

**PENGARUH PENAMBAHAN BERBAGAI KONSENTRASI
NANOFIBER SISAL PADA SILER RESIN EPOKSI
TERHADAP KERAPATAN APIKAL BAHAN
OBTURASI SALURAN AKAR**

INTISARI

Siler resin epoksi memiliki kekurangan yaitu *polymerization shrinkage*, oleh karena itu sampai saat ini masih terus dikembangkan siler yang ideal. Salah satu upaya yang dilakukan adalah penambahan *filler* berukuran nanometer. Serat sisal (*Agave sisalana*) adalah *filler* serat alam yang sedang dikembangkan. Tujuan penelitian ini adalah untuk mengetahui pengaruh penambahan *nanofiber* sisal berbagai konsentrasi pada siler resin epoksi terhadap kerapatan apikal bahan obturasi saluran akar.

Dua puluh lima sampel berupa gigi premolar dipreparasi menggunakan *rotary file* sampai #30/0.09. Saluran akar diirigasi dengan NaOCl 2,5%, EDTA 17% dan saline. Semua sampel gigi dibagi menjadi lima kelompok secara acak (n=5). Kelompok I-IV diobturasi menggunakan guta perca dan siler resin epoksi dengan kandungan *nanofiber* sisal, yaitu 0,25%, 0,5%, 0,75%, dan 1%. Kelompok V diobturasi menggunakan guta perca dan siler resin epoksi sebagai kontrol. Semua sampel diinkubasi selama 7 hari pada suhu 37°C. Sampel diuji dengan metode *centrifuging dye penetration* menggunakan larutan metilen biru 2%. Sampel dibelah secara longitudinal, diamati dibawah stereomikroskop (perbesaran 8x) dan diukur dalam satuan milimeter (mm). Data yang diperoleh dianalisis menggunakan uji ANAVA satu jalur dan LSD dengan tingkat signifikansi 95%.

Hasil analisis ANAVA satu jalur menunjukkan terdapat perbedaan signifikan secara statistik ($p < 0,005$). Kesimpulan penelitian ini adalah terdapat pengaruh penambahan *nanofiber* sisal berbagai konsentrasi terhadap kerapatan apikal bahan obturasi saluran akar. Kerapatan apikal yang tertinggi terdapat pada kelompok siler nanosisal 0,75% diikuti dengan kelompok siler nanosisal 0,5%. Kelompok siler nanosisal 0,25% dan 1% memiliki kerapatan apikal yang sama dengan kelompok resin epoksi (kontrol) dan kerapatan apikal yang lebih rendah dibandingkan dengan kelompok siler nanosisal 0,5% dan 0,75%.

Kata kunci: kerapatan apikal, *nanofiber* sisal, siler resin epoksi

APICAL SEALING ABILITY OF EPOXY RESIN-BASED SEALER WITH DIFFERENT SISAL FIBER NANOPARTICLES CONCENTRATIONS

ABSTRACT

Epoxy resin-based sealer has shortage due to its polymerization shrinkage, therefore ideal sealer is still being developed. Addition of nanometer-sized filler is one kind of way to overcome it. Sisal fibre (*Agave sisalana*) is one of the natural fibers that are being developed as a promising filler in composite. The aim of this study was to determine the apical sealing ability of the epoxy resin-based sealer with different sisal fiber nanoparticles concentrations.

Twenty five mandibular premolars were used in this study. The root canals were prepared using rotary files up to #30/0.09. The canal was irrigated with 2.5% NaOCl and 17% EDTA, then was rinsed with saline. All teeth were randomly divided into 5 groups (n=5). Group I-IV was obturated with gutta-percha and epoxy resin-based sealer that was incorporated with sisal fiber nanoparticles, 0,25%, 0,5%, 0,75% and 1% respectively. Group V was obturated with gutta-percha and epoxy resin sealer as a control,. All samples were stored in an incubator for 7 days at 37 °C. Samples were tested with centrifuging dye penetration method with methylene blue 2% solution. The samples were longitudinally sectioned, observed under stereomicroscope (8x magnification) and measured in millimeters (mm). The data were analyzed using one-way Anova and LSD test (95% significance level).

The results of one-way Anova showed there was statistically significant difference ($p < 0,005$). The conclusion of this study was there's an effect of various concentrations of sisal fiber nanoparticles on apical sealability of the root canal obturation material. The highest apical sealability was found in the 0,75% nanosisal sealer group followed by the 0,5% nanosisal sealer group. Apical sealability of 0,25% and 1% nanosisal sealer had the same value as the epoxy resin sealer group and these three groups had lower value compared to the 0,5% and 0,75% nanosisal sealer group.

Keywords: apical sealing ability, sisal fiber nanoparticles, epoxy resin-based sealer