

# Scaffold komposit karbonat apatit/kitosan/alginate dengan ekstrak mangostin: sintesis, karakterisasi dan viabilitas sel = Scaffold composite of carbonate apatite alginate chitosan with mangosteen extract shynthesis characterize and cythotoxicity

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## Abstrak

### [<b>ABSTRAK</b><br>

Ekstrak mangostin sebagai biomaterial baru yang ditambahkan pada scaffold karbonat apatit / alginate / kitosan diharapkan dapat membunuh sisa sel kanker pada tulang setelah dilakukan tindakan pembedahan. Semua material yang akan digunakan pada tubuh harus memenuhi syarat untuk dapat diterima jaringan dan tidak menimbulkan reaksi toksik pada tubuh. Tujuan penelitian ini untuk memperoleh informasi mengenai viabilitas sel terhadap scaffold komposit karbonat apatit / alginate / kitosan dengan ekstrak mangostin. Scaffold dibuat dari bahan serbuk karbonat apatit / alginate / kitosan dengan ekstrak mangostin menggunakan metode freeze drying. Karakterisasi dilakukan dengan XRD, FTIR, SEM dan dilanjutkan dengan viabilitas sel menggunakan MTT assay pada konsentrasi 10%, 7.5%, 5%, 2.5%, 1% atau 0.5%. Hasil penelitian diperoleh porositas scaffold komposit karbonat apatit / alginate / kitosan dengan ekstrak mangostin berkisar 50 ? 300 m. Diperoleh viabilitas tertinggi dari scaffold komposit karbonat apatit / alginate / kitosan dengan ekstrak mangostin pada konsentrasi 0.5 %. Terdapat perbedaan bermakna antara viabilitas sel dari sampel scaffold karbonat apatit / alginate / kitosan dibandingkan terhadap viabilitas sel dari sampel scaffold karbonat apatit / alginate / kitosan dengan ekstrak mangostin pada konsentrasi 10 % dan 7.5 % ( $P < 0.05$ ) tetapi tidak memberikan perbedaan bermakna pada konsentrasi 5%, 2.5%, 1% dan 0.5% ( $P > 0.05$ ). Dapat disimpulkan scaffold komposit karbonat apatit / alginate / kitosan dengan ekstrak mangostin mempengaruhi viabilitas sel sehingga bersifat sitotoksik.

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### <b>ABSTRACT</b><br>

Mangosteen Extract as a new biomaterial to be added to carbonate apatite scaffold / alginate / chitosan is expected to remove any remaining cancer cells in the bones after surgery. All materials which will used on the body must eligible to be accepted by system and does not cause toxic reactions in the body. The purpose of this study was obtaining information on cell viability against carbonate apatite composite scaffold / alginate / chitosan with mangosteen extract. The scaffold is made of carbonate apatite powder / alginate / chitosan with extract mangosteen using freeze drying method. Characterization are performed by XRD, FTIR, SEM and followed by cell viability using MTT assay at concentrations of 10%, 7.5%, 5%, 2.5%, 1% or 0.5%. The results were obtained composite scaffold porosity carbonate apatite / alginate / chitosan mangosteen extract range 50-300 lm. Obtained the highest viability of carbonate apatite composite scaffold / alginate / chitosan with mangosteen extract at a concentration of 0.5%. There is a significant difference between the cells viability of composite of scaffold carbonate apatite / alginate / chitosan samples compared to the cells viability of composite of scaffold carbonate apatite / alginate / chitosan with mangostin extract samples at concentrations of 10% and 7.5% ( $p < 0.05$ ), but no difference significant in the concentration 5%, 2.5%, 1% and 0.5% ( $p > 0.05$ ). It can be concluded composite of scaffold carbonate apatite / alginate /

chitosan with mangostin extract affect the viability of cells that are cytotoxic.;Mangosteen Extract as a new biomaterial to be added to carbonate apatite scaffold / alginate / chitosan is expected to remove any remaining cancer cells in the bones after surgery. All materials which will used on the body must eligible to be accepted by system and does not cause toxic reactions in the body. The purpose of this study was obtaining information on cell viability against carbonate apatite composite scaffold / alginate / chitosan with mangosteen extract. The scaffold is made of carbonate apatite powder / alginate / chitosan with extract mangosteen using freeze drying method. Characterization are performed by XRD, FTIR, SEM and followed by cell viability using MTT assay at concentrations of 10%, 7.5%, 5%, 2.5%, 1% or 0.5%. The results were obtained composite scaffold porosity carbonate apatite / alginate / chitosan mangosteen extract range 50-300  $\mu$ m. Obtained the highest viability of carbonate apatite composite scaffold / alginate / chitosan with mangosteen extract at a concentration of 0.5%. There is a significant difference between the cells viability of composite of scaffold carbonate apatite / alginate / chitosan samples compared to the cells viability of composite of scaffold carbonate apatite / alginate / chitosan with mangostin extract samples at concentrations of 10% and 7.5% ( $p < 0.05$ ), but no difference significant in the concentration 5%, 2.5%, 1% and 0.5% ( $p > 0.05$ ). It can be concluded composite of scaffold carbonate apatite / alginate / chitosan with mangostin extract affect the viability of cells that are cytotoxic., Mangosteen Extract as a new biomaterial to be added to carbonate apatite scaffold / alginate / chitosan is expected to remove any remaining cancer cells in the bones after surgery. All materials which will used on the body must eligible to be accepted by system and does not cause toxic reactions in the body. The purpose of this study was obtaining information on cell viability against carbonate apatite composite scaffold / alginate / chitosan with mangosteen extract. The scaffold is made of carbonate apatite powder / alginate / chitosan with extract mangosteen using freeze drying method. Characterization are performed by XRD, FTIR, SEM and followed by cell viability using MTT assay at concentrations of 10%, 7.5%, 5%, 2.5%, 1% or 0.5%. The results were obtained composite scaffold porosity carbonate apatite / alginate / chitosan mangosteen extract range 50-300  $\mu$ m. Obtained the highest viability of carbonate apatite composite scaffold / alginate / chitosan with mangosteen extract at a concentration of 0.5%. There is a significant difference between the cells viability of composite of scaffold carbonate apatite / alginate / chitosan samples compared to the cells viability of composite of scaffold carbonate apatite / alginate / chitosan with mangostin extract samples at concentrations of 10% and 7.5% ( $p < 0.05$ ), but no difference significant in the concentration 5%, 2.5%, 1% and 0.5% ( $p > 0.05$ ). It can be concluded composite of scaffold carbonate apatite / alginate / chitosan with mangostin extract affect the viability of cells that are cytotoxic.]