DISCOLORATION OF HEAT CURED ACRYLIC RESIN PLATE DUE TO INFUSION OF TELANG FLOWER TEA (*Clitori ternatea*)

(DISKOLORASI PLAT RESIN AKRILIK HEAT CURED AKIBAT INFUSI THE BUN GA TELANG (Clitori ternatea)

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ABSTRACT

Tooth loss is a common oral health problem that can lead to reduced masticatory function, compromised aesthetics, and impaired speech. Heat-cured acrylic resin is a widely used denture base material due to its favorable aesthetics, ease of manipulation, affordability, and non-toxicity. However, its color stability can be compromised by dietary exposure to pigmented substances such as coffee, tea, and fruit juices. Herbal beverages, including telang flower (Clitoria ternatea) tea, are increasingly consumed in Indonesia. This study aimed to determine the effect of telang flower tea infusion on the color stability of heat-cured acrylic resin over varying immersion durations.This experimental study used a pre-test and post-test control group design. Heat-cured acrylic resin plate samples were immersed in telang flower tea infusion for 1, 3,

5, and 7 days. Color changes were measured using a spectrophotometer at a wavelength of 680 nm. Data were analyzed using one-way ANOVA to assess differences in color change across groups, followed by a post hoc Tukey test. ($P<0.05$). Results revealed significant differences in color changes between the control and treatment groups ($p=0.02$), with the greatest discoloration observed after 7 days of immersion. The degree of color change increased with longer soaking durations, indicating a time-dependent effect of telang flower tea on the acrylic resin surface. Conclusion are telang flower tea infusion significantly affects the color stability of heat-cured acrylic resin. The longer the immersion time, the greater the discoloration observed. These findings suggest that dietary habits involving herbal teas may influence the aesthetic durability of denture materials.

Keywords: color change; heat cured acrylic resin; spectrophotometer; telang flower.

ABSTRAK

Kehilangan gigi merupakan masalah kesehatan mulut yang umum dan dapat menyebabkan penurunan fungsi pengunyahan, terganggunya estetika, serta kesulitan dalam berbicara. Resin akrilik heat cured merupakan bahan dasar gigi tiruan yang banyak digunakan karena memiliki estetika yang baik, mudah dibentuk, terjangkau, dan tidak beracun. Namun, stabilitas warnanya dapat terganggu oleh paparan zat pewarna dari makanan dan minuman seperti kopi, teh, dan jus buah. Minuman herbal, termasuk teh bunga telang (Clitoria ternatea), semakin banyak dikonsumsi di Indonesia. Penelitian ini bertujuan untuk mengetahui pengaruh perendaman dalam infus teh bunga telang terhadap stabilitas warna resin akrilik heat cured pada berbagai lama perendaman. Penelitian eksperimental ini menggunakan desain pre-test dan post-test control group. Sampel berupa lempeng resin akrilik heat cured direndam dalam infus teh bunga telang selama 1, 3, 5, dan 7 hari. Perubahan warna diukur menggunakan spektrofotometer dengan

panjang gelombang 680 nm. Data dianalisis menggunakan uji ANOVA satu arah untuk mengetahui perbedaan perubahan warna antar kelompok, dilanjutkan dengan uji post hoc Tukey (p < 0,05). Hasil penelitian menunjukkan perbedaan signifikan dalam perubahan warna antara kelompok kontrol dan perlakuan (p = 0,02), dengan perubahan warna paling besar terjadi setelah perendaman selama 7 hari. Tingkat perubahan warna meningkat seiring dengan lamanya waktu perendaman, menunjukkan efek yang bergantung pada durasi perendaman infus teh bunga telang pada permukaan resin akrilik. Kesimpulannya, infus teh bunga telang secara signifikan memengaruhi stabilitas warna resin akrilik heat cured. Semakin lama waktu perendaman, semakin besar perubahan warna yang terjadi. Temuan ini menunjukkan bahwa kebiasaan konsumsi teh herbal dapat memengaruhi daya tahan estetika bahan gigi tiruan..

***Kata kunci**: bunga telang; perubahan warna; resin akrilik heat cured; spektrofotometer*

INTRODUCTION

Tooth loss is a condition in which the oral cavity loses one or more teeth. Tooth loss can occur due to caries, trauma, and periodontal disease, leading to a decline in mastication, aesthetics, and articulation function.[1,2,3] The state of tooth loss can interfere with aesthetics and make a person unconfident in their appearance. Aesthetics can be improved by using dentures. Dentures consist of several components, including the base or foundation. According to Basker et al. (1996), the foundation of dentures is divided into three surfaces: occlusal surface, polishing surface, and mold surface. The ideal conditions of a denture prosthesis base material include aesthetics, strength, stiffness, high durability, and good surface hardness.

The materials and types of dental prosthesis bases in Indonesia are diverse, including heat cured acrylic resin. Heat cured acrylic resin material is widely used in Indonesia because it has good aesthetic properties, is easy to manipulate, is relatively cheap, and is non-toxic.[5] Heat cured acrylic resin has a drawback, namely poor color stability. Poor color stability in

heat cured acrylic resin occurs due to two factors, including intrinsic factors and extrinsic factors.[6] Color stability in acrylic resin can occur from the diet and drinking of patients who contain dyes such as fruit juice, chocolate, tea, and coffee.

Research on the effect of long-term soaking of heat cured acrylic resin in telang flower tea drink (*Clitori ternatea*) on color change. Slab-shaped heat cured acrylic resin is used as a sample soaked in telang flower tea infusion for 1 day, 3 days, 5 days, and 7 days. To determine the effect of soaking time of heat cured acrylic resin plate on the infusion of telang *Clitori ternatea* flower tea on color change.

METHOD

Laboratory experimental pre-test and post-test control group design is a research design that measures variables before and after treatment and then compares them with the control group. The design of this study was used to compare the color change of the treatment group of acrylic resin plate samples soaked in the infusion of telang flower tea brew for 1 day, 3 days, 5 days, and 7 days.

RESULT

The results of the study based on data that have been obtained after soaking with telang flower tea infusion for 1 day, 3 days, 5 days, and 7 days are that there is a significant color change on the 7th day, which means that the longer the soaking time will affect the color stability of the heat-cured acrylic resin plate.

Table 1. Results of measurement of color change of *heat cured* acrylic resin plate with spectrophotometer.

Groups/Samples	Mean±SD	p-value
Day 1	5138.67±1.432	
Day 3	4326.83±1.685	0.002*
Day 5	2925.17±1.160	
Day 7	3640.92±1.005	

ANOVA test, *p <0.05 significant

Based on Table 1, the results of measuring acrylic resin with a spectrophotometer on a sample of heat cured acrylic resin plate, the longer the immersion time will affect the color stability of the resin plate on the 7th day has a small light absorption.

Table 2. Specific differences between immersion durations.

Group	1	3	5	7	P value
1		0.725*	0.045*	0.005*	0.05
3	0.725*		0.299	0.052*	
5	0.045*	0.299		0.768*	
7	0.005*	0.052*	0.768*		

Post hoc Tukey (HSD) test, *p <0.05 significant

In Table 2, the *results of the Post hoc Tukey* (HSD) test show that the color change in the acrylic resin group on day 7 has significant color change because the results of *the Post hoc tukey* test have a value of p<0.05, but on day 3 and day 5 there is no significant color change

because of a value of p >0.05.

DISCUSSION

The study's results showed 26 samples of heat-cured acrylic resin plates with a size of 65 x 10 x 2.5 mm. Each sample of the acrylic resin plate is polished and then measured for surface roughness to match the condition of the acrylic resin plate at the time of the oral cavity, and it is standardized. The samples of the acrylic resin plates are heat cured and will be soaked in the infusion of telang flower tea for 1 day, 3 days, 5 days, and 7 days with each group of 6 samples of acrylic resin plates. Wirayuni K.A (2017) conducted a study by soaking a heat-cured acrylic resin plate with a 25% rosella flower, showing a color change in the acrylic resin. The measurement was carried out using a spectrophotometer and to be standardized. Each sample of acrylic resin at the time of measurement was measured using a spectrophotometer with an absorption wavelength of 680 nm to show a response to whether there was a significant color change. The spectrophotometer used is 380-780 nm. The p-value or significance obtained in the statistical test results showed a significant color change in the heat cured acrylic resin on the 7th day after soaking with telang flower tea infusion. There was a color change on the 1st, 3rd, and 5th days, but it was not significant. It follows the research of H Fauziyyah (2018), who stated that the research results showed a difference in color change in acrylic resin.[29]

CONCLUSION

The conclusion of the research results of significant color change is found on day 7. The longer the soaking time will affect the color stability of the heat-cured acrylic resin plate. These findings suggest that dietary habits involving herbal teas may influence the aesthetic durability of denture materials.

CONFLICT OF INTEREST

There is no conflict of interest in the writing of this article.

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