Fabrikasi multimaterial scaffold untuk aplikasi rekayasa tulang = Fabrication of multimaterial scaffold fo tissue engineering application

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Abstrak

[ABSTRAK
Penelitian ini membahas tentang mechanical properties dari multimaterial berupa bahan polimer dan hydrogel dalam pembuatan konstruksi multiple layer dengan tujuan untuk mendapatkan sifat dan struktur mekanikal yang kuat sebagai scaffold dalam aplikasi rekayasa jaringan lunak. Material yang digunakan dalam penelitian ini adalah PLA (poly lactic acid) sebagai bahan polymer dan gelatin sebagai hydrogel dengan tambahan starch komersil sebagai penguat gelatin. Terdapat dua metode dalam pembuatan scaffold yaitu casting untuk fabrikasi scaffold PLA dan gelatin, hybrid bioprinting untuk fabrikasi scaffold gelatin dan starch. Variasi pengujian dilakukan dengan memberikan perbedaan volume gelatin terhadap PLA dan perbedaan konsentrasi starch dalam campuran gelatin. Hal ini bertujuan untuk membandingkan mechanical properties scaffold yang dibentuk oleh PLA dan gelatin pada volume berbeda dan mechanical properties scaffold dari gelatin dan konsentrasi starch berbeda. Dari pengukuran dan pengujian mechanical properties berupa uji tekan (compressive test) akan didapatkan bentuk struktur yang cocok dan sifat mekanik dari sistem multimaterial scaffold. Untuk fabrikasi scaffold didapatkan nilai young modulus, E= 5.8 MPa pada scaffold campuran gelatin dan starch.
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ASBTRACT
This study discusses about mechanical properties of multimaterial scaffold which is constructed by polymer and hydrogel to get good mechanical properties and structure scaffold for soft tissue engineering application. The materials for this study are PLA (poly lactid acid) as polymer and gelatin as hydrogel with commercial starch. There are two methods to fabricate scaffold, they are casting for PLA and gelatin scaffold fabrication and hybrid bioprinting for gelatin and starch scaffold fabrication. Variation testing is done by giving difference volume between PLA and gelatin, and difference consentration of starch. From the measurement and mechanical properties test by compressive test will be obtained suitable structure and mechanical properties for multimaterial scaffold. The lowest yopung moduslus is E=5.8 MPa which fabricated by gelatin and starch.;This study discusses about mechanical properties of multimaterial scaffold
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