CULTIVATION TRIALS OF *Gracilaria* sp. (Rhodophyta)
IN POND IN PUSAT PENYELIDIKAN TERNAKAN AIR
PAYAU (PPTAP), GELANG PATAH, JOHORE

GLENDEN PLANT LANGGANGON

FAKULTI SAINS DAN TEKNOLOGI
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI
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By

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Research Report submitted in partial fulfilment of
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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS

cm	-	Centimeter
mL	-	Millilitre
mg L^{-1}	-	Milligram per Litre
$^{0}/_{0}$	-	Percent
$^{0}/_{00}$	-	part per thousand
L	-	Litre
^{o}C	-	Degree Celsius
mg	-	milligram
kg	-	Kilogram
DO	-	Dissolved Oxygen
ppm	-	parts per million
RGR	-	Relative Growth Rate
Sec	-	Second
NaOH	-	Sodium Hydroxide
H_2SO_4	-	Sulphuric Acid

LIST OF APPENDICES

Tajuk: Percubaan Pengkulturan *Gracilaria* sp. (Rhodophyta) Dalam Kolam Di Pusat Penyelidikan Ternakan Air Payau (PPTAP), Gelang Patah, Johor

ABSTRAK

Pengkulturan rumpai laut merah *Gracilaria* sp. telah dijalankan selama 8 minggu di sebuah kolam yang berada di Pusat Penyelidikan Ternakan Air Payau (PPTAP), Gelang Patah, Johore. Pengkulturan *Gracilaria* sp. ini melibatkan 2 kaedah iaitu kaedah ikatan dan kandang berjaring. Kadar tumbesaran relatif (RGR, % day $^{-1}$) bagi kedua-dua kaedah telah diukur sepanjang tempoh pengkulturan. Begitu juga dengan kadar tumbesaran bagi 3 kedalaman yang berbeza (atas, tengah, bawah). Pada akhir tempoh pengkulturan, *Gracilaria* sp. tersebut telah dituai dan agarnya diekstrak bagi menentukan kualiti agarnya.

Secara keseluruhan, purata kadar tumbesaran relatif (RGR, % day $^{-1}$) bagi kaedah ikatan lebih tinggi daripada kaedah kandang berjaring dengan kadar 1.3 % day $^{-1}$. Di bawah keadaan yang menggalakkan, *Gracilaria* sp. mencapai kadar relative tumbesaran tertinggi iaitu 3.5 % day $^{-1}$. Manakala kedalaman atas mencatat kadar tumbesaran relatif yang tertinggi iaitu 2.3 %, day $^{-1}$.

Peratusan hasil agar daripada kedua-dua kaedah mempunyai nilai julat dari 18.4% ke 42.5% di mana kedua-dua kaedah (melalui atau tanpa melalui rawatan alkali) adalah bersilang kaitan dengan ketegangan gel. Agar yang melalui rawatan alkali mempunyai ketegangan gel yang tertinggi berbanding agar tanpa melalui rawatan alkali. Ketegangan gel untuk agar daripada *Gracilaria* sp. yang dikultur menggunakan kaedah kandang berjaring dengan 335.622 g.1.2cm^{-2} merupakan yang tertinggi bagi suhu 90° C yang

melalui rawatan alkali. Suhu gel agar dan pencairan gel agar boleh dibandingkan dengan agar tepung komersil dari Jepun iaitu 42 ° C dan 84 ° C.

ABSTRACT

The cultivation of the red seaweed *Gracilaria* sp. was conducted throughout a culture period of 8 weeks in a pond in Pusat Penyelidikan Ternakan Air Payau (PPTAP), Gelang Patah, Johore. This cultivation was carried out using 2 different methods which were the line culture method and cage culture method. During the culture period, the relative growth rate (RGR, % day $^{-1}$) of *Gracilaria* sp. for both methods was monitored weekly. Growth rates at 3 different depths (top, middle, bottom) for line culture method were also monitored. At the end of the culture period the *Gracilaria* sp. was harvested and extracted to determine the agar quality of *Gracilaria* sp.

The overall average relative growth rate (RGR, % day $^{-1}$) for line culture method was higher than for cage culture method at a rate of 1.3 % day $^{-1}$. Under favourable conditions, the highest RGR was also recorded for line culture method at 3.5 % day $^{-1}$. Meanwhile the top line displayed the highest RGR compared to the other depths at 2.3 % day $^{-1}$.

The agar yield of samples from both culture methods ranged from 18.4% to 42.5% (extracted with or without alkali treatment) were inversely correlated with gel strength. Agar extracted after alkaline treatment had the highest gel strength.The gel strength of agar extracted from *Gracilaria* sp. in cage culture method (335.622 g.1.2cm^{-2}) was the highest in 90° C alkali treatment. The gelling and melting temperatures were also comparable to the commercial agar powder from Japan at 42 ° C and 84 ° C respectively.