

ABSTRAK

Resin akrilik (polimetil metakrilat) adalah bahan yang sering dipakai pada pembuatan basis gigi tiruan. Penambahan bahan antara lain titanium dioksida (TiO_2) untuk meningkatkan sifat mekanik juga dapat dilakukan pada resin akrilik *self-cured*. Penelitian ini bertujuan untuk menilai pengaruh penambahan titanium dioksida terhadap kekerasan basis gigi tiruan resin akrilik *self-cured*. Jenis penelitian ini adalah penelitian kuantitatif dengan *design true experimental in vitro* dengan rancangan penelitian *posttest only with control group design*. Penelitian dilakukan di Laboratorium Bahan Teknik, Departemen Teknik Mesin Sekolah Vokasi, Universitas Gadjah Mada, pada bulan Maret 2021. Penambahan titanium dioksida dihitung berdasarkan berat, yaitu 1%, 3%, maupun 5% berat filler dibandingkan dengan berat total. Kekerasan resin akrilik *self-cured* diukur dengan menggunakan Vickers Hardness Tester. Tiap kelompok terdiri dari 6 sampel, dengan total sebanyak 24 sampel. Rerata paling tinggi yaitu pada kelompok dengan penambahan TiO_2 3% ($15,377 \pm 0,455$ HVN), sedangkan paling rendah yaitu pada kelompok dengan penambahan TiO_2 5% ($11,39 \pm 0,163$ HVN). Hasil uji ANOVA menunjukkan nilai $p < 0,001$ yang menunjukkan bahwa terdapat perbedaan bermakna setidaknya pada salah satu kelompok dibandingkan kelompok lainnya. Uji *post hoc Bonferroni* menunjukkan bahwa seluruh kelompok TiO_2 1%, TiO_2 3%, dan TiO_2 5% menunjukkan perbedaan bermakna secara statistik ($p < 0,001$) terhadap kelompok kontrol, namun peningkatan kekerasan dapat diamati hanya pada penambahan TiO_2 3%. *Filler* titanium dioksida berpengaruh terhadap kekerasan resin akrilik *self-cured*. Penambahan TiO_2 3% dapat meningkatkan kekerasan resin akrilik *self-cured*, dan peningkatannya bermakna secara statistik. Penambahan TiO_2 1% atau 5% akan menurunkan kekerasan resin akrilik *self-cured*.

Kata kunci: resin akrilik, titanium dioksida

ABSTRACT

Acrylic resin (polymethyl methacrylate) is a material that is often used in the manufacture of denture bases. The addition of materials such as titanium dioxide (TiO₂) to improve mechanical properties can also be done on self-cured acrylic resin. This study aimed to assess the effect of adding titanium dioxide to the hardness of the self-cured acrylic resin denture base. The type of this research is quantitative research with true experimental in vitro design with posttest only with control group design. The study was conducted at the Engineering Materials Laboratory, Department of Mechanical Engineering, Vocational School, Gadjah Mada University, in March 2021. The addition of titanium dioxide was calculated by weight, namely 1%, 3%, or 5% by weight of the filler compared to the total weight. The hardness of the self-cured acrylic resin was measured using a Vickers Hardness Tester. Each group consisted of 6 samples, with a total of 24 samples. The highest average was in the group with 3% TiO₂ addition (15.377±0.455 HVN), while the lowest was in the group with 5% TiO₂ addition (11.39±0.163 HVN). The results of the ANOVA test showed a p value <0.001 which indicated that there was a significant difference in at least one group compared to the other group. Bonferroni's post hoc test showed that all groups of 1% TiO₂, 3% TiO₂, and 5% TiO₂ showed statistically significant differences (p<0.001) compared to the control group, but an increase in hardness could be observed only with the addition of 3% TiO₂. Titanium dioxide filler affects the hardness of self-cured acrylic resin. The addition of 3% TiO₂ can increase the hardness of self-cured acrylic resin, and the increase is statistically significant. The addition of 1% or 5% TiO₂ will reduce the hardness of the self-cured acrylic resin.

Keywords: acrylic resin, titanium dioxide

