

PREPARATION OF HYDROGEL COMPOSITE FROM RICE HUSK USING MICROWAVE RADIATION AND ITS POTENTIAL APPLICATION



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SURABAYA
2018

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Preparation of Hydrogel Composite from Rice Husk Using Microwave Radiation and its Potential Application

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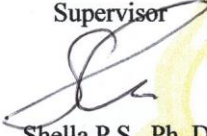
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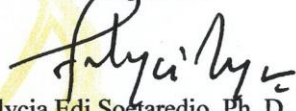
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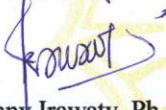


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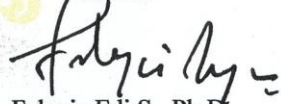
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PREFACE

The authors would like to first thank Jesus Christ for His blessing grace, and also His inclusion that the Research Project entitled Preparation of Hydrogel Composite from Rice Husk Using Microwave Radiation and its Potential Application 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:

- 1 Shella P.S, Ph.D as Principal Supervisor and Felycia Edi Soetaredjo, Ph.D as Co-Supervisor.
- 2 Wenny Irawati., Ph.D. as Head of the Committees, Ir. Suryadi Ismadji., Ph.D. and Sandy Budi Hartono, Ph.D as members of committees
- 3 Felycia Edi Soetaredjo, Ph.D as the Head of Chemical Engineering Process laboratory, Dra. Adriana Anteng Anggorowati, M.Si. as the Head of Chemical Analysis Laboratory and Suryadi Ismadji, Ph.D as the Head of Instrument Laboratory.
- 4 Mr. Novi as laborant of Chemical Analysis Laboratory and Mr. Pudjo as laborant of Chemical Engineering Operation Laboratory and as laborant of Chemical Engineering Process Laboratory.
- 5 Sandy Budi Hartono, Ph.D as Head of Chemical Engineering Department.
- 6 Suryadi Ismadji, Ph.D as Dean of Engineering Faculty.
- 7 Our parents and family who have given a lot of help and support, both materially and morally.
- 8 Our lecturers, friends and also those who are too many to be listed by name that had contributed their kind assistance.

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, June 5th 2018

The authors

ABSTRACT

Hydrogel composite was successfully prepared and characterized include condition for synthesis hydrogel-composite ratio cellulose – NaOH/urea/ECH temperature and reaction time using microwave radiation. Fourier Transform Infrared Spectra (FTIR), X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Energy Diffraction-X (EDX) performed for hydrogel-composite characterization. Rice husk cellulose used for raw material to synthesis hydrogel. Clay minerals such as zeolites have been proven to have excellent adsorption capacity for the removal of heavy metal. The adsorption capacity of hydrogel is further increased by combining with zeolite. Therefore, In this research cellulose combined with zeolite to synthesis hydrogel composite and applied to adsorption of Cu in aqueous solution by using Kinetics and Isotherm Adsorption.

It was found that best ratio cellulose and NaOH/Urea 4 gram with 7:12:81 (NaOH/Urea/Water), has maximum swelling ratio, that is 52.4% where hydrogel formed. This ratio used to synthesis hydrogel-composite with cellulose - zeolite ratio of 4:4 (g/g), where it was given the best adsorption capacity of 1.41029 mg/g. Ratio 4:4 used in kinetic adsorption and found that adsorption in chemical sorption type. This is proved in Isotherm adsorption parameter studied at 30, 50, and 70 °C with Langmuir and freundlich model that Q_e has increase along temperature increased. Freundlich model was very well described adsorption of Cu with Hydrogel Composite. And it was found that at pH 7 has maximum adsorption capacity $Q_e = 4.318$ mg/g

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