ABSTRAK

PENGARUH PENAMBAHAN NANOSELULOSA SERAT KULIT DURIAN (*Durio zibethinus* Murr.) TERHADAP KEKUATAN IMPAK PLAT ORTODONTI RESIN AKRILIK *SELF-CURE* METODE *SPRAY-ON*

Diva Sascha Pranancita

Plat ortodonti merupakan salah satu komponen pada peranti ortodonti lepasan yang umumnya terbuat dari bahan berupa resin akrilik *self-cure* yang dimanipulasi menggunakan metode *spray-on.* Resin akrilik *self-cure* mudah fraktur selama penggunaannya sehingga dibutuhkan bahan penguat untuk meningkatkan kekuatan impaknya yaitu nanoselulosa serat kulit durian (*Durio zibethinus* Murr.). Tujuan penelitian ini adalah mengetahui pengaruh penambahan nanoselulosa serat kulit durian (*Durio zibethinus* Murr.) terhadap kekuatan impak resin akrilik *self-cure* metode *spray-on.* Jenis penelitian ini merupakan penelitian eksperimental laboratoris dengan rancangan penelitian *post-test only control group design.* Nanoselulosa serat kulit durian disintesis dengan metode hidrolisis asam, kemudian dilakukan uji karakterisasi TEM dan SEM. Empat puluh lima sampel terbagi ke dalam lima kelompok yaitu resin akrilik *self-cure* dengan penambahan nanoselulosa 0,25%, 0,5%, 0,75%, 1%, dan resin akrilik *self-cure* tanpa penambahan nanoselulosa. Data yang diperoleh diuji secara statistik dengan *One-Way ANOVA* dan dilanjutkan dengan uji *Post-Hoc* LSD. Hasil uji TEM menunjukkan nanoselulosa serat kulit durian yang dihasilkan berbentuk *whisker* dengan panjang 179-495 nm dan lebar 10-20 nm. Hasil uji statistik menunjukkan adanya perbedaan yang bermakna ($p<0,05$) antara kelompok perlakuan dengan kelompok kontrol, namun tidak terdapat perbedaan yang signifikan antara kelompok penambahan nanoselulosa 0,75% dengan kelompok penambahan nanoselulosa 1%. Konsentrasi optimal untuk meningkatkan kekuatan impak resin akrilik *self-cure* terdapat pada kelompok penambahan nanoselulosa 0,75%. Hasil uji SEM pada penelitian ini masih menunjukkan adanya porus dan aglomerasi. Simpulan dari penelitian ini adalah terdapat pengaruh penambahan nanoselulosa serat kulit durian (*Durio zibethinus* Murr.) terhadap kekuatan impak resin akrilik *self-cure* metode *spray-on.*

Kata kunci: Kekuatan impak, kulit durian, nanoselulosa, plat ortodonti, resin akrilik *self-cure*

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ABSTRACT

EFFECT OF DURIAN RIND (Durio zibethinus Murr.) *NANOCELLULOSE ADDITION ON THE IMPACT STRENGTH OF SELF-CURE ACRYLIC RESIN ORTHODONTIC BASE PLATE WITH SPRAY-ON METHOD*

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Orthodontic base plate is one of the main component of removable orthodontic appliances, which usually made from self-cure acrylic resin which is manipulated using the spray-on method. Self-cure acrylic resin is easy to fracture during use, therefore a reinforcing material needs to be added to improve its impact strength, such as durian rind nanocellulose. The purpose of this study was to determine the effect of the addition of durian rind (Durio zibethinus Murr.*) nanocellulose on the impact strength of self-cure acrylic resin orthodontic base plate with spray-on method. This type of research was a laboratory experiment with a research design in the form of a post-test only control group design. Durian rind nanocellulose was synthesized by acid hydrolysis method and characterized by TEM and SEM test. Forty-five samples consisted of five groups, namely self-cure acrylic resin which added with 0.25%, 0.5%, 0.75%, 1% nanocellulose, and self-cure acrylic resin without the addition of nanocellulose. Data analysed by One-Way ANOVA test followed by the Post-Hoc LSD test. The TEM test result in this study showed that the durian rind nanocellulose produced was in the form of a whisker with a length of 179-495 nm and a width of 10-20 nm. The statistical test result showed a significant difference ($p<0.05$) between the control group and the treatment group, but there was no significant difference between the 0.75% nanocellulose addition group and the 1% nanocellulose addition group. The optimal concentration to increase the impact strength of self-cure acrylic resin was found in the 0.75% nanocellulose addition group. The SEM test result in this study showed porous and agglomeration. The conclusion of this study was that there was an effect of the durian rind nanocellulose addition on the impact strength of self-cure acrylic resin orthodontic base plate with spray-on method.*

***Keywords**: Durian rind, impact strength, nanocellulose, orthodontic base plate, self-cure acrylic resin*

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