

INTISARI

Basis gigi tiruan *thermoplastic nylon* cenderung mudah berubah warna karena memiliki ikatan amida yang mudah menyerap air. Partikel nano *titanium dioxide* (TiO₂) telah digunakan sebagai bahan *coating* basis gigi tiruan untuk meningkatkan kekuatan mekanisnya. Minuman kopi mengandung asam klorogenat dan asam tanik yang dapat merubah warna basis gigi tiruan. Tujuan penelitian ini adalah mengkaji pengaruh partikel nano *titanium dioxide* (TiO₂) *coating* dan lama perendaman kopi terhadap perubahan warna basis gigi tiruan *thermoplastic nylon*.

Sampel terdiri dari 24 plat *thermoplastic nylon* berbentuk persegi (30 x 30 x 2 mm), dibagi menjadi 4 kelompok (n=6) yaitu kelompok kontrol (tanpa TiO₂ *coating*) dan perlakuan (dengan TiO₂ *coating*) yang direndam dalam larutan kopi robusta selama 15 dan 30 hari. Uji perubahan warna dengan spektrofotometer dengan mengukur selisih rerata nilai absorbansi cahaya sebelum dan sesudah perendaman larutan kopi. Analisa statistik dengan ANAVA dua jalur dilanjutkan uji *post hoc* LSD ($\alpha = 0,05$).

Hasil penelitian menunjukkan selisih nilai rerata absorbansi cahaya sebelum dan sesudah perendaman kopi paling rendah pada kelompok perlakuan 15 hari ($0,011 \pm 0,005$) dan paling tinggi pada kelompok kontrol 30 hari ($0,077 \pm 0,027$). Uji ANAVA dua jalur menunjukkan partikel nano TiO₂ *coating* dan lama perendaman kopi berpengaruh terhadap perubahan warna *thermoplastic nylon* ($p < 0,05$). Uji *post hoc* LSD menunjukkan terdapat perbedaan bermakna antara kelompok kontrol dan perlakuan pada perendaman kopi 15 dan 30 hari ($p < 0,05$). Kesimpulan penelitian ini adalah partikel nano *titanium dioxide* (TiO₂) *coating* dapat mengurangi perubahan warna *thermoplastic nylon* akibat perendaman larutan kopi. Tidak ada perbedaan pengaruh lama perendaman larutan kopi selama 15 dan 30 hari terhadap perubahan warna kelompok kontrol dan tidak ada pengaruhnya juga pada kelompok perlakuan.

Kata kunci: *titanium dioxide coating*, *thermoplastic nylon*, perendaman kopi, spektrofotometer, perubahan warna

ABSTRACT

The thermoplastic nylon denture base material is prone to be discolored because its amide bonds absorb water easily. Titanium dioxide (TiO₂) nanoparticles have been used as a denture base coating material to increase its mechanical strength. Coffee contains chlorogenic and tannic acid which can change the color of denture bases. The purpose of this study was to examine the effect of titanium dioxide (TiO₂) nanoparticles coating and the duration of coffee immersion on the discoloration of thermoplastic nylon denture base.

Samples consisted of 24 thermoplastic nylon in square-shaped (30 x 30 x 2 mm) were divided into 4 groups (n = 6). They were control (without TiO₂ coating) and treatment (with TiO₂ coating) groups, then immersed in coffee solution for 15 and 30 days. Discoloration test using spectrophotometer by measuring the delta absorbance of light before and after coffee immersion. Statistical analysis was performed with two-way ANOVA and the post hoc LSD test ($\alpha = 0.05$).

The results showed the lowest delta absorbance of light before and after coffee immersion was in the 15-day treatment group (0.011 ± 0.005) and the highest was in the 30-day control group (0.077 ± 0.027). Two-way ANOVA test showed TiO₂ nanoparticles and the duration of coffee immersion had an effect on discoloration of thermoplastic nylon ($p < 0.05$). Post hoc LSD test showed there were significant differences between the control and treatment group at 15 and 30 days of coffee immersion ($p < 0.05$). The conclusion of this study was titanium dioxide (TiO₂) nanoparticles coating can reduce discoloration of thermoplastic nylon due to coffee immersion. There was no significant difference between the duration of coffee immersion on discoloration of thermoplastic nylon.

Keywords: titanium dioxide coating, thermoplastic nylon, coffee immersion, spectrophotometer, discoloration