





ENZYMATIC AND NON-ENZYMATIC ACTIVITY OF *Cryptocoryne minima*  
CULTURES UNDER DROUGHT STRESS

By

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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **Enzymatic and Non enzymatic Activity of *Cryptocoryne minima* Cultures Under Drought Stress** oleh **Hasyimah Binti Hassan** no. matrik: **UK15558** 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 research report entitled **Enzymatic and Non-enzymatic Activity of *Cryptocoryne minima* Cultures Under Drought Stress** is the result of my own research except as cited in the references.

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## ENZYMATIC AND NON-ENZYMATIC ACTIVITY OF *Cryptocoryne minima* UNDER DROUGHT STRESS

### ABSTRACT

Osmotic stress is the main problems in aquatic plant as this stress becomes a major plant limiting factor in decreasing water content, inhibiting the rate of photosynthesis, and decreasing the rate of respiration. Responses of enzymatic and non- enzymatic activities to drought in *Cryptocoryne minima* plantlet were observed in this study. *C. minima* plantlets were cultured into Gamborg B5 media with 20% (w/v) PEG-4000 for drought stress treatment using seven days interval and in Gamborg B5 media without PEG media used as control. The growth and activities of ascorbate peroxidase (APX), peroxidase (POD), and catalase (CAT) as well as  $\alpha$ -tocopherol, ascorbic acid, antocyanin, and carotenoid were examined. Fresh weight and dry weight are increased every week along the treatment period however the weight of treatment plants were less than that of control plant. Drought stress induce by PEG reduce the activity of CAT and POD than that of control. Meanwhile, the ascorbic acid and carotenoid was increased.  $\alpha$ -Tocopherol and APX activity shows fluctuated pattern and antocyanin show the lower concentration when treated with PEG. Drought stress cause physiological changes on the *C. minima* plantlet.



## AKTIVITI ENZIM DAN BUKAN ENZIM PADA *Cryptocoryne minima* DI BAWAH TEKANAN KEMARAU

### ABSTRAK

Tegasan osmosis merupakan masalah utama pada tumbuhan akuatik di mana tekanan ini menjadi faktor penghad yang terbesar dalam pengurangan kandungan air, merencat kadar fotosintesis, dan menurunkan kadar respirasi. Tindak balas aktiviti enzim dan bukan enzim kepada kemarau dalam anak pokok *Cryptocoryne minima* telah diperhati dalam kajian ini. Anak pokok *C. minima* telah dikultur ke dalam media Gamborg B5 yang di tambah 20% (w/v) PEG-4000 untuk dijadikan sebagai rawatan kemarau dengan menggunakan selang tujuh hari dan media Gamborg B5 tanpa PEG digunakan sebagai kawalan. Kadar tumbesaran dan aktiviti-aktiviti askorbat peroksida (APx), peroksida (POD), dan katalase (CAT) serta  $\alpha$ -tokoferol, asid askorbik, antosianin, dan karotenoid telah diuji. Berat kering dan berat basah meningkat setiap minggu sepanjang tempoh rawatan manakala berat untuk pokok yang telah mengalami rawatan PEG adalah kurang daripada berat pokok kawalan. Tegasan kemarau yang di aruh oleh PEG menurunkan aktiviti CAT dan POD. Manakala, asid askorbik dan karotenoid meningkat berbanding kawalan. Aktiviti  $\alpha$ - tokoferol dan APX menunjukkan bentuk turun naik dan antocyanin menurun apabila dirawat menggunakan PEG. Tekanan kemarau menyebabkan perubahan fisiologi dalam anak pokok *C. minima*.