

ABSTRAK

**PENGARUH PENAMBAHAN VARIASI KONSENTRASI NANOSELULOSA  
KULIT DURIAN (*Durio zibethinus* Murr) TERHADAP KEKUATAN  
FLEKSURAL PLAT ORTODONTI RESIN AKRILIK *SELF-CURE*  
METODE *SPRAY-ON*  
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**Latar Belakang.** Peranti ortodonti lepasan berfungsi untuk memperbaiki susunan dan kedudukan gigi-geligi, sehingga didapatkan perbaikan pengunyahan, keseimbangan otot dan keserasian estetika wajah yang harmonis. Peranti ortodonti lepasan memiliki beberapa komponen penting, salah satunya yaitu basis akrilik yang saat ini telah banyak dimodifikasi dengan serat alam seperti nanoselulosa kulit durian untuk meningkatkan kekuatan fleksuralnya. **Tujuan.** Mengetahui pengaruh penambahan variasi konsentrasi nanoselulosa kulit durian terhadap kekuatan fleksural plat ortodonti resin akrilik *self-cure* metode *spray-on*. **Metode.** Jenis penelitian yang dilakukan yaitu penelitian eksperimental laboratoris dengan rancangan penelitian berupa *post test only control group design*. Penelitian ini menggunakan tiga macam uji, yaitu *Transmission Electron Microscope* (TEM), kekuatan fleksural, dan *Scanning Electron Microscope* (SEM). Jumlah sampel yang digunakan penelitian berjumlah 40 sampel yang terdiri dari 5 kelompok masing-masing terdiri dari 8 sampel meliputi kelompok resin akrilik *self-cure* dengan penambahan nanoselulosa kulit durian 2%, 3%, 4%, 5% serta kelompok tanpa penambahan nanoselulosa kulit durian. Data diuji dengan *One-way ANOVA* dilanjutkan uji *Post-Hoc LSD*. **Hasil.** Hasil uji TEM menunjukkan nanoselulosa yang dihasilkan berbentuk *whiskers* dengan diameter 7-20 nm dan panjang 275-475 nm. Hasil uji rerata kekuatan fleksural tertinggi terdapat pada kelompok 2 yaitu 80,72 MPa. Konsentrasi optimal nanoselulosa kulit durian untuk meningkatkan kekuatan fleksural yaitu sebanyak 2%. Hasil uji statistik menunjukkan terdapat perbedaan sangat bermakna ( $p \leq 0,01$ ) antara kelompok perlakuan dengan kelompok kontrol dan antar kelompok perlakuan. Hasil uji SEM menunjukkan masih terdapat porus dan aglomerasi. **Simpulan.** Terdapat pengaruh penambahan variasi konsentrasi nanoselulosa kulit durian terhadap kekuatan fleksural pada plat ortodonti resin akrilik *self-cure* dengan metode *spray-on*.

**Kata kunci** : Peranti Ortodonti Lepasn ; Nanoselulosa ; Kulit Durian ; Resin Akrilik *Self-cure* ; Kekuatan Fleksural

ABSTRACT

**THE EFFECT OF ADDING VARIATIONS IN THE CONCENTRATION OF  
DURIAN RIND (*Durio zibethinus Murr*) NANOCELLULOSE ON THE  
FLEXURAL STRENGTH OF THE SELF-CURE ACRYLIC RESIN  
ORTODONTIC PLATE WITH SPRAY-ON METHOD**

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**Background.** Removable orthodontic appliance functions to correct the teeth' arrangement and position to obtain improved mastication, muscle balance, and harmonious facial aesthetic harmony. A removable orthodontic appliance has several essential components, one of them is the acrylic base, which recently has been heavily modified with natural fibers, namely durian rind nano cellulose, to enhance its flexural strength. **Purposes.** To determine the effect of adding nano cellulose durian rind on the flexural strength of the spray-on method of self-cure acrylic resin orthodontic base plate. **Method.** This type of research is an experimental laboratory study with a research design in the form of a post-test only control group design. This study used three kinds of tests, TEM, flexural strength, and SEM. The number of samples used in the study amounted to 40 samples consisted of 5 groups each consisting of 8 samples, including the self-cure acrylic resin group with 2%, 3%, 4%, 5% durian rind nano cellulose and without the addition of durian rind nano cellulose. One sample from each group was tested with SEM. Data analyzed by ANOVA followed by LSD test. **Results.** The TEM test results showed that the resulted nano cellulose was whiskers with a diameter of 7-20 nm and lengths of 275-475 nm. The highest results of the flexural strength average were 80.72 MPa. The optimal concentration of durian rind nano cellulose to increase flexural strength is 2%. The results of statistical tests showed that there were very significant differences ( $p \leq 0,01$ ) between the treatment groups and the control groups and between the treatment groups. SEM was showing porous and agglomeration. **Conclusions.** There is an effect of adding durian rind nano cellulose on the self-cure acrylic resin orthodontic base plate's flexural strength using the spray-on method.

**Keywords :** Removable Appliance; Nanocellulose ; Durian Rind ;  
Self-cure Acrylic Resin ; Flexural Strength