SINTESIS KOMPOSIT MATERIAL MAGNETIK/KITOSAN TERIMPREGNASI NANOPARTIKEL PERAK SEBAGAI ANTIBAKTERI *Staphylococcus aureus*

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INTISARI

Dalam penelitian ini, komposit material magnetik/kitosan terimpregnasi nanopartikel perak telah disintesis sebagai antibakteri *Staphylococcus aureus*. Penelitian diawali dengan isolasi material magnetik (MM) dari pasir besi, sintesis komposit material magnetik/kitosan (MM/Kit) dan komposit magnetik/kitosan terimpregnasi nanopartikel perak (MM/Kit/AgNP) dengan variasi konsentrasi larutan $AgNO_3$. Material yang telah disintesis dikarakterisasi dengan spektrofotometer FT-IR, XRD, SEM-EDX dan TEM. Uji antibakteri dilakukan dengan metode difusi sumuran untuk mengetahui diameter zona hambat yang menunjukkan aktivitas antibakteri.

Hasil penelitian menunjukkan komposit MM/Kit/AgNP telah berhasil disintesis dan memberikan aktivitas antibakteri yang tinggi terhadap *Staphylococcus aureus* ditunjukkan dari zona hambat (> 10 mm) dan termasuk kategori kuat. Konsentrasi AgNP yang diimpregnasikan semakin besar pada komposit maka aktivitas antibakterinya meningkat. Komposit MM/Kit/AgNP dengan $AgNO_3$ 1,5 mM merupakan komposit yang memiliki aktivitas antibakteri terbesar dengan diameter zona hambat sebesar 16,79 mm.

Kata kunci : material magnetik, kitosan, nanopartikel perak, antibakteri, *Staphylococcus aureus*

SYNTHESIS OF COMPOSITE MAGNETIC MATERIAL/CHITOSAN IMPREGNATED WITH SILVER NANOPARTICLES AS AN ANTIBACTERIAL OF *Staphylococcus aureus*

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ABSTRACT

In this research, synthesis of composite magnetic material/chitosan impregnated with silver nanoparticles as an antibacterial *Staphylococcus aureus* has been carried out. The research was begun with isolation of magnetic materials (MM) from iron sand, synthesis of magnetic material/chitosan (MM/Kit) composite and magnetic material/chitosan impregnated silver nanoparticles (MM/Kit/AgNP) composite with various concentrations of $AgNO_3$ solution. The materials that have been synthesized were characterized by FT-IR spectrophotometer, XRD, SEM-EDX and TEM. Antibacterial test was carried out by using the well diffusion method to determine the diameter of the inhibitory zone indicating antibacterial activity.

The results showed that MM/Kit/AgNP composites have been successfully synthesized and provide high antibacterial activity against *Staphylococcus aureus* as shown from the inhibitory zone (> 10 mm) which is in the strong category. The higher the concentration of AgNP added to the composites, the higher the antibacterial activity. MM/Kit/AgNP with 1.5 mM $AgNO_3$ gave antibacterial activity with a diameter of the inhibition / clear zone of 16.79 mm.

Keywords: magnetic material, chitosan, silver nanoparticles, antibacterial, *Staphylococcus aureus*