

**NANOKRISTAL SELULOSA BAKTERI SEBAGAI KANDIDAT  
*DRUG DELIVERY SYSTEM* PADA FIKOSIANIN**

**SKRIPSI**

diajukan untuk memenuhi salah satu syarat memperoleh gelar Sarjana Sains  
dalam bidang Kimia



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oleh

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Sebuah skripsi yang diajukan untuk memenuhi Sebagian syarat memperoleh gelar Sarjana Sains pada Fakultas Pendidikan Matematika dan Ilmu Pengetahuan Alam

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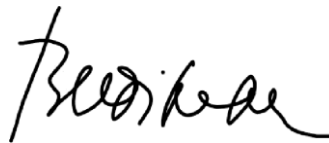
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## ABSTRAK

Fikosianin banyak digunakan dalam industr makanan fungsional, kosmetik, dan obat – obatan karena sifatnya yang tidak beracun. Studi terbaru menunjukkan bahwa fikosianin memiliki aktivitas anti inflamasi, anti hiperalgesik, anti oksidan, anti tumor, dan anti kanker. Akan tetapi, ketika dikonsumsi aplikasi fikosianin sering dibatasi oleh ketidakstabilan terhadap pH lambung. *Drug Delivery System* (DDS) hadir untuk mengatasi masalah ini dengan cara melepaskan fikosianin di target yang tepat untuk menambah efektivitas dan mengurangi toksisitasnya. Nanokristal Selulosa Bakteri (BCNC) dapat digunakan sebagai DDS karena berukuran nano, luas permukaan besar, biokompatibilitas yang baik, dan non-toksik. Penelitian bertujuan untuk melihat potensi BCNC sebagai kandidat DDS Fikosianin. Penelitian ini meliputi isolasi BCNC, ekstraksi dan pemurnian Fikosianin, dan uji kinerja BCNC sebagai DDS Fikosianin. Pada penelitian ini diperoleh BCNC yang terkonfirmasi oleh analisis FTIR. Dari analisis XRD diperoleh indeks kristalinitas BC dan BCNC berturut-turut adalah 69,49% dan 87,8%. Citra TEM memperlihatkan morfologi BCNC seperti jarum, dengan diameter dan panjang partikel rata – rata berturut-turut  $25\pm 10$  dan  $626\pm 172$  nm. Persentase adsorpsi Fikosianin pada BCNC sebesar 44,8% pada waktu 40 menit.

Kata Kunci: adsorpsi, BCNC, *drug delivery system*, Fikosianin

## **ABSTRACT**

*Phycocyanin is widely used in the functional food, cosmetic, and pharmaceutical industries because of its non-toxic nature. Recent studies have shown that phycocyanin has anti-inflammatory, anti-hyperalgesic, anti-oxidant, anti-tumor, and anti-cancer activities. However, when ingested the application of phycocyanin is often limited by instability to gastric pH. Drug Delivery System (DDS) is here to overcome this problem by releasing phycocyanin at the right target to increase its effectiveness and reduce its toxicity. Bacterial Cellulose Nanocrystals (BCNC) can be used as DDS because of their nano size, large surface area, good biocompatibility, and non-toxicity. The aim of the study was to see the potential of BCNC as a candidate for DDS Phycocyanin. This research includes isolation of BCNC, extraction and purification of Phycocyanin, and performance test of BCNC as DDS Phycocyanin. In this study, BCNC was obtained which was confirmed by FTIR analysis. From XRD analysis, the crystallinity index of BC and BCNC were 69.49% and 87.8%, respectively. The TEM image shows a needle-like morphology of BCNC, with a particle diameter and average length of  $25\pm 10$  and  $626\pm 172$  nm, respectively. The percentage of Phycocyanin adsorption in BCNC was 44.8% at 40 minutes.*

*Keywords: adsorption, BCNC, drug delivery system, Phycocyanin*

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