RESEARCH PROJECT

BENTONITE-ALGINATE POLYMER NANOCOMPOSITE FOR THE REMOVAL OF WATER-SOLUBLE CATIONIC DYE

Submitted by:

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WIDYA MANDALA CATHOLIC UNIVERSITY

SURABAYA

2017

LETTER OF APPROVAL

Seminar of **RESEARCH PROJECT** for student with identity below:

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has been conducted on May 22nd 2017, therefore for student has fulfilled one of several requirements for **Bachelor of Engineering** degree in Chemical Engineering Department, Faculty of Engineering, Widya Mandala Surabaya Catholic University Surabaya.

Surabaya, 02 June 2017

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PREFACE

The authors would like to thank God for His blessing that the Research Project entitled Bentonite-Alginate Polymer Nanocomposite for the Removal of Water-Soluble Cationic Dye has been accomplished. This report is a prerequisite in achieving Bachelor of Engineering degree in Chemical Engineering.

The authors realize that the completion of this report is achieved by the help of many people. There for, the authors would like to thank the persons below:

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The authors realize that this report is far from perfect, therefore any critics and comments which will better improve the research is gladly accepted. Lastly the authors hope that the report will be useful to all readers who need information regarding the research of the report.

Surabaya, May 22nd 2017

The authors

ABSTRACT

Dyes in wastewater produced from textile industry are hazardous pollutants and caused many environmental and health problems. There are various wastewater treatment for dyes removal, however one of the low cost and effective method is adsorption. In adsorption, good adsorbent is adsorbent that has high adsorption capacity, inexpensive and regeneratable. Activated carbon usually used as an adsorbent that has higher adsorption capacity compare to bentonite, but price of activated carbon is more expensive. In order to increace the adsorption capacity of bentonite as adsorbent, bentonite will be combine with natural polymer (alginate) to produce a composite, which called nanocomposite. This nanocomposite will be used to adsorpt cationic dye in wastewater of textile industry.

In this research, the process of nanocomposite preparation and performance was studied. Bentonite-alginate nanocomposite was made with ionotropic gelation method. First, bentonite was pre-treatment using hydrochloride acid 5 N, then bentonite dispersion and alginate solution was mixed in certain time then dropped into calcium chloride solution until gelispheres formed. Bentonite-alginate nanocomposite was tested in crystal violet dye as a model of dyes in wastewater textile industry. Adsorption capacity was measured using spectrophotometry method to determine the maximum adsorption capacity.

Keywords: adsorption, alginate, bentonite, crystal violet