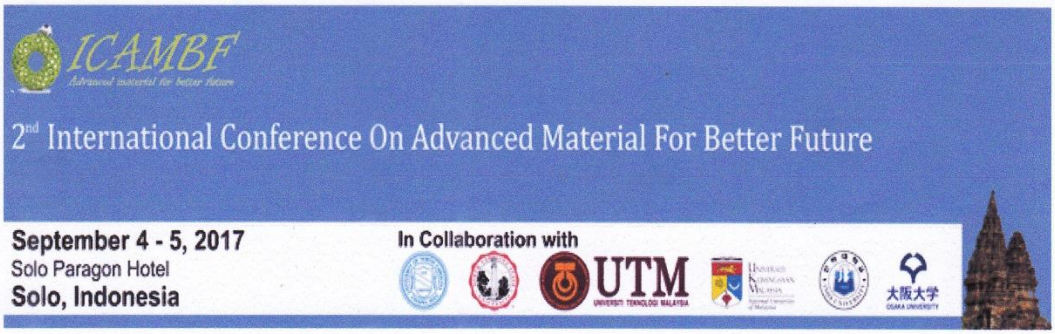


**Menu**

Scope
Important Dates
Registration Rates
Speakers
Call for Papers
Infromation for Authors
Paper Submission
Venue
Contact Us

CONFERENCE CONTENT

Search
All
Search

Browse
By Conference
By Author
By Title

HOME ABOUT LOG IN ACCOUNT SEARCH
ARCHIVE ANNOUNCEMENTS ORGANIZING TEAM

*Home* > *International Conference on Advanced Material for Better Future* >
*International Conference on Advanced Material for Better Future 2017*

# INTERNATIONAL CONFERENCE ON ADVANCED MATERIAL FOR BETTER FUTURE 2017

SOLO PARAGON HOTEL, JL. DR. SOETOMO

SEPTEMBER 4, 2017 – SEPTEMBER 5, 2017

**"Schedule of Conference"**

**ORGANIZED BY:**

Faculty of Mathematics and Natural Sciences Laboratory, Sebelas Maret University

We look forward to welcoming delegates to Surakarta, Central Java to experience the conference and all that this vibrant city with unique cultures.

**INTERNATIONAL CONFERENCE ON ADVANCED MATERIAL FOR BETTER FUTURE**, offers a tremendous opportunity for researchers; practitioners and industrial scientists to represent a diverse multi-disciplinary range of sciences to meet and discuss the cutting edge topics of functional materials. The conference will include plenary speeches, invited presentations, and contributed presentations (oral and poster). Also we bring the ability to interact and advance their work through various speakers and workshop-exhibition sessions.

Selected papers will be published in **"IOP Proceedings" (Open Acces)** which is indexed by SCOPUS. All papers can be published after passing through the reviewing system.

**OBJECTIVES**

1. As a scientific forum covers all frontier topic in advanced materials and nanotechnology, related scientists, researchers and research scholars to communicate their research outcomes, sharing ideas and knowledge about all aspects of advanced materials and nanotechnology,
2. Provides the premier interdisciplinary and multidisciplinary forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns, practical challenges encountered and the solutions adopted in advanced materials and nanotechnology,

OPEN CONFERENCE SYSTEMS

Conference Help

USER
Username
Password
Remember me
Log In

NOTIFICATIONS
View
Subscribe / Unsubscribe

FONT SIZE

INFORMATION
For Readers
For Authors

## Venue

SOLO PARAGON
HOTEL, Jl. Dr. Soetomo

**Scope of the conference**

The conference will emphasize the advanced material and nanotechnology as a broad fuctional material for better future which covering the following topics:

- Metallurgy & Alloy Materials
- Nanomaterials
- Polymer & Composite
- Drug & Biomaterial Technology
- Electronic Materials & Sensing
- Functional Materials
- Construction Materials
- Energy Materials
- Separation Materials
- Computational Materials
- Biomaterial Engineering
- Other areas related to material science

**SPEAKERS**

**The speakers of plenary lectures are:**

- **Prof. Santiago Gomez Ruiz**: Novel Nanosystems for the Treatment of Bone Tumours, Rey Juan Carlos University, Móstoles (Madrid). Spain
- **Prof. Seung Bok Choi**, Smart Materials and Structures, Inha University, Incheon.Korea
- **Prof. Saiful Amri Mazlan,** Magnetorheological Fluid / Elastomer, Universiti Teknologi Malaysia, Kuala Lumpur. Malaysia
- **Prof. Ari Handono Ramelan,** Exploration of Indonesian Natural renewable energy resources, Sebelas Maret University. Indonesia
- **Prof. Roger Narayan,** Novel methods of forming self-assembled nanosructured materials, Joint Department of Biomedical Engineering, University of North Carolina and North Carolina State University. USA
- **Prof. M. Mat Salleh,** Metallaporpirin complexes as a prospective for sensor device**,** Institute of Microengineering and Nanoelectronics, University Kebangsaan Malaysia
- **Prof. Takuji Ogawa**, Self-ordering of nanostructures on solid surfaces, Chemistry Department, Osaka University. Japan

## IMPORTANT DATES

- Abstract submission due: August 15, 2017
- Abstract acceptance notification: August 20, 2017
- Fullpaper submission due: August 25, 2017
- Deadline late for registration : August 25, 2017
- Conference days: September 4-5, 2017

**INTERNATIONAL ADVISORY BOARD**

- Prof. Chennupati Jagadish AC, Australian National University (ANU)
- Prof. Santiago Gomez Ruiz, Rey Juan Carlos University. Spain
- Prof. Nantakan Muensit, Prince Songkla University. Thailand
- Prof. Ari Handono Ramelan, Sebelas Maret University. Indonesia
- Prof. Seung Bok Choi, Inha University. Korea
- Prof. Hanafi Ismail, Universiti Sains Malaysia. Malaysia
- Prof. Roger Narayan, Joint Department of Biomedical Engineering University of North Carolina and North Carolina State University. USA
- Prof. Yuichi Sato, Akita University. Japan
- Prof. Saiful Amri Mazlan, Universiti Teknologi Malaysia. Malaysia
- Prof. Dorian Sabaz, Simon Fraser University. USA
- Prof. Takuji Ogawa, Osaka University. Japan
- Prof. M. Mat Salleh, University Kebangsaan Malaysia. Malaysia

# International Conference on Advanced Material for Better Future 2017

## SOLO PARAGON HOTEL, Jl. Dr. Soetomo

## September 4, 2017 – September 5, 2017

**ORGANIZED BY:**

Faculty of Mathematics and Natural Sciences Laboratory, Sebelas Maret University

We look forward to welcoming delegates to Surakarta, Central Java to experience the conference and all that this vibrant city with unique cultures.

**INTERNATIONAL CONFERENCE ON ADVANCED MATERIAL FOR BETTER FUTURE**, offers a tremendous opportunity for researchers; practitioners and industrial scientists to represent a diverse multi-disciplinary range of sciences to meet and discuss the cutting edge topics of functional materials. The conference will include plenary speeches, invited presentations, and contributed presentations (oral and poster). Also we bring the ability to interact and advance their work through various speakers and workshop-exhibition sessions.

Selected papers will be published in **"IOP Proceedings" (Open Acces)** which is indexed by SCOPUS. All papers can be published after passing through the reviewing system.

**OBJECTIVES**

1. As a scientific forum covers all frontier topic in advanced materials and nanotechnology, related scientists, researchers and research scholars to communicate their research outcomes, sharing ideas and knowledge about all aspects of advanced materials and nanotechnology,
2. Provides the premier interdisciplinary and multidisciplinary forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns, practical challenges encountered and the solutions adopted in advanced materials and nanotechnology,

**Scope of the conference**

ICAMBF
Advanced Material For Beter Future

UNIVERSITAS SEBELAS MARET
FAKULTAS MIPA

The conference will emphasize the advanced material and nanotechnology as a broad fuctional material for better future which covering the following topics:

- Metallurgy & Alloy Materials
- Nanomaterials
- Polymer & Composite
- Drug & Biomaterial Technology
- Electronic Materials & Sensing
- Functional Materials
- Construction Materials
- Energy Materials
- Separation Materials
- Computational Materials
- Biomaterial Engineering
- Other areas related to material science

ICAMBF
Advanced Material For Better Future

UNIVERSITAS SEBELAS MARET
FAKULTAS MIPA

Amanatie Amanatie:

Thank you for your submission, "SYNTHESIZED OF 2.7 DI-HYDROXYXANTHONE FROM XANTHONE AND ANTI-MALARIAL ACTIVITIES" to International Conference on Advanced Material for Better Future. With the online conference management system that we are using, you will be able to track its progress through the editorial process by logging in to the conference web site:

Submission URL:
https://icambf.uns.ac.id/?schedConf=icambf2017&page=author&op=submission&path%5B%5D=3158
Username: amanatie

If you have any questions, please contact me. Thank you for considering this conference as a venue for your work.

Dr. Sayekti Wahyuningsih S.Si.,M.Si
International Conference on Advanced Material for Better Future

---

International Conference on Advanced Materials for Better Future 2016
International Conference on Advanced Materials for Better Future 2017
https://icambf2016.uns.ac.id/icambf2016?schedConf=icambf2017&page=index

Klik di sini untuk Balas atau Teruskan

ICAMBF
Advanced Material For Better Future

UNIVERSITAS SEBELAS MARET
FAKULTAS MIPA

UNIVERSITAS
SEBELAS MARET
FACULTY OF MATHEMATICS
AND NATURAL SCIENCES

2nd ICAMBF
International Conference on Advanced Material for Better Future

# Certificate of Participant

This is to certify that

## Amanatie

has participated 2nd International Conference on Advanced Material for Better Future
conducted in Surakarta, September 4th & 5th 2017

as

Presenter

**In paper entitled: Synthesized of 2,7 Di-Hydroxyxanthone from Xanthone and Antimalarial Activities**

Organized by,
Faculty of Mathematics and Natural Sciences
Universitas Sebelas Maret

Organizing Committee,
International Conference on Advanced Material for Better Future

ICAMBF
Advanced Material For Better Future

Prof. Ir. Ari Handono Ramelan, M.Sc.(Hons)., Ph.D.
Chairman

In Collaboration with

OSAKA UNIVERSITY

UTM
UNIVERSITI TEKNOLOGI MALAYSIA

*2rd International Conference on Advanced material For Better Future*
*September 4-5, 2017, Solo Paragon Hotel, Solo, Indonesia*

# SYNTHESIZED OF 2.7 DI-HYDROXYXANTHONE FROM XANTHONE AND ANTI-MALARIAL ACTIVITIES

**Amanatie[1*], Jumina[2], Mustofa[3], Hanafi[4]**

[1] *Department of chemistry. Faculty of Mathematics and Natural Sciences. Yogyakarta State University. Yogyakarta, Yogyakarta. 55281 Indonesia.*

[2] *Department of Chemistry. Faculty of Mathematics and Natural Sciences. Gadjah Mada University. Yogyakarta. 55281 Indonesia.*

[3] *Faculty of Medicine . Gadjah Mada University. Yogyakarta.55281 Indonesia.*

[4] *P3K LIPI Serpong Tanggerang. 15314 Indonesia.*

E-mail: amanatie_uny.ac.id.

**Abstract:** The purpose of the research is to synthesize 2,7- di-hydroxyxanthone compounds from xanthone and to evaluate antiplasmodial against activities. The synthesize of 2,7-di-hydroxyxanthone compounds worked with chromatogramphy methods including Thin Layer Chromatography (TLC), Vacuum Liquid Chromatography (VLC). A compound structures were determined based on the spectroscopic evidences including, Infrared (IR), one dimension (1-D) and two dimension (2-D) Nuclear Magnetic Resonance (NMR) spectra and comparison the spectroscopy data with related data from references. The biological properties of compounds are evaluated towards antiplasmodial against activity. The result of the product was obtained as white solid in 63.49% yield. The IR spectrum showed the absorption at 3433 $cm^{-1}$ Which was reinforced with a sharp attack at 1087$cm^{-1}$ indicating the stretching of OH, while the stretching of aromatic C=C appeared at 1620 $cm^{-1}$. The $^1$H-NMR (500MHz, and DMSO –d6) spectrum showed that the aryl protons appeared in the region of δ12.98 ppm. In this region, there were 2 singlet at $\delta_H$ 12.98 ppm ( 1H, 2-OH) and (1H,7-OH) and shows the presence of two OH groups. Based on spectroscopy analyses, it could be started that the reaction of 2.7 di-aminoxanthone with $NaNO_2$/HCl and $H_3PO_4$ produced 2.7- di-hydroxyxanthone. *In vitro* antiplasmodial assay of the product synthesized 2,7 di-hydroxyxanthones against .*Falciparum* strain of 3D7 showed that the $IC_{50}$ values of 2,7-di-hydroxy xanthone, were 0.31 µg/mL, respectively

**Keywords**: *Synthesized*, 2,7 dihydroxyxanthone, *invitro*, *antiplasmodium*.

## 1 Introduction

Indonesia is an archipelago country that has various types of flora and fauna. The geographical position of Indonesia passed by equatorial line caused Indonesia to have tropical climate. The diversity of Indonesian flora and fauna is high in number compared to countries in the America. The condition of Indonesian plants is strongly influenced by climate, soil, and relief. One type of plant that has been known in Java is Garcinia *dulcis* or in everyday life isn called mundu plants. Some examples of other Garcinia types are Garcinia *ambonensis* in Ambon called large sour wood, Garcinia bancana in West Sumatra called kasturi, Garcinia mangostana known as mangosteen, and Garcinia hombroniana in Malacca are called mangosteen forests. Garcinia dulcis has a raw fruit that can be eaten when it is ripe. Xanton derived compounds are commonly found in Garcinia plants commonly known as mangosteen. Some of the xanton

derivatives have biological and pharmacological activities such as 2-hydroxy xanton, 2.7 dihydroxyxanthone and have anti-malarial activity.

Malaria is global health problem in developing countries. The efforts to eliminate this disease have been doing in many ways. However, the expected results is still not given. Evenmore, malaria becomes one of threatening disease in the world. This is indicated by the increase of malaria incidence especially in the endemic area.

There are several problems against malaria. The main problems is the presence of malaria vectors (mosquito) which are resistant to insecticide and the resistant malaria parasites (such as *plasmodium falciparum*) to anti-malaria drugs (such as chloroquin). The parasites are widely spread almost in all endemic area at whole over the world. Therefore, such anti-malaria drugs are not effective and sensitive anymore. These reasons lead the researchers to find the new anti-malaria drugs. One of strategies is based on the development of active compounds obtained from medicinal plants, which are traditionally used by people to cure malaria **[1]**.

One of tropical plants employed as the traditional medicine is plant of *Garcinia dulcis*. It can be classified into the family of *Gutterferae* and much found in Indonesia (well known as mangosteen plant). This plant has been proven to display antiplasmodium activity. From 400 of *Garcinia* plants, it was found that xanthone was the major component, beside terpenoid, benzophenone and biflavonoid. 2-hydroxy xanthone, 2,7 dihydroxyxanthone had the potential biological activies. The 2.7-di-hydroxyxanthone as anti-malaria agent has not been reported.

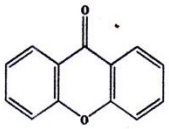

**Fig. 1 Structure of xanthone**

The efforts to find the new anti-malaria drugs could be done in several ways, such as: a) synthesis of 2-hydroxyxanthone compound which could inhibit the specific metabolism of parasite, b) isolation of active compounds of natural products which are traditionally employed to cure malaria, and c) synthesis of analog compound of anti-malaria drugs, **[2].**

This research was initialized by isolating and identifying the xanthones from the root of *G. Dulcis* as well as performing the anti-malaria assay **[3]**. However, the yield obtained was very low. Therefore the author tried to find the way to increase the yield. As an example, the researchers perform the study on relationship between structure and activity of xanthones. According to the obtained equation, the design on xanthone could be done by modifying the type and position of substituent on the active sites. The designed xanthones could be then synthesized and applied in the anti-malaria assays.

Several xanthone derivatives were reported to display anti-malaria activities **[4]**. Xanthones could selectively inhibit the growth of *P. falciparum* in culture. Study on anti-malaria activity of xanthone derivatives showed that there was correlation between the structure and the anti-malaria activity ($IC_{50}$). Preliminary study on $IC_{50}$ value (the inhibition value of *P.falciparum* growth) with semi empirical method of PM3 showed that the anti-malaria activity was correlated with the electronic properties of the substituents **[5]**.

Xanthone and its derivatives were commonly obtained from isolation of natural products. Isolation of xanthone has been conducted from the leave **[6]** and bark **[7]** of *Garcinia dulcis*. **[8]** has obtained new xanthone derivatives of 7-O-methyl garcinon-E from *G. cowa* with $IC_{50}$ of 1.50-3.00 µg/mL. Other xanthone derivatives of 1,3,7-trioxygenated and prenylated xanthone have been isolated from Calophylum caledonicum **[9]**. The synthesis of 2,7-dihydroxyxanthone

from xanthone has been conducted by the previous researchers. The originality of this research could be seen as the synthesized for 2.7-dihydroxy xanthones have been conducted. The *in vitro* antiplasmodium assay of the product synthesized 2,7 -dihydroxyxanthones to *P. falciparum* strain 3D7 has not been reported

This research was synthesized of 2,7 di-hydroxyxanthone and analyzed of the product synthesized 2.7dihydroxyxanthones using UV-Vis, IR, $^{1}$H-NMR, $^{13}$C-NMR spectrometers and Test *in vitro* anti-malaria assay of the synthesized 2,7-dihydroxy xanthones against *P.falciparum*.

This research was conducted with the main aims of synthesizing the 2,7-dihydroxyxanthones and performing the *in vitro* anti-malaria assay of the 2.7 di-hydroxyxanthone. The specific aims were 1) To synthesized the 2,7dihydroxy xanthone from 2,7-diaminoxanthone; 2) To analyzed the product synthesized 2,7di-hydroxyxanthones using spectroscopy method (FTIR, $^{1}$H-NMR, $^{13}$C-NMR, spectrometer); and 3). To conduct new anti-malarial activity of the 2,7-dihydroxy xanthone.

## 2 Material and Method

### 2.1. Material chemical compounds:

Xanthone, Hydrogen Chloride (HCl), Natrium Nitride ($NaNO_2$), phosphoric acid, ethanol-aquades. HEPES buffer, P. *falciparum*, Gentamicin sulfate, $NaHC0_3$, serum and red blood cells, Giemsa dyes.

### 2.2. General procedure:

Spektra of Infra Red (IR): Perkin-Elmer Spectrum One FT-IR spectrophotometers. Spektra of $^{1}$H and $^{13}$C NMR: spektrofotometer JEOL LTD ECP400, operated at 400 MHz ($^{1}$H) and 100.53 MHz ($^{13}$C), use aceton-$d_6$ as solvent and TMS as internal standard. Separation and purification used Thin Layer Chromatography (TLC), Vacuum Liquid Chromatography (VLC).

### 2.3. Prosedure of the synthesized of 2,7di-hydroxyxanthone

The 2,7diaminoxantone compound of 0.01 gram (0.00005 mol) was introduced into the 3-neck flask, suspended in Hydrogen Chloride (HCl) and added 10 mL of Natrium Nitride ($NaNO_2$) 2.8 M at 5 ° C until the solution changed entirely to yellow. The mixture was stirred at 5° C. for 30 minutes and then added 15 ml of 1 M Hydrogen Chloride (HCl) solution and be cooled. The resulting mixture was stirred at 5°C for 5 hours, acidified with phosphoric acid. The product is recrystallized with ethanol-aquades. The obtained product was analyzed by Infrared (IR) spectrometer, one dimension (1-D) and two dimension (2-D) Nuclear Magnetic Resonance (NMR) spectra.

### 2.4. Prosedure Testing the effect of antiplasmodium *in vitro*

Testing the effect of antiplasmodium in vitro is required P. *falciparum* culture. The cultures used were 3D7, bred by the Trager and Jensen method modified by Waruyanti, **[10], [11]** by candle jar with RPMI 1640, HEPES buffer, Gentamicin sulfate, NaHC03, serum and red blood cells. The breeding is carried out in a sticked glass candle and incubated glass exchanger in the incubator at 37°C. The medium is replaced periodically every 24 hours. The *P. falciparum* stage required for this test was a ring shaped young *trophozoite* obtained by synchronization in a 5% w/v sorbitol solution. The anti-plasmodium effect test of the 2-hydroxyxanton compound is performed in a microbial well. Into the micro well plate which has been given the test compound with various concentrations, given 50 µl of P. falciparum suspension. Incubate in incubator at 37°C for 24 hours. The results were evaluated by making the dosage form with Giemsa dyes. The number of living schizons accounted for 200 asexual parasites, used as a criterion for the effects of antiplasmodium. From the observation results obtained $IC_{50}$ value

indicates that the test compound has activity inhibiting the growth of P. falciparum in vitro. Then continued data analysis with probit analysis.

## 3 Result and Discussion

### 3.1. Synthesized of xanthone

There are several routes to synthesized xanthone (Figure 2). The conventional one is Grover, Shah and Shah method. This method requires salicylic acid and phenolic compounds. The mixture is heated together with zinc chloride in phosphoryl chloride. The limitation of this method is the low yield. Thus, this method is well developed.

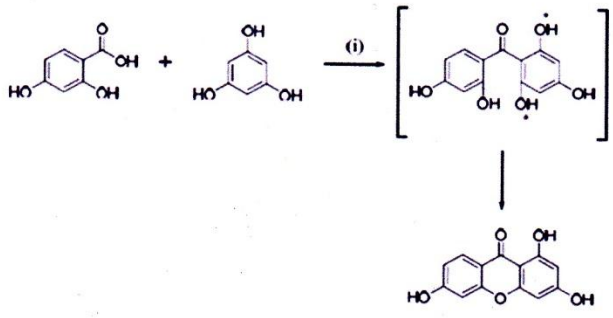


**Fig. 2 Synthesis of xanthone via Grover, Shah and Shah method.**

Another route is benzophenone route. This compound could be obtained via Friedel-Craft acylation between benzoil chloride and anisole. The other strategy is via Fries rearrangement of diaryl ester derivatives (Figure 3) **[12].**

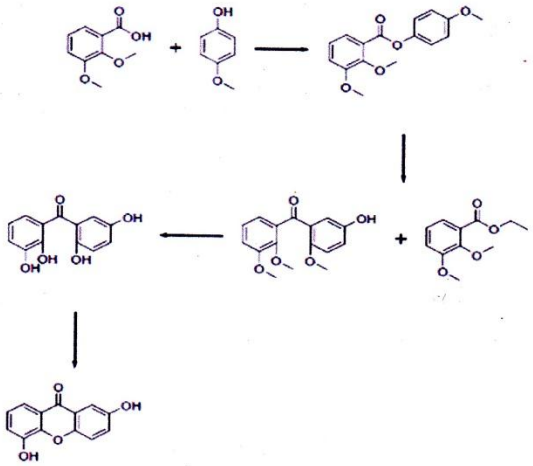

**Fig. 3 Synthesis of xanthone via benzophenone route**

### 3.2 Synthesized of 2-hydroxyxanthone

The synthesized 2-hydroxyxanthone from monoaminoxanthone was the reacted with $NaNO_2$, HCl, and $H_3PO_4$ (Figure 4).

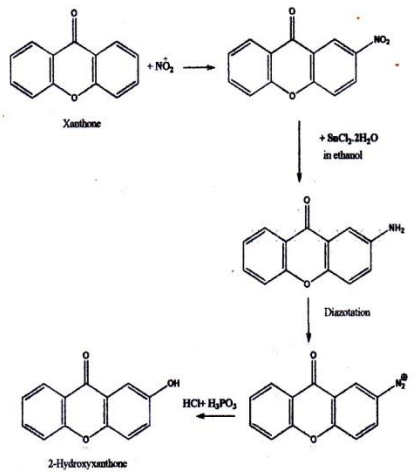


**Fig. 4. Synthesized of 2-hydroxyxanthone**

### 3.3. Analyzed of 2-hydroxyxanthone

2-Hydroxy xanthone was obtained by reacting 2-aminoxanthone with $NaNO_2$ to produce diazonium salt. Then, hydrolyzed of the salt produce Produced 2-hydroxyxanthone . The product was obtained as white solid in 69,80% yield. The IR spectrum showed the absorption at 3433 $cm^{-1}$ indicating the stretching of OH, while the stretching of aromatic C=C appeared at 1620 $cm^{-1}$.

The $^1$H-NMR spectrum showed that the aryl protons appeared in the region of δ 6,97 -7,78 ppm. In this region, there were 4 doublet at $\delta_H$ 6.97 (H, $J$ = 8.3 Hz),

7.26 (H, $J$=8.3 Hz) ,7.37 (H, $J$=8.3 Hz) and 7.78(2H,$J$=23Hz) ppm as well as one doublet of doublet peak at δ 7.50 ppm (2H,*dd*,$J$ and 8.3 Hz). One singlet peak from hydroxyl proton appeared at $\delta_H$ 12.53 ppm.

Identification of the product using $^{13}$C-NMR showed aryl carbons at δ106, 110, 117, 137 and 155 ppm. The peak at δ 113, 116, 118, 135, 136, 161 dan δ 179,2 from the carbonyl group while the peak at δ 175 ppm was the peak for the carbon ($C_2$) next to hydroxyl group.

Based on spectroscopy analyses, it could be stated that the reaction of aminoxanthone with $NaNO_2$/HCl and $H_3PO_4$ produced 2-hydroxyxanthone. The reaction mechanism was presented on Figure 5.

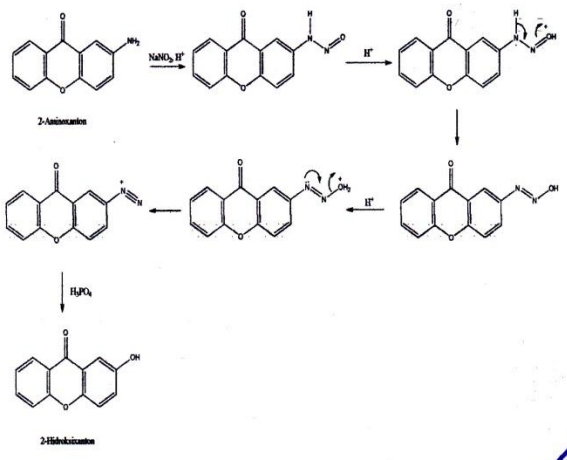

**Fig. 5. Mechanism of synthesized of 2-hydroxyxanthone**

### 3.4. Synthesized 2.7 dihydroxyxanthone

The product was obtained as white solid in 63.49% yield. The IR spectrum showed the absorption at 3433 $cm^{-1}$ Which was reinforced with a sharp attack at 1087$cm^{-1}$ indicating the stretching of OH, while the stretching of aromatic C=C appeared at 1620 $cm^{-1}$. The $^1$H-NMR (500MHz, and DMSO –d6) spectrum showed that the aryl protons appeared in the region of δ12.98 ppm. In this region, there were 2singlet at $\delta_H$ 12.98 ppm (1H, 2-OH) and (1H, 7-OH), shows the presence of two OH groups. An aromatic proton appears in the intermediate region of δ 7.30-7.69ppm Ie 7.69 for $H_1$ and $H_8$ (2H.d.*J* =2.4Hz), 7.43 for $H_3$ and $H_6$ (2H, *dd*, *J* = 2.4 and 8.2Hz) and 7.30 ppm for $H_4$ and $H_5$ (2H.d.j= 8.2Hz).

Identification of the product using $^{13}$C-NMR( 125MHz, $CDCL_3$) Shows the presence of three peaks of the CH group aryl carbons at 119.56 (2C, $C_4$ and $C_5$, 11.8.74 ( 2C, $C_3$ and $C_6$), and 117.41ppm(2C, $C_1$ and $C_8$). 3 peaks of quaternary carbon groups appear on the region 151.44 (2C. $C_9$ and $C_{12}$), 148.58 (2C, $C_2$ and $C_7$) and 122.45 ppm (2C, $C_{10}$ and $C_{11}$), 1 peak of carbonyl group C=O at 179.22 ppm at $C_{13}$.

### 3.5. Anti-malarial Activity Test

Malaria is a disease caused by the infection of protozoa from the genus of *Plasmodium*. There are 4 species of *Plasmodium* which could cause malaria. They are *P. falciparum*, *P. vivax*), *P. malariae*, *P. ovale* (**[13]**, **[14]**, **[15]**, **[16]**, **[17]**). Among them, *P. Falciparum* is the most responsible to the malaria caused death. Moreover, patients could be infected by more than one species of *Plasmodium*, for example *P. falciparum* and *P.vivax* in subtropical area, *P. falciparum* and *P. malariae* in tropical country in Africa. Results of survey showed that there are 15 million case of malaria, where 70 million citizens live in the malaria endemic area. In Jawa and Bali, the case of malaria increased from 0.12 per 1,000 citizens to 0.81 per 1,000 citizens **[18]**.

The infection of malaria is done by *Anopheles* female mosquitoes. Among 400 species of *Anopheles*, 67 species could be the vector of malaria. In Indonesia, there are more than 80 species of *Anopheles* and 24 species was reported to be malaria vector.

Malaria has been reported to be the major cause of the increase of mortality, i.e. 2.7 million people annually. This disease attacks children under 5 years (85%) and pregnant women in Africa. The group with high risk to be infected by malaria is worker from endemic area that entering the endemic area. In 2006, it was predicted that there were 247 case of malaria in the world and the mortality of 881,00 (90% in Africa, 4% in South East Asia, 4% in Mediterania and 2% in other area)**[19]**.

Clinical symptoms of malaria are various depend on the parasite. General symptom is fever. Infection by *P. falciparum* is the most one as this parasite attack the erythrocit and skizogoni in 36-48 hours. The attack could lead the physical change on the erythrocit, e.g. erythrocit become thinner, the diameter become larger, thus it leads anemia. If it is not be treated, the anemia will become more serious and could lead the permisiosa complication.

The efforts to eliminate malaria are not easy. The increase of malaria cases because of various factors such as resistant parasite to the anti-malaria drugs and the resistant *Anopheles* to the insecticide.

*Plasmodium* Resistance is the ability of strain of parasite to survive and breed on the medication using active medicine administered in the standard dosage or higher. Resistance of malaria parasite to standard anti-malaria drugs of chloroquin was found in South America (Columbia and Venezuela) in 1960 **[20]**, and followed in Thailand in 1961.Then, the resistance spread in East Africa in 1978. In Indonesia, the resistance of *P. falciparum* to chloroquin was reported in Kalimantan in 1974 and spread in all provinces in 1996 **[21]**. Additionally, resistant *P. vivax* to chloroquin was also found in Papua, Nias, Flores and Sulawesi Utara. The situation is getting worse due to the case of resistance of *P. falciparum* to drugs of sulfadoxin-pirimetamine in 10 provinces and kina in 5 provinces in Indonesia **[22]**. Another resistance to meflokuin has also been reported. In fact the drug has not been utilized in Indonesia **[23]**.

Chloroquin as the first line anti-malaria drug in the world has important role in controlling and medication of malaria. The resistance of *P. falciparum* to chloroquin could be caused by the operational factors such as subteurapeutic dosage and the intensive application of chloroquin as anti-malaria drug. The other important factors are pharmacological and transmission factors[21]. The consumption of chloroquin for long period and frequently although in teurapeutic dosage, could lead the parasite to adapt by carrying out other metabolism pathways. In addition, the genetic recombination on sexual stadium between gametocyte and different strain in the mosquitoes could lead the genetic mutation **[24]**.

Chloroquin has been considered to have activity in inhibiting the production of hemozoin on the vacuole of malaria parasites. However, the resistant mechanism of *P. falciparum* to chloroquine has not been known yet **[25]**. There were several hypotheses regarding the resistant mechanism, such as the change in metabolism pathway, thus the anti-malaria drug which enter the *Plasmodium* could not be metabolized properly. Characteristic of resistant parasites to chloroquin is the fast efflux, while that of sensitive parasites is it could survive against radioisotope-label-drug for longer period **[26]**. The resistance has forced the researchers to find new anti-malarial drugs to substitute the non sensitive anti-malaria drugs against *P. falciparum*.

The study gives to synthesized 2.7 di-hydroxyxanthone and biological activity as well as new anti-malarial activity with $IC_{50}$ = 0.31µg/mL.

**Conclusions**

According to results and discussion, it could be concluded that: 1) 2,7di-Hydroxy xanthone which theoretically displayed anti-malarial activity. 2) Reaction of 2,7-di-aminoxanthone with $NaNO_2$, HCl and $H_3PO_4$ produced 2,7 di-hydroxy xanthone in 63.49 % yield. 3) *In vitro* antiplasmodial assay of the product synthesized 2-hydroxyxanthones against *P. falciparum* strain of 3D7 showed that the $IC_{50}$ values of 2,7-di-hydroxyxanthone, were 0.31 µg/mL, respectively.

## References

[1]. Mustofa,, *Malaria between hope and reality*, Speech inauguration of Professor of Gadjah Mada University.Yogyakarta 2009.

[2]. Sholikah, E.N, *New Antiplasmodium N-Alkyl and N-Benzyl 1,10-Fenantrolin Derivatives: Study In Vitro Activity, Cytotoxicity, Physical Properties of Chemistry, And Pharmacokinetics Profile*, Dissertation, Doctoral Program, Faculty of Medicine, Gadjah Mada University, Yogyakarta, 2010.

[3]. Amanatie, Jumina Mustofa, and Hanafi, M , *Development of new compound xanton derivatives from Garcinia dulcis root as antiplasmodium*, Research Report on Incentive

Grant of Applied Research in the Field of Health and Pharmaceutical Technology Year II and III), Research Institute of Yogyakarta State University,Yogyakarta, 2008-2009.

[4]. Likhitwitayawuid,K.,Chanmahasathien,W.,Ruangrungsi, N. dan Krungkrai,J., *Antiplasmodiuml xanthones* from *Garcinia cowa*, Plana Medica.,2000, 64,70- 7.

[5]. Likhitwitayawuid, K., Ruangrungsi, N., and Krungkrai, J. *Antiplasmodiuml xanthones from Garcinia cowa*, **Planta medica**, 2001,.64,7 0-72.

**[6].** Kosela, S., Hu, I.H., Rahmatia, T., Hanafi, M. dan Sim, K.Y., *Dulxanthones F-H, three New pyranoxanthones* from *Garcinia dulcis*, J.Nat. Prod, 2000, 63, 406-407.

**[7].** Hanafi, M., Soemiati, A., Kosela, S. dan Leslie, J.H., Identification and cytotoxic L1210 cell evaluation of prenylated pyranoxanthonoids from *Garcinia dulcis* fruit (*Gutteferae*) nHexane Extract. *Prosiding Seminar Internasional UGM*, 2004.

[8]. Likhitwitayawuid, K., Chanmahasathien,W., Ruangrungsi, N. dan Krungkrai, J. *Antiplasmodium xanthones from Garcinia cowa*, Plana Medica., 2000, 64,70- 72.

[9]. Hay, A.E., Helesbeux, J.J., Duval, O., Labaied , M., Grellier, P. and Richomme, P, Antiplasmodiuml xanthone from *Calophylum caledonicum* and *Garcini viellardii*, Life Sci., 2004, 75, 3077-3085.

[10]. Wijayanti, M.A., Supargiyono, Mustofa, Sholikhah, E.N., Jumina, Tahir, I., and Hadanu, R., Heme Polymerization Inhibitory Activity (HPIA) of N-Alkyl and N-Benzyl-1,10-phenanthroline Derivatives as Antiplasmodium, *Proceeding of International Conference on Chemical Sciences (ICCS-20070: Jointly held by Department of Chemistry Gadjah Mada University and Department of Chemistry, Universiti Sains Malaysia, Yogyakarta,* 2007, 237-242.

[11]. Neetu Tomar, Shiv Vardan Singh, Chottes Lal Jain, Gaurav Verma, Anirban Pal, Vineeta Singh, Synthesis and antiplasmodial Activity of Some Novel Chalcone Derivatives. *Asian Journal of Pharmacuetical and research* . Asian J Pharm Clin Res, 2015, Vol 8, Issue 2 47-50.

[12]. Naidoo, J.M., *Novel Methodology for The Synthesis of Xanthones*, Tesis, University Withwatersrand, Johannesbur, 2009.

[13]. Siswandono dan Sukardjo, B., Principles of drug design, Erlangga university Press, Surabaya, 2000.

[14]. Ramya, T.N.C., Suroliya, N., dan Surolia, A, *Survival Strategis of the malaria parasite Plasmodium falciparum*, Curr. Sci., 2002, 83, 7, 818-825.

[15]. Zein, U., Recent handling of malaria falciparum, Repsository, Universitas Sumatra Utara, Medan,2005.

[16]. Ashley, E., McGready, R., Proux, S. dan Nosten, F., *Malaria, Travel medicine and Infectious Disease*, 2006, 4, 159-173.

[17].Daily, J.P., *Antiplasmodium drug therapy. The role of parasite biologi and drug resistance*, J.Clin. Pharmacol.,2006, 46,1487-1497.

[18]. Syamsudin, Dewi, R.M. and Hernita *Effect of gelugur acid leaves (Garcinia atroviridis Griff Anders) Against Plasmodium bergei in mice*, Airlangga Pharmacy Magazine,, 2004 4, 3,101-104.

[19]. WHO, *Malaria*, http://www.who.int/mediacentre/factsheets/fs094/en/, 2013, accessed on 23 Maret 2013.

[20]. Krogstad, D.J., *Malaria as a Reemerging Disease*, Epidemiologic Reviews, 1996,18, 1, 77-89.

*Amanatie, Jumina, Mustofa, Hanafi*

ICAMBF
Advanced Material For Better Future

UNIVERSITAS SEBELAS MARET
FAKULTAS MIPA

[21]. Zein, U., Recent handling of malaria falciparum Repsository, University of Sumatra Utara, Medan, 2005.

[22]. Achmad, M.F. dan Sutanto, I, *Peran gen pfindr-1 On the mechanics of Plasmodium falciparum resistance to chloroquine*, Indonesian Medical Magazine 2003, (53) 2,72.

[23]. Emiliana, T., Tuti, S., Renny, M., Arbani, P.R. dan Harijani, A.M., *Sensitivitas Plasmodium falciparum terhadap beberapa obat antiplasmodium di desa Pekadangan, Jawa Tengah*, Cermin Dunia Kedokteran, 1993, p.82.

[24]. Black, R.H., Canfield, C.J., Clide, D.F., Peters, W. dan Wernsdorfer, W.H., *Chemotherapy of Malaria,* 2ndEd, WHO, Geneva. 1968,136, 36-37.

[25]. Zaranz, B., Jaso, A., Lima, L.M., Aldana, I., Monge, A., Maurel, S. dan Sauvain, M., *Antiplasmodial activity of trifluoromethyl-2- carbonylquinoxaline-di-N- oxide derivatives*, Brazilian J. Pharm. Sci, 2006, 42, 3, 357-361.

[26]. Ramya, T.N.C., Suroliya, N., dan Surolia, A., *Survival Strategis of the malaria parasite Plasmodium falciparum*, Curr. Sci., 2002, 83, 7, 818-825.

# *"Program & Schedule"*

ICAMBF

*Advaced material for beter future*

## 2nd International Conference on Advanced Material for Better Future

ICAMBF

Advanced Material For Beter Future

UNIVERSITAS SEBELAS MARET

FAKULTAS MIPA

## General Information

### *Date:*

September 4-5th, 2017

### *Venue*

Solo Paragon Hotel & Residences
Jalan Dr. Sutomo, Banjarsari, Solo (Surakarta), Indonesia, 57125

### *Official Language*

English

### *On-Site Registration*

Emerald Grand Ballroom, Solo Paragon Hotel & Residences

### *Paper Submission for publication*

Selected papers will be published in "IOP Proceedings" (Open Access) which is indexed by SCOPUS. All paper can be published after passing through the reviewing system.

### *Information for Oral Presentation*

- Presenters are requested to come to this event on time on September 4-5th, 2017 at 8.15 am.
- Presenters are requested to submit their file presentation (file type: power point) in "presentation submission desk" while do registration.
- All presentation of oral presenter will be delivered in parallel session.
- Parallel session is distributed according to the field of each presenter that have correlation topic of their research.
- All presentation will be presented their work according to schedule below. The existing fields consist of:

| Place | The existing fields | |
|---|---|---|
| | Day 1 | Day 2 |
| Emerald 1 | Metal & Alloy Material/ Metallurgy (MA) | Polymer & Composite (PC) |
| Emerald 2 | Functional Materials (FM) | Civil & Construction Materials (CM) |
| Red Shapphire | Biomedical Materials/Biomaterial Technology (BB) | Energy Materials/Nanomaterials (EN) |
| Blue Shapphire | Material Chemistry and Physics (MCP) | Miscellaneous (MS)/ Biomedical Materials/Biomaterial Technology (BB) |

- All presenter will be present their work for 10 minutes and 5 minutes later to Q&A.

## *Information for Poster Presentation*

- Poster presenters are requested to come to this event on time on September 4-5th, 2017 at 8.15 am.
- The poster presentation will be held in a special session on the second day (Tuesday, September 5th 2017).
- Poster presenters are requested to submit their file poster presentation (filetype: power point 97-03 + audio) and x-banner poster in "poster submission desk" while do regristration on September 4th, 2017.
- During the poster session, there will be poster presentation playback (power point + audio that consisting of 3 slides containing: thought framework of the research, methods, and brief summary of results for 3 minutes), while all of participants going on the x-banner poster exhibition.
- During the poster session, all of poster presenters stand by beside of the x-banner poster and promote their research work to the participants.
- Guideline for x-banner poster: applied in size 160 x 60 cm. The contens of x-banner poster are logo of icambf and your affiliation, ID number, title, name and affiliation of authors, introduction, methods, results, conclusion, references, ancknowledgement.

  The font size of the title >40 pt

  The font size of the name and affiliation of authors is 30 pt

  The font size of the text 24 pt

- Guideline for poster presentation (filetype: power point 97-03 + audio) consisting of 3 slides containing: thought framework of the research, methods, and brief summary of results for 3 minutes (maximum). Put the ID number in the top-right corner on the first slide.

ICAMBF
Advanced Material for Beter Future

UNIVERSITAS SEBELAS MARET
FAKULTAS MIPA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11.15 am – 12.00 pm | **PLENARY 4**<br>Speaker: Prof. Saiful Amri Mazlan<br>Universiti Teknologi Malaysia<br>Kuala Lumpur, Malaysia<br>Chairperson: Ir. Ubaidillah, ST., M.Sc., Ph.D.<br>**"The Performance of Rheological Properties of MR Materials by having Different Shapes of Magnetic Particles"**<br>(Emerald Grand Ballroom) | | | | | | | |
| 12.00 pm – 13.00 pm | **LUNCH BREAK**<br>(Foyer UG) | | | | | | | |
| 13.00 pm – 16.45 pm | **Tea Break and Parallel Session** | | | | | | | |
| | **Parallel session: 1A – Metal & Alloy Material/ Metallurgy (MA)**<br>Chairperson: Dian M<br>(Emerald 1) | | **Parallel session: 1B- Functional Materials (FM)**<br>Chairperson: Iwan Yahya<br>(Emerald 2) | | **Parallel session: 1C: Biomedical Materials/Biomaterial Technology (BB)**<br>Chairperson: Anif Nur Artanti<br>(Red Sapphire) | | **Paralel session 1D- Material Chemistry and Physics (MCP)**<br>Chairperson: Fitria Rahmawati<br>(Blue Sapphire) | |
| | 13.00 – 13.15 | **Keynote. 1**<br>ID078<br>Murni Handayani | 13.00 – 13.15 | **Keynote 2.**<br>ID072<br>Sulistyo Saputro | 13.00 – 13.15 | **Keynote 3.**<br>ID091<br>Venty Suryanti | 13.00 – 13.15 | **Keynote 4.**<br>ID045<br>Ubaidillah |
| | 13.15 – 13.30 | ID0128<br>Dian Maruto W | 13.15 – 13.30 | ID076<br>Pranoto | 13.15 – 13.30 | ID007<br>Selfi Handayani | 13.15 – 13.30 | ID087<br>Seong Hwan K |
| | 13.30 – 13.45 | Sayekti W | 13.30 – 13.45 | ID073<br>Sulistyo Saputro | 13.30 – 13.45 | ID028<br>Anif Nur Artanti | 13.30 – 13.45 | Iwan Yahya |
| | 13.45 – 14.00 | ID004<br>Yuliusman | 13.45 – 14.00 | ID083<br>Khoirina Dwi Nugrahaningtyas (Aji Indo) | 13.45 – 14.00 | ID024<br>Fea Prihapsara | 13.45 – 14.00 | ID005<br>Norzilawati Mohamad |
| | 14.00 – 14.15 | ID015<br>Yuliusman | 14.00 – 14.15 | ID074<br>Sulistyo Saputro | 14.00 – 14.15 | ID010<br>M. Shidiq Harramatan Aziz | 14.00 – 14.15 | ID046<br>Ubaidillah |
| | 14.15 – 14.30 | ID021<br>Yuliusman | 14.15 – 14.30 | ID075<br>Dini Novi Rohmah | 14.15 – 14.30 | ID014<br>Syaiful Choiri | 14.15 – 14.30 | ID0130<br>Ahmad Marzu |

ICAMBP
Advanced Material For Beter Future

UNIVERSITAS SEBELAS MARET
FAKULTAS MIPA

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 14.30 – 14.45 | ID063<br>Rahmatika Alfia | 14.30 – 14.45 | ID026<br>Triana Kusumaningsih | 14.30 – 14.45 | ID040<br>Godras Jati | 14.30 – 14.45 | ID082<br>Fitria Rahmawati |
| 14.45 – 15.00 | ID0133<br>Putri Puspita Sari | 14.45 – 15.00 | ID008<br>Ozi Adi Saputra | 14.45 – 15.00 | ID029<br>Fea Prihapsara | 14.45 – 15.00 | ID054<br>Patiha |
| 15.00 – 15.15 | ID032<br>Yoyok Winardi | 15.00 – 15.15 | ID0132<br>Pranoto | 15.00 – 15.15 | ID041<br>Rohula Utami | 15.00 – 15.15 | ID043<br>Susi Nurul Khalifah |
| 15.15 – 15.30 | ID077<br>Eko Sulistyono | 15.15 – 15.30 | ID093<br>Rujito Sesario | 15.15 – 15.30 | ID080<br>Suci Srirejeki | 15.15 – 15.30 | ID049<br>Julian Refki |
| 15.30 – 15.45 | ID034<br>F.Firdiyono | 15.30 – 15.45 | ID009<br>Ozi Adi S.<br>(Anggit Pradifta) | 15.30 – 15.45 | ID0105<br>Ratna Kusumawati | 15.30 – 15.45 | ID044<br>Heriyanto |
| 15.45 – 16.00 | ID104<br>Theodora Pradnya Pramudita | 15.45 – 16.00 | ID088<br>Tetri Widiyani | 15.45 – 16.00 | ID094<br>Amanatie | 15.45 – 16.00 | ID019<br>Dwi Ni'maturrohmah (Desy M) |
| 16.00 – 16.15 | ID0106<br>Bernadus Bandriyana | 16.00 – 16.15 | | 16.00 – 16.15 | ID0107<br>Yuliana Suselo | 16.00 – 16.15 | ID022<br>Husna Syaima |
| 16.15– 16.30 | ID0109<br>Anne Zulfia (Krisiphala Sosrodimulyo) | 16.15– 16.30 | | 16.15– 16.30 | ID020<br>Syaiful Choiri | 16.15– 16.30 | ID0100<br>Sri Mulijani |
| 16.30 – 16.45 | ID0127<br>Miftah Alfi Yasin | 16.30 – 16.45 | | 16.30 – 16.45 | ID095<br>Mamluatul Hikmah (Artini Pangastuti) | 16.30 – 16.45 | ID0116<br>Liya NMZS |
| **POSTER** | ID016<br>Ainur Rosyida | | ID039<br>Fendi Aji Purnomo | | ID042<br>Kawiji | | ID053<br>Syaiful Ichsan |
| **POSTER** | ID096<br>Venty Suryanti | | ID085<br>Agus Purnomo | | ID057<br>Hartatik | | ID058<br>Hartatik |
| **POSTER** | ID059<br>Hartatik | | ID060<br>Hartatik | | ID086<br>Rudi Hartono | | ID092<br>Libek Triyono |

ICAMBE
Advanced Material For Better Future

UNIVERSITAS SEBELAS MARET
FAKULTAS MIPA

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | POSTER | ID0102<br>Carissa H | | ID0114<br>Sayekti W<br>(Yosef Rio) | | ID079<br>Desi Suci H. | | ID084<br>Riyatur |
| | POSTER | ID0117<br>Ema Fajariani | | ID0118<br>Bagus Taufik | | ID0115<br>Sayekti W<br>(Liya NMZS) | | ID0123<br>Cahya Esth |
| | POSTER | ID0124<br>Kurnia | | ID0125<br>Muhammad Asri<br>Safi'Ie | | ID0122<br>Is Fatimah | | ID025<br>Ganjar Fadi |
| | POSTER | ID081<br>Khoirina Dwi<br>Nugrahaningtyas<br>(Dewi Ariyani) | | ID0131<br>Ahmad Marzuki | | Ahmad Marzuki | | |

ICAMEF
Advanced Material For Beter Future

UNIVERSITAS SEBELAS MARET
FAKULTAS MIPA