

## INTISARI

### **KAJIAN PENGARUH KONSENTRASI DOPAN ION Cu<sup>2+</sup> TERHADAP SIFAT FISIKOKIMIA DAN BIOANTIBAKTERI MATERIAL HIDROKSIAPATIT (HA) BERBAHAN DASAR CANGKANG LOBSTER *PANULIRUS HOMARUS***

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Kajian pengaruh variasi konsentrasi ion Cu<sup>2+</sup> sebagai dopan material dalam hidroksiapatit (HA) yang berbahan dasar cangkang lobster *Panulirus homarus* telah dilakukan pada penelitian ini dengan variasi konsentrasi ion Cu<sup>2+</sup> sebesar 0,5; 1,0 dan 1,5 mol%. Variasi konsentrasi dilakukan untuk mengetahui kandungan dopan ion sampel pada bakteri *Porphyromonas gingivalis*, *Staphylococcus aureus*, dan *Fusobacterium nucleatum* sebagai agen antibakteri. Ion Cu<sup>2+</sup> dicampurkan dengan HA yang telah didispersikan dalam air dan kemudian dipanaskan dengan sistem hidrotermal. Kontrol negatif dan positif juga akan diberikan pada penelitian ini yaitu HA tanpa dopan serta dengan doping ion Ag<sup>+</sup>. Karakterisasi dilakukan dengan XRD, FTIR, SEM-EDX dan uji bakteri. Penambahan ion Cu<sup>2+</sup> mempengaruhi *microstrain*, ukuran kristal, ukuran mikropori, persentase massa, rasio Ca/P dan daya hambat terhadap bakteri. Hasil XRD dikuatkan dengan hasil analisa FTIR menunjukkan penurunan ukuran kristal dan penambahan *microstrain* setelah dilakukan penambahan ion Cu<sup>2+</sup>. Hasil SEM-EDX menunjukkan penambahan ukuran mikropori dan persentase massa Cu serta nilai rasio Ca/P setelah penambahan ion Cu<sup>2+</sup>. Daya hambat terhadap bakteri semakin besar seiring kenaikan konsentrasi ion Cu<sup>2+</sup>.

Kata kunci : Hidroksiapatit (HA), perak (Ag<sup>+</sup>), tembaga (Cu<sup>2+</sup>), fisikokimia, antibakteri

## ABSTRACT

### ***STUDY OF THE EFFECT OF Cu<sup>2+</sup> ION DOPANT CONCENTRATION ON THE PHYSICOCHEMICAL AND BIO-ANTIBACTERIAL PROPERTIES OF HYDROXYAPATITE (HA) MATERIAL BASED FROM LOBSTER SHELLS OF PANULIRUS HOMARUS***

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The study on the effect of variations in Cu<sup>2+</sup> ion concentration as materials dopan in hydroxyapatite (HA) based on lobster shell *Panulirus homarus* introduced into the study with 0,5; 1,0; and 1,5mol% of the Cu<sup>2+</sup> ion concentration. Variations in concentration are found to identify the content of sample dopan in *Porphyromonas gingivalis*, *Staphylococcus aureus*, and *Fusobacterium nucleatum* as antibacterial agents. The Cu<sup>2+</sup> ion is diluted with the ha which has been dispersed in water and then heated with a hydrothermal system. Negative and positive control will also be provided with the study of ha without sin and with an Ag<sup>+</sup> doping. The characteristics were done with XRD, FTIR, SEM-EDX, and bacterial testing. The addition of Cu<sup>2+</sup> ions affects microstrain, crystalline size, microporous size, mass percentage, Ca/P ratio and resistance to bacteria. The XRD results were strengthened by a FTIR analysis showing a decrease in the size of the crystals and a microstrain after a Cu<sup>2+</sup> ion addition. SEM-EDX results show an increase in the micropore size and percentage of Cu mass as well as the value of the Ca/P ratio after the addition of Cu<sup>2+</sup> ions. Resistance to bacteria increases as the concentration of ion Cu<sup>2+</sup> increases.

Keywords: Hydroxyapatite, silver, copper, physicochemical, antibacterial