





**CORROSION INHIBITION OF MILD STEEL BY NATURAL HONEY AND  
SACCARIDES**

**By  
Cheng Yen Lin**

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FACULTY OF SCIENCE AND TECHNOLOGY  
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**PENGAKUAN DAN PENGESAHAN LAPORAN PENYELIDIKAN SFZ 4399 A/B**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: corrosion  
inhibition of mild steel by natural honey and saccharides

oleh: Cheng Yen Lin no. matrik: UK13417

telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Fizik sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah Sarjana Muda Sains Gunaan (Fizik Elektronik & Instrumentasi), Fakulti Sains dan Teknologi, UMT.

Disahkan oleh:

Penyelia Utama  
 Nama: **DR. MOHD IKMAR NIZAM BIN MOHAMAD ISA**  
 Pensyarah  
 Cop Rasmi: **Jabatan Sains Fizik  
 Fakulti Sains dan Teknologi  
 Universiti Malaysia Terengganu  
 21030 Kuala Terengganu**

Tarikh: 29/08/09

Penyelia Bersama (jika ada)

Nama:

Cop Rasmi


Tarikh: .....

Ketua Jabatan Sains Fizik  
 Nama:  
 Cop Rasmi: **DR. MOHD IKMAR NIZAM BIN MOHAMAD ISA**  
 Head  
 Department of Physical Sciences  
 Faculty of Science and Technology  
 University Malaysia Terengganu  
 21030 Kuala Terengganu

Tarikh: 29/08/09

## DECLARATION

I hereby declare that this thesis entitled **Corrosion inhibition of mild steel by natural honey and saccharides** is the result of my own research except as cited in the references.

Signature :  .....

Name : CHENG YEN LIN

Matrix No. : UK 13417

Date : 29 APRIL 2009

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## **CORROSION INHIBITION OF MILD STEEL BY NATURAL HONEY AND SACCHARIDES**

### **ABSTRACT**

Mild steel is the most versatile, least expensive and widely used engineering material which has found extensive application in various industries. However, the corrosion resistance of mild steel is relatively limited. This causes many corrosion problems to be arising in the related industries. There are several methods introduced to overcome the corrosion problems. Among these methods, the use of corrosion inhibitor is very popular. In this research project, the natural products such as natural honey and saccharides glucose are used as an inhibitor for mild steel. The objectives of this research are to determine and compare the inhibition efficiency of honey and glucose on mild steel corrosion. There will be seven type solutions [seawater, honey + seawater (1:300), honey + seawater (1:60), honey + seawater (1:30), glucose + seawater (1:300), glucose + seawater (1:60) and glucose + seawater (1:30)] being prepared to used as corrosion medium for the mild steel immersion test. The immersion period was 28 days while every specimens checking was done on 4 days interval. The corrosion rate of the mild steel and the corrosion inhibition of honey and glucose on mild steel were evaluated by using weight loss method, potentiodynamic polarization scan and electrochemical spectroscopy (EIS). The results show that the presence of honey and glucose in seawater was retards the rate of dissolution and hence inhibits the corrosion of mild steel in seawater. Thus, the corrosion rate of mild steel is decreases with the increases of concentration of honey and glucose. Besides, the inhibition efficiency of both honey and glucose are also increases with concentration of honey and glucose. In this research, it shows that both honey and glucose are good inhibitor for mild steel. However, glucose shows much better inhibition efficiency compared to honey.



## **PERENCATAN PENGHAKISAN KELULI SEDERHANA OLEH MADU ASLI DAN SAKARIDA**

### **ABSTRAK**

Keluli lembut ialah logam yang serba guna, murah dan bahan kejuruteraan yang mempunyai aplikasi yang luas dalam pelbagai industri. Bagaimanapun, sifat tahan kakisan bagi keluli lembut adalah rendah. Ini menyebabkan banyak masalah kakisan wujud dalam industri yang berkaitan. Untuk mengatasi masalah kakisan tersebut, beberapa kaedah telah diperkenalkan. Antara kaedah-kaedah tersebut, penggunaan perencat kakisan adalah amat popular. Dalam projek ilmiah ini, madu asli dan glukosa digunakan sebagai perencat kakisan bagi keluli lembut di dalam air laut. Objektif-objektif bagi penyelidikan ini adalah menentukan dan membandingkan kecekapan perencatan bagi madu dan glukosa pada kakisan keluli lembut. Terdapat tujuh jenis larutan [air laut, madu + air laut (1:300), madu + air laut (1:60), madu + air laut (1:30), glukosa + air laut (1:300), glukosa + air laut (1:60) dan glukosa + seawater (1:30)] disediakan sebagai bahantara kakisan keluli lembut. Tempoh rendaman keluli lembut dalam tujuh jenis larutan ialah 28 hari, manakala setiap penilaian dan pengukuran bagi spesimen-specimen dibuat dengan setiap 4 hari berselang. Kecekapan perencatan kakisan madu dan glukosa dinilai dan diukur menggunakan kaedah kehilangan berat, pengimbasan pengutupan, dan spektroskopi elektrokimia (EIS). Keputusan yang diperolehi menunjukkan bahawa kehadiran madu dan glukosa dalam air laut mengurangkan kadar kelarutan keluli lembut dan oleh itu menghalangkan kakisan keluli lembut dalam air laut. Oleh itu, kadar kakisan keluli lembut dikurangkan dengan peningkatan kepekatan madu dan glukosa. Kedua-dua kecekapan perencatan bagi madu dan glukosa adalah meningkat dengan kepekatan madu dan glukosa. Kajian ini menunjukkan kedua-dua madu dan glukosa adalah perencat yang baik. Walaubagaimanapun, glukosa menunjukkan kecekapan perencatan yang lebih baik berbanding dengan madu.