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Quantification of polyphenoloxidase (PPO) from *Bruguiera cylindrica* and *B. sexangula* / by Norhasmilia Suhaimi.

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PERPUSTAKAAN SULTANAH NUR ZAHIRAH UMT

QUANTIFICATION OF POLYPHENOLOXIDASE (PPO) FROM  
*Bruguiera cylindrica* and *B. sexangula*

By  
NORHASMILIA BT SUHAMI

Research Report submitted in partial fulfillment of  
the requirements for the degree of  
Bachelor of Science (Biological Science)

DEPARTMENT OF BIOLOGICAL SCIENCES  
FACULTY SCIENCE AND TECHNOLOGY  
UNIVERSITI MALAYSIA TERENGGANU  
2009



**JABATAN SAINS BIOLOGI  
FAKULTI SAINS DAN TEKNOLOGI  
UNIVERSITI MALAYSIA TERENGGANU**

**SBB/SBD 4399B  
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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **QUANTIFICATION OF POLYPHENOLOXIDASE (PPO) FROM *Bruguiera cylindrica* and *B. Sexangula*** oleh **NORHASMILIA BT SUHAMI**, no. matrik: **UK 13477** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh ijazah **SARJANA MUDA SAINS (SAINS BIOLOGI)**, Fakulti Sains dan Teknologi, Universiti Malaysia Terengganu.

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## DECLARATION

I hereby declare that this thesis entitled **Quantification of Polyphenoloxidase (PPO) from *B.cylindrica* and *B.sexangula*** is the result of my own research except as cited in the references.

Signature :  .....

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Date : 14 Mei 2009

## ACKNOWLEDGEMENTS

Alhamdulillah, I would like to thank Allah S.W.T. for giving me the strength and blessing to accomplish this project successfully. Most of all, I would like to thank my project supervisor, Assoc. Prof Dr. Aziz bin Ahmad for his kindness, advices and meaningful guidance to complete this project with flying colours. I also would like to convey my sincere gratitude to Tuan Haji Razali, in helping me to find the *Bruguiera sp.* at mengabang area of UMT.

Special gratitude to my beloved parents and families who always give me support, advices and blessing without fail. I also extend my appreciation to all my course mates and friends especially Suelawati bt Semail who gave me full commitment, strength and support.

Thanks also to all lecturers, Science Officers and Lab Assistants from Department of Biological Sciences that always give a good cooperation and helping hand during running of this project especially to Biotechnology Laboratory. All the encouragement and support from you all have strengthened up my will power and confidence to complete this project.

Last but not least, to everyone who has given advice and support direct or indirectly, thanks for helping and being supportive to me. May Allah bless all of you, thank you so much.

## QUANTIFICATION OF POLYPHENOLOXIDASE (PPO) FROM *Bruguiera cylindrica* and *B. sexangula*

### ABSTRACT

Polyphenoloxidase (PPO) is a nuclear-coded protein that can be found in plastid. PPO is one of the main enzymes responsible for quality loss due to phenolic degradation and oxidizes o-diphenolic compounds to the corresponding o-quinones in the presence of oxygen. The activity of PPO was examined on *Bruguiera cylindrica* and *B. sexangula* leaves. The effect of different pH (5.8, 6.4 and 8.0) of extraction buffer and different substrate specificity on PPO activity was investigated. PPO activity was highest in leaves number one for both species. PPO activity in *B. cylindrica* was higher compared with *B. sexangula*. *B. cylindrica* shown highest activity in pH 8.0 and *B. sexangula* was in pH 5.8. The enzyme seemed to have the highest affinity which indicates by lowest  $K_m$  value with pyragallol for *B. cylindrica* and 4-methylcatechol for *B. sexangula*. The most efficient phenolic substrate for *B. cylindrica* and *B. sexangula* was 4-methylcatechol by considering the highest ratio  $V_{max}/K_m$ . The species optimum pH and specific substrates for PPO activity is species dependent. Further study is needed to characterize the properties and role of PPO in *Bruguiera sp.*

## **PENGGUANTITIAN ENZIM POLYPHENOLOXIDASE (PPO) DARIPADA *Bruguiera cylindrica* dan *B. Sexangula***

### **ABSTRAK**

Enzim polyphenoloxidase (PPO) adalah nuklear-protein yang terdapat di dalam plastid. PPO adalah salah satu daripada enzim utama yang berupaya untuk mengurangkan kualiti pada tumbuhan dengan cara mengurangkan phenolic dan mengoksidakan o-diphenolic kepada o-quinones dengan kehadiran oksigen. Aktiviti PPO telah ditentukan daripada daun *Bruguiera cylindrica* dan *B. Sexangula*. Kesan pH pengekstrakan penimbal yang berbeza (5.8, 6.4 and 8.0) dan spesifik substrat yang berbeza terhadap aktiviti PPO telah dikenalpasti. Aktiviti PPO paling tinggi adalah pada kedudukan daun nombor satu untuk kedua-dua spesis. Aktiviti PPO pada *B. cylindrica* adalah lebih tinggi berbanding *B. sexangula*. Aktiviti PPO tertinggi bagi *B. cylindrica* adalah pH 8.0 manakala untuk *B. sexangula* adalah pH 5.8. Enzim ini mempunyai tarikan yang tinggi berdasarkan kepada nilai  $K_m$  yang terendah dengan pyragallol untuk *B. Cylindrica* dan 4-methylcatechol untuk *B. Sexangula*. Substrak yang paling efisien untuk *B. cylindrica* dan *B. Sexangula* adalah 4-methylcatechol berdasarkan nisbah  $V_{max}/K_m$  yang tertinggi. Setiap spesis ini mempunyai pH optima dan spesifik substrat yang tersendiri bagi aktiviti PPO. Lanjutan kajian diperlukan untuk mengenal pasti ciri-ciri dan peranan PPO yang terdapat pada *Bruguiera sp.*