

INTISARI

Perawatan terhadap penyakit periodontal seperti penggunaan nanofiber sebagai *guided tissue regeneration* (GTR) digunakan dalam regenerasi jaringan. Nanofiber sebagai GTR mampu membantu penghantaran bahan terapeutik seperti *Platelet Derived Growth Factor-AB* (PDGF-AB) yang terkandung di dalam *platelet-rich plasma*. Pembuatan nanofiber dengan mencampurkan *platelet-rich plasma* (PRP), kitosan, dan *polyvinyl alcohol* mampu mengendalikan pelepasan PDGF-AB sehingga meningkatkan efek terapeutik. Penelitian ini bertujuan untuk menguji ikatan antara PDGF-AB dengan nanofiber PRP-Kitosan-PVA dan pengaruhnya terhadap kadar pelepasan *growth factor* tersebut.

Pada penelitian ini digunakan nanofiber PRP-Kitosan-PVA dengan diameter 5 mm untuk dilakukan uji FTIR dan ELISA. Uji FTIR digunakan untuk menentukan jenis ikatan atau interaksi yang terjadi antar bahan. Dilakukan uji konfirmasi menggunakan metode ELISA untuk menilai pelepasan PDGF-AB dalam lima waktu pengamatan yaitu 15 menit, 60 menit, 1 hari, 3 hari, dan 10 hari. Data uji FTIR dianalisis secara kualitatif dengan membandingkan spektra FTIR dengan referensi spektra setiap bahan, sedangkan dilakukan uji korelasi *Spearman* untuk metode ELISA.

Hasil uji FTIR menunjukkan tidak terjadinya ikatan kimia dikarenakan tidak terbentuknya gugus fungsi baru antara PRP dengan bahan penyusun nanofiber yaitu kitosan dan PVA sehingga disimpulkan bahwa hanya terjadi ikatan fisika. Perhitungan uji korelasi antara waktu pengamatan dengan kadar pelepasan PDGF-AB menunjukkan korelasi yang signifikan ($p < 0,05$) serta nilai $r = 0,950$ yang berarti kekuatan korelasi antara waktu pengamatan dengan kadar pelepasan yang dihasilkan sangat kuat. Kesimpulan dari penelitian ini adalah pencampuran bahan nanofiber PRP, kitosan, dan PVA tidak menghasilkan ikatan kimia melainkan berupa ikatan fisika serta terdapat korelasi antara waktu pengamatan dengan peningkatan kadar pelepasan PDGF-AB.

Kata kunci: nanofiber, *platelet derived growth factor-AB*, *platelet-rich plasma*, ikatan kimia, kadar PDGF-AB

ABSTRACT

Treatments against periodontal diseases such as the use of nanofibers as *guided tissue regeneration* (GTR) are used in tissue regeneration. Nanofiber as GTR is able to assist the delivery of therapeutic ingredients such as *Platelet Derived Growth Factor-AB* (PDGF-AB) which is contained in *platelet-rich plasma*. The preparation of nanofiber by mixing *platelet-rich plasma* (PRP), chitosan, and *polyvinyl alcohol* is able to control the release of PDGF-AB, thereby increasing the therapeutic effect. This study aims to examine the bond between PDGF-AB and PRP-Chitosan-PVA nanofiber and its effect on the level of release *growth factor*.

In this study, PRP-Chitosan-PVA nanofiber with a diameter of 5 mm was used for FTIR and ELISA tests. The FTIR test is used to determine the types of bonds or interactions that occur between materials. Then, a confirmation test was carried out using the ELISA method to assess the release of PDGF-AB in five observation times, namely 15 minutes, 60 minutes, 1 day, 3 days, and 10 days. The FTIR test data were analyzed qualitatively by comparing the FTIR spectra with the reference spectra of each material, while the correlation test was carried out by Spearman test for the ELISA method.

The FTIR test results showed that there was no chemical bonding due to the absence of a new functional group between PRP and the building blocks of the nanofiber, namely chitosan and PVA, so it was concluded that only physical bonds occurred. The calculation of the correlation test between the time of observation and the release level of PDGF-AB showed a significant correlation ($p < 0.05$) and the value of $r = 0.950$, which means that the strength of the correlation between the time of observation and the resulting release level was very strong. The conclusion of this study is that mixing PRP, chitosan, and PVA nanofiber materials does not produce chemical bonds but in the form of physical bonds and there is a correlation between the time of observation and the increase in the level of PDGF-AB release.

Keywords: nanofiber, *platelet derived growth factor-AB*, *platelet-rich plasma*, chemical bonding, levels of PDGF-AB