

**PREPARATION AND CHARACTERIZATION OF
CHITIN-HUMIC ACID HYBRID AND CHITIN-HUMIC ACID
HYBRID HYDROGEL AS ADSORBENT FOR Cu(II)**

BLYTH ANGELA C. BALGOS

**An Undergraduate Thesis Presented
to the Department of Chemistry
College of Arts and Sciences
University of the Philippines Visayas**

**In Partial Fulfillment of the Requirements
for the Degree of
Bachelor of Science in Chemistry**

JUNE 2017

ABSTRACT

Gelatinous chitin was functionalized with humic acid to produce a chitin-humic acid hybrid. The gelatinous chitin was protonated using HCl and humic acid was deprotonated by using NaOH in separate containers. The protonated gelatinous chitin and the deprotonated humic acid were then mixed to form the chitin-humic acid hybrid. A portion of the chitin-humic acid hybrid was used to prepare the chitin-humic acid hydrogel. The chitin-humic acid hybrid hydrogel was then prepared using 1,2,3,4-butanetetracarboxylic dianhydride(BTCA) as crosslinker. The chitin-humic acid hybrid hydrogel was then characterized using FT-IR and swelling test. The degree of swelling of the chitin-humic acid hydrogel was found to be 38.10 ± 3.06 . It can also be inferred from the results of the swelling test that the chitin-humic acid hybrid hydrogel has a low crosslink density. Characterization by FT-IR suggested successful immobilization for the hybrid and BTCA crosslinking for the hydrogel. The potential of chitin-humic acid hybrid and chitin-humic acid hybrid hydrogel to adsorb Cu(II) in a solution was then evaluated. The process was done by subjecting the chitin-humic acid hybrid to Cu(II) adsorption. The results for Cu(II) adsorption test was subjected to a Shapiro-Wilk test for normality and was determined to have normally distributed data. One-sample T-test was then used to compare the adsorption capacity of the hybrid and hydrogel. The mean % Cu(II) Removal of the chitin-humic acid hybrid and chitin-humic acid hybrid hydrogel were $41.36 \pm 2.35\%$ and $51.21 \pm 1.32\%$, respectively. Results suggested that the chitin-humic acid hybrid hydrogel has significantly higher % Cu(II) Removal compared to the chitin-humic acid hybrid.