INTISARI

Hidroksiapatit merupakan senyawa biokompatibel yang berpotensi meningkatkan sifat mekanis bahan kedokteran gigi. Nano-hidroksiapatit (nHAp) dapat disintesis dari limbah biogenik seperti cangkang kerang abalon (*Haliotis squamata*). Penelitian ini bertujuan untuk mengkaji pengaruh penambahan nano-hidroksiapatit dari cangkang kerang abalon (*Haliotis squamata*) terhadap daya serap air dan kekuatan transversal basis gigi tiruan resin akrilik polimerisasi panas.

Penelitian ini merupakan penelitian eksperimental dengan nHAp yang disintesis menggunakan metode presipitasi. Konsentrasi nHAp yang diuji adalah 2,5%, 5%, dan 10% yang ditambahkan ke dalam resin akrilik polimerisasi panas. Karakterisasi nHAp dan interaksinya dengan matriks akrilik dilakukan menggunakan *scanning electron microscopy* (SEM), *fourier transform infrared spectroscopy* (FTIR), x-*ray diffraction* (XRD), dan *particle size analysis* (PSA). Pengujian daya serap air dan kekuatan transversal dilakukan untuk mengevaluasi sifat fisik dan mekanis sampel.

Hasil penelitian menunjukkan bahwa laju daya serap air terendah pada kelompok akrilik dengan penambahan nHAp 5% dan tertinggi pada kelompok dengan penambahan nHAp 10%. Konsentrasi nHAp sebesar 2,5% dan 5% secara signifikan meningkatkan kekuatan transversal, namun konsentrasi nHAp yang lebih tinggi, yaitu 10%, secara signifikan menurunkan kekuatan transversal. Hasil uji ANAVA satu jalur dan uji *post hoc* LSD menunjukan adanya perbedaan yang signifikan antarkelompok ($p<0,05$), baik pada uji daya serap air dan uji kekuatan transversal. Kesimpulan penelitian ini adalah penambahan 5% nano-hidroksiapatit cangkang kerang abalon (*H. squamata*) pada basis gigi tiruan resin akrilik polimerisasi panas terbukti dapat menurunkan laju daya serap air serta meningkatkan kekuatan transversal.

Kata Kunci: Cangkang kerang abalon (*Haliotis squamata*), nano-hidroksiapatit, resin akrilik polimerisasi panas, daya serap air, kekuatan transversal.

ABSTRACT

Hydroxyapatite is a biocompatible compound with the potential to enhance the mechanical properties of dental materials. Nano-hydroxyapatite (nHAp) can be synthesized from biogenic waste such as abalone shells (*Haliotis squamata*). This study aimed to investigate the effect of adding nano-hydroxyapatite derived from abalone shells (*Haliotis squamata*) on the water absorption and transverse strength of heat-polymerized acrylic denture base resin.

This experimental study synthesized nHAp using the precipitation method. The tested nHAp concentrations were 2.5%, 5%, and 10%, which were incorporated into heat-polymerized acrylic resin. Characterization of nHAp and its interaction with the acrylic matrix was performed using Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FTIR), X-Ray Diffraction (XRD), and Particle Size Analysis (PSA). Water absorption and transverse strength tests were conducted to evaluate the physical and mechanical properties of the samples.

The results showed that the lowest water sorption rate occurred in the acrylic group supplemented with 5% nHAp, whereas the highest water sorption rate was observed in the group supplemented with 10% nHAp. The addition of nHAp at concentrations of 2.5% and 5% significantly increased transverse strength; however, a higher nHAp concentration of 10% significantly decreased transverse strength. One-way ANOVA and LSD post hoc tests revealed statistically significant differences among groups ($p < 0.05$) for both water sorption and transverse strength. In conclusion, incorporating 5% nano-hydroxyapatite derived from abalone shells (*Haliotis squamata*) resulted in reduction in water sorption and improvement in transverse strength.

Keywords: Abalone shells (*Haliotis squamata*), nano-hydroxyapatite, heat-polymerized acrylic resin, water absorption, transverse strength.