectives: the aim of the study was carried out to investigate the effect of "Awur" tea on the population of Streptococcus mutans levels in plaque. Method: Ten respondents participated as the subjects on the study: as a treatment group. who were examined before and after drinking tea for a period of one month an also as control group who did not drink tea. Plaque samples were collected with sterile excavator as mud as 10 mg and were put in a small tube of 9 ml Na CI 0,9%. taken before and after drinking tea land also taken from subject who did not drink tea. A serial dilution was made, followed by inoculation on TYS208 medium (Schaeken. MJM. van der Hoeven, IS and Franken. HCM, 1986), Data which were obtained from Colony Forming Units of mutans streptococci in plaque grew on the TYS20B medium before and after drinking tea analyzed in a descriptive and "Wilcoxon Matched - pairs Signed ranks" test. Results: showed that there was no significant difference in the average number of Streptococcus mutans colonies in the group who did not drink tea, However, a significant difference was found respectively as a result of before and after drinking tea. Conclusion: Therefore it could be concluded that "Awur" tea is effective in inhibiting the growth of mutans streptococcal level in plaque.

Key words: "Awur"tea-Streptococcus mutans-plaque

INTRODUCTION

The Directorate of Oral Health of the Indonesian Ministry of health has stated that 90 % of population is suffering from dental caries and toothache is the 6th most common diseases in Indonesian society, so this is a challenge for dental profession to decrease the rate of dental caries.
*Streptococcus mutans* are the prime cause of dental caries, they cause the dental caries by forming dental plaque. The ability of *Streptococcus mutans* to form plaque on synthesize extra cellular polysaccharides (dextran) from sucrose might involved this microorganism adherence to hard surface. An epidemiological study about caries activity of *Streptococcus mutans* showed a high caries prevalence in the people of Kelapa Island Indonesia thereby needed anti microbial agent to eradicate *Streptococcus mutans* in plaque and reduce caries risk in population.

Efforts to control dental caries in the community have been done with various methods, i.e. with tooth brushing, gargling with antiseptics and fluoridation in toothpaste.

In the past research showed that black tea can inhibit the growth of *Streptococcus mutans* in plaque when black tea was drunk as much as 2 times daily for one month to prevent the increase of dental caries. Other research said that the extract of green tea and black tea can inhibit the formation of dental plaque.

The extract of tea was known as polyphenolic compound can inhibit *Streptococcus mutans* in vitro.

One of the methods to reduce dental caries prevalence is by inhibiting the growth of *Streptococcus mutans* in plaque with fluoride in leaves of “Awur” tea available in the traditional market and its price is very cheap.

If fluoride in the “Awur” tea can reduce the population level of *Streptococcus mutans* in plaque, that means that we have found a very cheap and acceptable method for Indonesian people to prevent dental caries.

The purpose of this research were to determine the level of Colony Forming Units of *Streptococcus mutans* in dental plaque of groups who drink “Awur” tea and who does not drink “Awur” tea and to determine the fluoride concentration in the leaves of “Awur” tea.

The result of the research can add knowledge that by consuming “Awur” tea, can inhibit the growth of *Streptococcus mutans* colonies in dental plaque so we can anticipate the process of dental caries.

**MATERIAL AND METHODS**

The research was carried out by using experimental laboratory method in human with epidemiological approach. The subjects of the research were dental students of the Faculty of Dentistry Universitas Indonesia.

Ten students conducted two times treatment as a treatment group who drink “Awur” tea and also as a control group who does not drink “Awur” tea. The criteria of the subjects was 3rd year dental students, female and with an average oral hygiene.
Independent variable: One glass of “Awur” ready to be drink which was made with 2 gram of tea in 149 ml of water added 10 gram of sugar. It was given twice a day before going to the lecture at 06.00 am and at 12.00 noon (in campus). The tea was drunk one after hour after preparation after it was not hot.

Control variables: The place of research student, “Awur” tea in traditional market, the custom of drinking in the community of Jakarta, the concentration of tea ready to be drunk, the technique of making tea according to the Wonosari Lawang tea plantation of “Santoon” type BP II.

The implementation of research as follows: The measurement of the concentration of fluoride in the solution of the “Awur” tea 2 gram of tea in 140 ml of water ready to be drunk, added with 10 gram of sugar was done in the chemistry Laboratory of Mathemathic and Natural Sciences Universitas Indonesia.

The procedure to count of the number of Colony Forming Units of Streptococcus mutans in plaque were as follows: sample collection of Streptococcus mutans of the plaque of respondents before being treated, was taken with a sterile excavator from mandibular and maxilliar buccal and occlusal surface of the teeth approximately 10 mg, and then was put into 9 ml sterile physiologic saline. A series of dilution to 10.000 fold was made and then it was streaked on solid culture of TYS20B, incubated at optimal temperature at 37° Celsius degree in anaerobic condition for 3 X 24 hours.

After treatment for one month, sample of plaque was taken with the same method. The Colony Forming Units of Streptococcus mutans grew on solid medium TYS20B after incubation were counted and recorded Statistical analysis was done with Wilcoxon Matched-pairs Signed-ranks test.

RESULTS

This study found that the fluoride concentration in the drinking "Awur" tea was 3.288 ppm. The mean population of Streptococcus mutans Colony Forming Unit before and after drinking "Awur" tea can be seen in table 1. It is shown that the population of Streptococcus mutans were higher in group before the treatment was conducted,

The difference between before and after drinking "Awur" tea of Colony Forming Units of Streptococcus mutans among 10 subjects could be seen in table 1.
Table I. Statistical analysis result of *Streptococcus mutans* Colony Forming Units before and after treatment.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>1979.1000</td>
<td>499.0515</td>
<td>149.9867</td>
</tr>
<tr>
<td>After</td>
<td>1505.2000</td>
<td>499.1154</td>
<td>158.0708</td>
</tr>
</tbody>
</table>

“G” table of critical values of T in the Wilcoxon shows that N = 10 a T of 1 allow us to reject H₀ at alpha = 0.01. Therefore we reject H₀ whereas H₀ is no effect by drinking a glass of “Awur” for tea twice a day for one month in inhibiting the growth of *Streptococcus mutans* in dental plaque. Thus it means that there is an effect by drinking a glass of “Awur” tea twice a day for one month in inhibiting the growth of *Streptococcus mutans* in dental plaque.

Table 2. Statistical analysis result with Wilcoxon Matched-pairs Signed-ranks test. Of *Streptococcus mutans* Colony Forming Units

<table>
<thead>
<tr>
<th>Pair</th>
<th>Before treatment</th>
<th>After treatment</th>
<th>D</th>
<th>Rank of d</th>
<th>Rank with less frequent sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1543</td>
<td>850</td>
<td>693</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1550</td>
<td>877</td>
<td>673</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1570</td>
<td>1078</td>
<td>492</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1706</td>
<td>1011</td>
<td>695</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1690</td>
<td>980</td>
<td>710</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1660</td>
<td>1698</td>
<td>-38</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>2002</td>
<td>1450</td>
<td>552</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>2100</td>
<td>1450</td>
<td>650</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2580</td>
<td>2078</td>
<td>502</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>2756</td>
<td>2241</td>
<td>515</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

T = 1

**DISCUSSION**

The result of research shows that after drinking “Awur” tea for one month there is significant decrease in the number of *Streptococcus mutans* in plaque. Therefore, the hypothesis that "Awur" tea has potency to inhibit the growth of *Streptococcus mutans* in plaque could be accepted.
Previous study has proved that tea contains fluoride with sufficiently high concentration (0.35-5.30 ppm), and black tea could inhibit the growth of *Streptococcus mutans*, by consuming it twice a day for a month. "Awur" tea belongs to black tea and this study showed its fluoride concentration is 3.288 ppm. The crude tea polyphenolic compounds from the leaf of *Camellia senensis* were found to be effectively inhibit the growth of *Streptococcus mutans* in plaque.

It is known that tea leaves containing active components such as fluoride and polyphenolic compounds and the isolated polyphenolic compound in the drinking water resulted significant reductions in caries development and plaque accumulation in the rats infected with *Streptococcus mutans*. Black tea has also other effects such as stimulant effect, antioxidant effect, diuretics, antipyretic, analgesic.

*Streptococcus mutans* is one of the factors that cause dental caries because of its acidogenic and cariogenic property. From this study drinking "Awur" tea might decrease the prevalence of dental caries by inhibiting the growth of *Streptococcus mutans*. "Awur" tea, which is include in black tea group, is selected for research because it is easily be found in traditional market in Jakarta with relative cheap price.

In this research, to consume "Awur" tea, twice a day each 2 gram in 140 ml water plus 10 grams sugar, for a month, can decrease the number of mutans streptococci in plaque. We make the tea by pouring 140 ml boiling water to 2 grams dry tea leaves. These were also done by researchers in Surabaya East Java Indonesia whereas addition of 10 grams sugar is meant to match this research with the habit of tea drinking of Jakarta community.

**CONCLUSION**

"Awur" tea belongs to black tea has been considered as having a potency to inhibit the growth of *Streptococcus mutans* plaque. There is a significant difference in the number of Colony Forming Units of *Streptococcus mutans* before and after drinking tea. This study shows that drinking "Awur" tea was effective in inhibiting the growth of *Streptococcus mutans* in plaque.
References


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