B.2 – 7

ISSN 1441-2132

MARINA CHIMICA ACTA

international journal

L.16 NO.2
TOBER 2015

HASANUDDIN UNIVERSITY
www.marina-chimica-acta.com

MARINA CHIMICA ACTA

International Journal
Published April and October each year
Hasanuddin University
Kampus Tamalanrea Makassar 90245
Indonesia
Phone/Fax : 62-411-585991
Email : nuklir@indosat.net.id or alfiannoor744@gmail.com
www.marina-chimica-acta.com

Marina Chimica Acta is an international journal published since 1999 containing original scientific reports in the field of marine chemistry. Open online access is available through www.marina-chimica-acta.com. Yearly printed subscription cost Rp. 500,000.00 plus domestic postage stamp Rp. 100,000.00. International stamp will be charged Rp. 150,000.00

Chief Editor
Alfian Noor — Analytical/Radiation Chemistry

Editors
Ahyar Ahmad — Biochemistry/ Biotechnology
Indah Raya — Inorganic Chemistry
Nunuk Hariani — Organic Chemistry
Nursiah La Nafie — Analytical Chemistry
Paulina Taba — Physical Chemistry

Invited Editors
Bohari M Yamin — UKM-Malaysia
Nicole de Voogd — Naturalis-Netherlands

Editorial Assistant
Waode Nur Rahmaniah

Cover design — Rahmat Januar Noor
Lay out — Ruslan
Publishing by — Science Partnership Foundation
Printed by — Com21

Address
Radiation Chemistry Laboratory, FMIPA Hasanuddin University Makassar 90245
Tel/Fax : 62411585991 email : nuklir@indosat.net.id or alfiannoor744@gmail.com

Marina Chimica Acta, October 2015
Jurusan Kimia, FMIPA UNHAS

Vol. 16 No.2
ISSN 1441-2132

INITIAL FORMATION OF SPERMONDE ARCHIPELAGO, THE LARGEST REEF PLATFORM IN INDONESIA, EFFORT TO DISCLOSE ITS TIME FRAME

Alfian Noor*, Maming Gaffar and Muhammad Zakir
Radiation Chemistry Laboratory, Hasanuddin University
Kampus UNHAS Tamalanrea, Makassar 90245
*Contact : alfiannoor744@gmail.com

ABSTRACT

Coral samples were taken from Langkai island waters of Spermonde archipel at four meter depth using university boat and equipped with professional diver. After having been washed, samples were brought into laboratory and cleaning coral by chemical and physical separation. Grinded sample was then acidified with hydrochloric acid 10% to produce CO_2 gas, coral origin, and finally absorbed in 5N sodium hydroxyde solution forming Na_2CO_3 and then calculating carbon amount by volumetric analysis. Eight mL of solution was mixed with twelve mL scintillating solution before measuring it in liquid scintillation counter Hidex 300 SL. Results showed that specific activity of carbon-14 in sample was 14.72 dpm/gC equivalent to 317 years. By application of absorbers other than NaOH, results were relatively the same. It can be concluded that the coral age investigated in Spermonde archipel was about 317 years. Further investigations are required to confirm the results especially in area and depth variations.

Key words : carbon-14, coral, Spermonde, age

INTRODUCTION

As reef platform, Spermonde archipel named originally as *spaera mundo* by European sailor meaning many dispersed islands on this archipelago, contains high level biodiversity where Professor Katili, renown Indonesian geologist, mention the place as 'living laboratory' very appropriate to do marine research.

One of key questions posed is when this reef start to be generated. Generally there are two approaches can be made. First by historical interpretation through written documents and artefacts found in the area which was traceable its connection with humanistic and social relationship as well as cultural activities existed on this platform. Second approach is to use biological marker using C-14 as age marker under condition that carbon containing materials, carbonated compounds, found in coral sample. By this later approach, one can estimate scientifically and objectively the initial formation period of Spermonde.This investigation is a preliminary step using C-14 in determining the age of coral smple in Langkai island.

METHOD

Coral sample taken at seawater near one of the islands in the Spermonde Archipelago, which is in Langkai Island at a depth about 4-5 m, coordinate S: 05° 01' 47,055" E: 119° 05' 50,272". Marble from Maros region was used as the Background Materials. Physical cleaning was carried out by water rinsing and scrubbing with a brush to remove carbon source contaminant possibly accumulated in side the coral and between the septa. Chemical cleaning on the other hand was done by immersing samples in a 1:1 mixture of 30% H_2O_2 and 1N NaOH and then ultrasonicated for 15 minutes. It was followed by quick dippped (30 seconds to 2 minutes) in a 1:1 mixture of 30% H_2O_2 and 1N $HClO_4$ and

dipped into 6N HCl for 15-60 seconds followed by rinsing with distilled H_2O, and finally dried. Sample was then crushed in an Dried coral sample was ground and then added with 10% hydrochloric acid until all carbonate has released as CO_2 base on the reaction :

$$CaCO_{3(s)} + 2\,HCl_{(aq)} \rightarrow CaCl_{2(aq)} + H_2O_{(aq)} + CO_{2(g)}$$

agate mortar and pestle to facilitate dissolution in the reaction flasks.

Where CO_2 is trapped in absorbent such as potassium hydroxyde or sodium hydroxyde solutions. Figure 1 below shows:

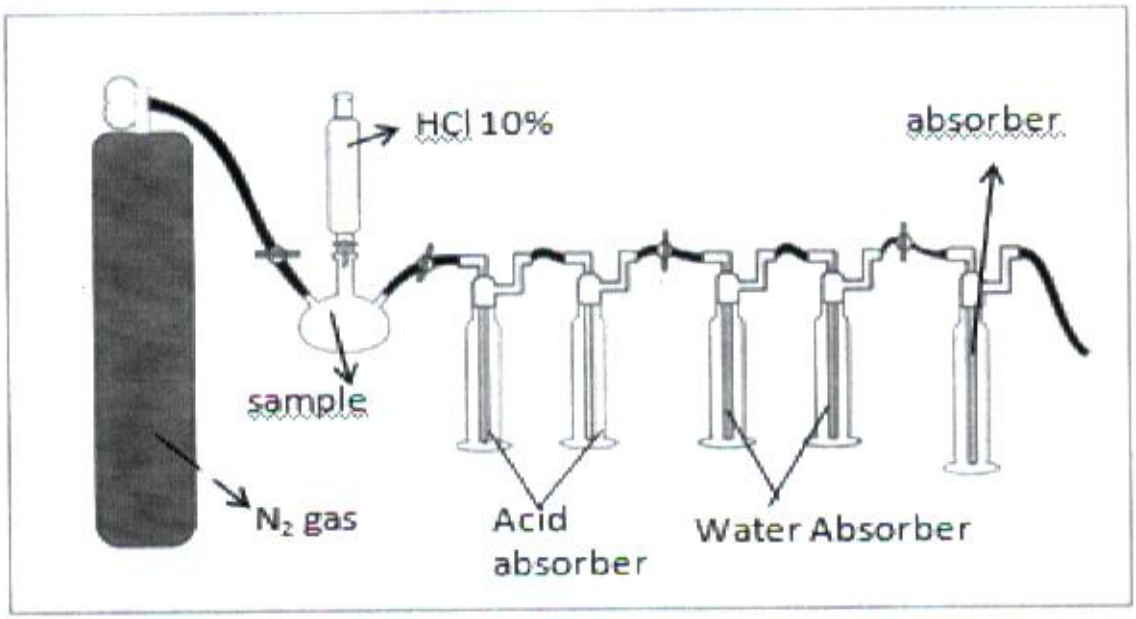

Figure 1. Diagram of CO_2 absorber consisted of nitrogen gas supply, HCl 10% flow,acid absorber, water absorber, and finally CO_2 absorber.

CO_2 gas is trapped with absorbent such as hydroxides (NaOH or KOH) or alkanolamines (MEA, DEA, TEA) Concentration of CO_2 absorbed is determined by difference (weight before and after absorption process) . The solution is put in 20mL vial consisting 8 mL sample plus 12 mL scintillator. Radioactive C-14 is then measured using LSC Hidex SL 300.

RESULTS AND DISCUSSION

Using Liquid Scintillation Counter Hidex 300 SL, one found specific activity of C-14 in sample was 14.72 dpm/gC equivalent to about 317 years. Further investigations are needed beyond surficial sediments by using corer to dig sample as low as possible. LSC will help marine ecologist and geologist in reconstructing Spermonde genesis and its evolution

REFERENCES

Adkins, J.F., Griffin, S., Kashgaria, M., Cheng, H., Druffel, E.R.M., Boyle, E.A., Edwards, R.L., Shen, C.C. 2002. Radiocarbon Dating of Deep-Sea Corals. Radiocarbon. 44 (2) : 567-580.

Canducci, C., Bartolomei, P., Magnani, G., Rizzo, A. 2013. Upgrade Of The CO_2 Direct Absorption Method For Low Level ^{14}C Liquid Scintillation Counting. Radiocarbon. 55 (2-3): 260-267.

Faurescu, I., Varlam, C., Stefanescu, I., Cuna, S., Vagner, I., Faurescu, D., Bogdan, D. 2010. Direct Absorption Method And Liquid Scintillation Counting For Radiocarbon Measurements In Organic Carbon From Sediments. Radiocarbon. 52 (2-3): 794–799.

Libby, W.F. 1960. Radiocarbon Dating. Nobel Lecture. Elsevier Publishing Company: Amsterdam.

Maming, Noor, A., Zakir, M., Raya, I., Jauhari, Kartika, S.A. (2014) Application in Liquid Scintillation Method on Carbon Dating in Determination of Coral Ages from Spermonde Archipelagos. Marina Chimica Acta. 15 (1): 31-35.

Rositasari, R. 1998. Aspek Ekologi dan Sejarah Pembentukan Terumbu Karang, *Balitbang Oseanografi, Puslitbang Oseanologi-LIPI*, Jakarta, 13 **(3 , 4)** : 1-9.

Satrio and Abidin, Z 2007. Perbandingan Metode Sintesis Benzena Dan Absorpsi CO_2 Untuk Penanggalan Radioisotop ^{14}C . Jurnal Ilmiah Aplikasi Isotop Dan Radiasi. 3 (1): 1-34.

Varlam, C, Stefanescu, I., Varlam, M., Popescu, I., Faurescu, I. 2007. Applying Direct Absorption Method And LSC For ^{14}C Concentration Measurement In Aqueous Samples, *Radiocarbon*, **49**(2), 281-289

Varlam, C., Stefanescu, I., Cuna, S., Vagner, I., Faurescu, I., Faurescu, D. 2010. Radiocarbon and Tritium Levels Along The Romanian Lower Danube River. Radiocarbon. 52, (2–3): 783–793.

Yuliati, H., Akhadi, M 2005. Radionuklida Kosmogenik Untuk Penanggalan. Puslitbang Keselamatan Radiasi dan Biomedika Nuklir. Pusat Radiasi Batan.

Vol. 16 No.2
ISSN 1441-2132

NOTES TO CONTRIBUTORS

1. ***Marina Chimica Acta*** is an international medium and occasional reviews of the publications of original studies (research papers) and occasional reviews in the field of marine chemistry. The journal will endeavor to cover all aspects, from chemical processes to theoretical and experimental work, and by providing a central channel of communication, to speed the flow of information in rapidly expanding disciplines. Submitted paper should be written in English.

2. **Manuscript preparation**
   a. The manuscript should preferably be prepared on Pdf format or Microsoft Word in window 7 or 8, with double spacing, double columns, and wide margin on A4 paper using font 12, Times New Roman, no more 15 pages.
   b. The manuscript, file form, should be sent to nuklir@indosat.net.id or alfiannoor744@gmail.com , with formal address : Laboratorium Kimia Radiasi, Fakultas MIPA, Universitas Hasanuddin, Makassar, 90245, Indonesia

3. **Manuscript sequences (research paper)**
   a. Title should be written in English comprising name of the author(s), full address of their affiliation and email. In case more than one author, please indicate to whom correspondence should be sent.
   b. Abstract is written in English, less than 300 words with four - six keywords.

4. **The composition is as follows**
   Introduction
   Material and Method
   Result and Discussion
   Conclusion
   Acknowledgement (if any)
   References (in alphabetical order and on separated sheet from the text)
   Illustration, Table, and Drawing objects should be compiled on separated sheet and should be numbered according to their sequence in the text.

Further information may be requested to nuklir@indosat.net.id or alfiannoor744@gmail.com

Vol. 16 No.1
ISSN 1441-2132

MARINA CHIMICA ACTA

International Edition
Hasanuddin University
Kampus Tamalanrea Makassar 90245
Phone/Fax : 62-411-585991
E-mail : nuklir@indosat.net.id or alfiannoor744@gmail.com
Web : www.marina-chimica-acta.com

TABLE OF CONTENT