

THE EFFECTS OF POST-HARVEST DARK TREATMENT ON THE
AGAR YIELD AND ITS QUALITY OF *Gracilaria changii*
(Xia et Abbott) Abbott, Zhang et Xia (Rhodophyta)

TING WEI CHIN

FACULTY OF APPLIED SCIENCE AND TECHNOLOGY
UNIVERSITI PUTRA MALAYSIA TERENGGANU
TERENGGANU

1999

**THE EFFECTS OF POST-HARVEST DARK TREATMENT
ON THE AGAR YIELD AND ITS QUALITY OF
Gracilaria changii (Xia et Abbott) Abbott, Zhang et Xia (Rhodophyta)**

BY

TING WEI CHIN

**This project report is submitted in partial fulfillment of
the requirements for the Degree of
Bachelor of Fisheries Science**

**Faculty of Applied Science and Technology
UNIVERSITI PUTRA MALAYSIA TERENGGANU**

1999

1100024175

ACKNOWLEDGEMENT

First of all, I would like to thank my dear supervisor, Dr. Siti Aishah Abdullah @ Christine A. Orosco, lecturer of Universti Putra Malaysia (Terengganu) who gave me the chance to learn from her. I really appreciate her patience, unstinted help, guidance and understanding during this final project. She was always willing to help, suggest and lend me many references to widen my knowledge in this study even though she was always busy.

The authorities of Institute Penyelidikan Perikanan (IPP), Penang was willing to offer me their facilities and laboratory to run my project. IPP officer, Encik Ramli Saad who was the one who supervised me, gave me some comments and shared his experience during this study. Thanks to Encik Ramli and to the assistants who harvested the *Gracilaria changii* together with me at Ban Merbok, Kedah.

I would also like to extend my sincere gratitude to my beloved family. They always supported and respected me in every aspect. Specifically, I would like to express my appreciation to my dearest father, TING NGO KING and my dearest mother, CHEW GET CHU, who really love me and educated me no matter how tough their life. Their understanding allowed me to concentrate on this study especially during the holidays when I had to devote the time to running my project instead of accompanying them. Thanks also to both my sisters, Wei Teng and Wei Ling for their love.

Lastly, I would like to thank all my friends at UPMT especially : Grace, Wai Kam, Guan Hong, Choon Sean, Nelson and other buddies who helped me during this study. Thanks for their kindness and patience to give me a hand. So with my two seniors, Ho See Yen and Soon Chin Kai who were my study partners during this final project, they always helped me and gave me any related information which I needed.

Thanks for everything.

THANK YOU VERY MUCH !

ABSTRACT

This study is on the effects of post-harvest dark treatment (DT) and light treatment (LT) on the agar yield and its qualities (gel strength,GS; melting temperature,MT and gelling temperature,GT) of *Gracilaria changii*.

Gracilaria changii harvested from ponds in Ban Merbok, Kedah were kept in aquaria under total darkness and normal light conditions. There were kept for 0 to 4 days treatment period and the seaweeds were collected everyday. Its agar was extracted (without alkali treatment) in order to compare the yield between DT and LT, as well as the qualities (GS, MT and GT) of agar. The same experiment was done for a treatment period of 0 to 8 days and the seaweeds were collected every 2 days.

The effect of LT and DT on agar was not significant. However, the effect of treatment period was considered significant. Both LT and DT resulted in higher agar yield after 4 days treatment at 10.09% and 11.29%, respectively. While the percentage of agar yield after 2 to 8 days LT and DT were very significant. The optimum treatment period for LT was two days with an agar yield of 21.36% yield. The highest yield was extracted from the seaweed after 4 days DT at 33.34%. The increased yield may be related to the dark condition under which in there is decreased starch formation due to the absence of photosynthesis and the use of the existing starch for plant metabolism.

Lower GS was obtained for both 0 to 4 days and 0 to 8 days treatment period. The highest GS was obtained before LT and DT at 167.18 gcm^{-2} for 0 to 4 days treatments. The lowest was at 70.30 gcm^{-2} for LT and 93.38 gcm^{-2} for DT. The 0 to 8 days treatment obtained the highest 67.89 gcm^{-2} for LT and 119.56 gcm^{-2} for DT. All these GS were equivalent to that of low grade commercial agar. However, new agar products of low GS (such as Ultra Agar) may indicate greater possible commercial use of this low GS.

The MT and GT were not much different at 70.00°C - 72.17°C and 34.33°C - 37.50°C , respectively for 0 to 4 days treatments. While the effect on MT (66.58°C - 70.25°C) and GT (34.58°C - 36.17°C) for 0 to 8 days LT and DT was not obvious.

From these results, it is recommended that, newly harvested *Gracilaria changii* be kept or stored in the dark for an optimum treatment period of 4 days but not more than 1 week to improve its agar yield.

ABSTRAK

Kajian ini adalah ke atas kesan rawatan gelap and rawatan terang bagi *Gracilaria changii* selepas dituai and sbelum di proses. Pratusan penghasilan agar and kualitinya (ketegangan agar, suhu keterlarutan and suhu pembekuan) di bandingkan.

Gracilaria changii yang telah dituai dari kolam Ban Merbok, Kedah ini diletakkan dalam akuarium dengan dua rawatan gelap dan terang berjangka masa selama 0 hingga 4 hari dan rumpair laut ini akan dipungut setiap hari. Agar akan diekstrakkan (tanpa rawatan alkali) demi membandingkan penghasilan agar antara *Gracilaria changii* yang selepas rawatan gelap and rawatan terang. Ketiga-tiga kualiti agar juga akan dikaji. Kajian yang tersebut di atas akan diulang tetapi dalam jangkamasa rawatan selama 0 hingga 8 hari. Sampel ini akan dipungut setiap 2 hari.

Kesan penghasilan agar bagi rawatan terang dan rawatan gelap tidak bermakna. Walau bagaimanapun, kasan bagi jangkamasa rawatan dianggap bermakna. Kedua-dua rawatan terang dan gelap memperolehi penghasilan agar yang tinggi pada 10.09% and 11.29% masing-masing. Manakala, peratusan bagi penghasilan agar selepas 2 hingga 8 hari rawatan gelap dan terang dianggap bermakna. Optima jangkamasa rawatan terang adalah selepas 2 hari pada penghasilan 21.36% agar. Penghasilan agar yang paling tinggi adalah selepas 4 hari rawatan gelap pada 33.34%. Pertambahan penghasilan agar berhubung kait dengan keadaan gelap yang menyebabkan kekurangan

kandungan kanji akibat ketidakhadiran fotosintesis dan kanji simpanan terus diguna sebagai makanan bagi metabolisma.

Ketegangan agar yang rendah diperolehi daripada sampel kajian ini bagi kedua-dua jankamasa rawatan (0 hingga 4 hari dan 0 hingga 8 dari). Ketegangan agar yang tertinggi adalah daripada sampel sebelum rawatan (167.18 gcm^{-2}) bagi 0 hingga 4 hari rawatan. Bagi ketegangan agar yang terendah adalah 70.30 gcm^{-2} bagi rawatan terang dan 93.38 gcm^{-2} bagi rawatan gelap. Rawatan selama 0 hingga 8 hari memperolehi ketegangan agar tertinggi (67.89 gcm^{-2}) bagi rawatan terang dan 119.56 gcm^{-2} bagi rawatan gelap. Kesemua ketegangan agar ini dianggap dalam kategori yang bergred rendah bagi agar komersil. Manakala, produk berketegangan agar rendah baru ini (seperti Ultra Agar) membayangkan potensi komersilnya dalam aplikasi agar yang berketegangan agar rendah.

Suhu keterlarutan dan suhu pembekuan tidak mempunyai perbezaan yang jelas dengan suhu 70.00°C - 72.17°C dan 34.33°C - 37.50°C masing-masing. Manakala kesan kedua-dua suhu keterlarutan (66.58°C - 70.25°C) dan suhu pembekuan (34.58°C - 36.17°C) bagi 0 hingga 8 hari rawatan terang dan gelap tidak jelas.

Daripada keputusan ini, adalah dicadangkan bahawa *Gracilaria changii* yang baru-baru dituai diletakkan dan distorkan dalam kegelapan dengan janka masa rawatan optimum 4 hari tetapi tidak melebihi 1 minggu demi meningkatkan penghasilan agarnya.