

**CHARACTERIZATION OF BIO-OPTICAL PROPERTIES IN
CORAL REEF WATERS OF BIDONG ISLAND**

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**SCHOOL OF MARINE SCIENCE AND ENVIRONMENT
UNIVERSITI MALAYSIA TERENGGANU**

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**CHARACTERIZATION OF BIO-OPTICAL PROPERTIES IN CORAL REEF
WATERS OF BIDONG ISLAND**

By

Muhammad Hafizuddin bin Aris

**Research Proposal submitted in partial fulfillment of
the requirements for the degree of
Bachelor of Science (Marine Biology)**

**School of Marine Science and Environment
UNIVERSITI MALAYSIA TERENGGANU**

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UNIVERSITI MALAYSIA TERENGGANU

DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled Characterization of Bio-Optical Properties in Coral Reef Waters of Bidong Island by Muhammad Hafizuddin bin Aris, Matric No. UK 25245 have been examined and all errors identified have been corrected. This report is submitted to the School of Marine Science and Environment as partial fulfillment towards obtaining the Degree in Science (Marine Biology), School of Marine Science and Environment, University Malaysia Terengganu.

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LIST OF ABBREVIATIONS

a	-	absorbance
mg	-	milligram
l	-	litre
m	-	meter
Km	-	Kilometer
m^{-1}	-	per meter
$mg\ l^{-1}$	-	milligram per litre
$mg\ m^{-3}$	-	milligram per meter cube

ABSTRACT

Surface water samples were collected from 11 stations at Bidong Island during August-September 2013 to analyse the total concentration of chlorophyll, suspended particulates, colored dissolve organic matter (CDOM) and spectral absorption coefficient of dissolved and particulate material. Live coral covers were also determined on selected areas. The end of blue spectrum (440nm), light absorption by non-phytoplankton materials (CDOM and detritus) accounts for more than 54% of the total non-water absorption. In balance, a minimum of 16% out of total absorption came from phytoplankton components. During the southwest monsoon season, relatively low concentration of total chlorophyll ($< 0.164 \text{ mg m}^{-3}$) were observed at outer stations of Bidong Island. Increasing trend of euphotic depth with distance from shore proving that coastal water are more turbid and becomes clearer as the stations sampled reach the offshore waters. The negative regression line of diffuse attenuation coefficient in photosynthetic active radiation spectra, K_d (PAR) also showed similar pattern of euphotic depth with distance. The concentration of total chlorophyll increase exponentially with percentage of live coral cover. It is proved that a healthier coral associated with higher primary productivity.

**PENCIRIAN SIFAT BIO-OPTIKAL PADA KAWASAN PERAIRAN
TERUMBU KARANG DI PULAU BIDONG**

ABSTRAK

Sampel di permukaan air diambil daripada 11 stesen di Pulau Bidong semasa bulan Ogos-September 2013 untuk dianalisis kepekatan jumlah klorofil, partikel terampai, bahan organik terlarut berwarna (CDOM) dan koefisien spektrum penyerapan untuk bahan terlarut dan partikel. Liputan karang hidup juga turut dikaji di beberapa kawasan terpilih. Di penghujung spektra biru (440nm), penyerapan cahaya oleh bahan bukan fitoplankton (CDOM dan detritus) merangkumi lebih daripada 54% daripada jumlah penyerapan bahan bukan air. Secara baki, sekurang-kurangnya 16% daripada jumlah penyerapan berasal daripada komponen fitoplankton. Semasa musim monsun barat daya, kepekatan jumlah klorofil yang rendah secara relatif ($< 0.164 \text{ mg m}^{-3}$) dapat diperhatikan di stesen luar persisir pantai Pulau Bidong. Aliran secara meningkat pada kedalaman *euphotic* bersama jarak dari pantai membuktikan air di persisir pantai adalah lebih keruh dan kembali jernih apabila stesen penyampelan menghampiri kawasan luar persisir. Garisan negatif regresi daripada koefisien atenuasi resapan dalam spektra radiasi fotosintesis aktif, K_d (PAR) juga menunjukkan pola yang sama dengan kedalaman *euphotic* bersama jarak dari pantai. Kepekatan jumlah klorofil meningkat dengan pesat bersama peratusan liputan karang hidup. Ini menunjukkan terumbu karang yang lebih sihat dapat dikaitkan dengan produktiviti primer yang lebih tinggi.