



# TREPSEA 2014

Proceeding of the International Conference of  
Transdisciplinary Research on Environmental Problem in  
Southeastern Asia

4<sup>th</sup> – 5<sup>th</sup> September 2014

Swiss Belinn Hotel, Makassar Indonesia



Organized by :



## COMMITTEES

**General Chairman:** Prof. PhD. Masayuki Sakakibara, Ehime University

**General Committee members:**

Prof.Dr. Dwia Aries Tina Pulubuhu, M.A, UNHAS

Dr. Edy Hartulistiyoso, IPB

Prof. Dr. Emmy Suparka, ITB

Prof. Endang Sukara, LIPI

Prof. Dr. Masrurah Mokhtar, UMI

Dr. Retno Peni Sancayaningsih, M.Sc, UGM

Dr. Syamsu Qamar Badu, M.Pd, UNG

**Scientific Committee members**

Abdul Haris, PhD, BPPT

Dr. rer.nat. Andhika Puspito Nograho, UGM

Assoc. Prof. Bam Razafindrabe, RU

Prof.Dr.Eng. Dadang Ahmad Suriamihardja, M.Eng, UNHAS

Dr Eng. Imam Achmad Sadisun, ITB

Prof. Jamie Galveztan, UM

Assoc. Prof. Kozo Watanabe, EU

Dr. Luky Adrianto, IPB

Prof. Mai Trong Nhuan, VNUH

Assoc. Prof. Mohammad Jahja, UNG

Prof. Dr Nadjib Bustan, STIK Makassar

Prof. Ryohei Kada, SNG

Prof. Dr. Subyakto, LIPI

Prof. Toshio Yoshii, EU

**Local Committee members from UNHAS**

Achmad Yasir Baeda, Basir Mahmud, Ety Bazergan, Chairul Paotonan,  
Hasdinar Umar, Khaeruddin Nurdin, Sabaruddin Rahman, Taufiqur Rachman.

**Secretary-general**

Satoshi Saito, EU

**Secretariat**

Kyoko Jomae (EU)

Achmad Yasir Baeda (UNHAS)

Rektorat Unhas (Ruang WR1), Kampus Unhas Tamalanrea

Jl. Perintis Kemerdekaan KM 9-10, Tamalanrea 90245.

Hp : 085656000975, email: baedayasir@gmail.com

## CONFERENCE INFORMATION

### Conference Location

TREPSEA 2014 is held in the Swiss Bellinn Hotel, Makassar, Indonesia.

### Registration Desk

The registration desk location: **Swiss Bellinn Hotel**

is open as follows: 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> September 2014 08:00 – 17:00

Payment method:

to Indonesia bank/desk	to Japan bank
Registration Rp. 500.000	¥ 5000 (excluded hotel fee)
Audience Rp. 300.000	¥ 3000 (excluded hotel fee)

### Refreshments

Coffee and tea will be served during the coffee breaks in morning and afternoon sessions as well as during the oral presentation sessions.

### Certificate of Attendance

Please contact the registration Desk if you require a certificate of attendance at TREPSEA 2014

## CONFERENCE EVENTS

### SCIENTIFIC EVENTS

#### Oral Presentation

The oral session will take place during 13:00 – 17:00 in day 1 and 09:00 – 11:30 in day 2. There are 4 general symposia; each general symposium will be conducted in separated room. The presenter has 20 minute to present and discuss.

#### Poster Sessions

The poster will be displayed in the poster hall. Authors will be present to discuss their poster between 17:00-18:30 in day 1.

#### Workshop Sessions

The workshop will take place during 14:00 – 16:00. The workshop will be held to start to discuss the way solving our problems in Southeast Asia with stakeholders. We call the cooperative meetings "Co-design".

## INSTRUCTION TO PRESENTER

### ORAL PRESENTATION

The duration of oral presentation is 20 minutes including present, discussion and changing the next presenter.

Please prepare your presentation file on "Power Point (Windows)" or PDF and drop it at the Speaker Ready Desk by the day before your presentation.

The Speaker Ready Desk is at Room A (front Room A) and is open between 13:00 – 19:00 on 3 September and 08:00 – 19:00 on 4<sup>th</sup> and 5<sup>th</sup> September.

The following version of Power Point is acceptable; 97, 2000, 2002, 2003, 2007, 2010, 2013

Only a windows PC is available for presentation and committee do not accept to use your own PC for presentation.

Please verify your presentation on Windows PC by yourself, if you prepared the file on Macintosh

Movies will be played on Media Player on windows without sound. The wmv format is recommended.

### POSTER PRESENTATION

Poster size is 914mm (horizontal length) by 1292mm (vertical length)

Location of each poster will be shown on a plan at the entrance of Poster Hall

Poster presentation time is 16:30 – 18:30 on 4<sup>th</sup> September

Please remove your poster by 18:30 – 19:00 on 4<sup>th</sup> September

## SCHEDULE

Day	Time	Events	Site / Room
Sept 3 (Wed)	13:00 - 15:00	LC and SC meeting	Room A
	15:30 - 17:30	GC meeting	Room A
	19:00 - 21:00	Ice Break party	Restaurant
Sept 4 (Thurs)	09:30 - 10:00	Opening ceremony	Ballroom
	10:10 - 10:30	Special keynote speaker 1: Prof Emmy Suparka	Ballroom
	10:30 - 10:50	Special keynote speaker 2: Dr Noel R Juban	Ballroom
	10:50 - 11:20	Coffee break	Ballroom
	11:20 - 11:40	Special keynote speaker 3 : Prof Mai Trong Nhuan	Ballroom
	11:40 - 12:00	Special keynote speaker 4: Prof Masayuki Sakakibara	Ballroom
	12:00 – 13:00	Lunch	Restaurant
	13:00 - 15:00	Oral presentation	Room A, B, and C
	15:00 - 15:20	Coffee break	Restaurant
	15:20 - 17:00	Oral Presentation	Room A, B, and C
	17:00 - 18:30	Poster presentation	Poster Hall
19:00 - 21:00	Dinner party	Restaurant	
Sept 5 (Fri)	09:00 - 11:30	Oral presentation	Ballroom
	11:30 - 14:00	Lunch	Restaurant
	14:00 - 16:00	Workshop	Room A, B and C
	16:00 - 16:30	Coffee break	Restaurant
	16:30 - 17:00	Closing ceremony	Ballroom

# MAKASSAR CITY MAPS

Hotel Swiss Belinn Panakkukang Makassar  
 Jl. Boulevard Raya No. 55, Panakkukang  
 Makassar 90222  
 Makassar, Indonesia  
 Tel : (62-411) 430 430  
 Fax : (62-411) 450 500



Hotel	Contact	Hotel	Contact
Hotel Denpasar (**)	+62 411 454848	Hotel Victoria International	+62 411 312468
Hotel Diamond	+62 411 421888	Amaris Hotel (**')	+62 411 436789
Hotel Penakukang	+62 411 425303	Hotel Grand Imawan (***')	+62 411 2665588
Hotel Awsin Inn (**')	+62 411 444700	Hotel Boulevard (*)	+62 411 441764
Hotel Asia (**)	+62 411 443378	HotelGrandasiaMakassar(****')	+62 411 4661010
Hotel Pengayoman (*)	+62 411 451971	Hotel Grand Twon (***)	+62 411 4663999

## PROGRAM

### PROGRAM DAY 1 (September 4)

#### Special Keynote Speaker

Full Presentation (10:10 - 12:00) Ballroom

Time	Title	Authors	Presenter
10:10 - 10:30	Natural Disaster Potential And Mitigation Effort In Southeast Asia : Case Study Mitigation Effort For Tsunami In Indonesia	Emmy Suparka	Emmy Suparka
10:30 - 10:50	Trans-disciplinary research towards participatory public policy development: The Lake HEAD Project experience	Noel R Juban, MD, MSc, Jaime Z. Galvez Tan, MD, MPH, Amiel Nazer C Bermudez, MD, MPH, and Leah A Palapar, MD, MPH	Noel R Juban
10:50 - 11:40	Towards proactive responses to disasters and sustainability of coastal city in the context of climate change: the case of Da Nang, Central Vietnam	Mai Trong Nhuan, Tran Manh Lieu, Nguyen Thi Hoang Ha, Nguyen Thi Khang, Truong Van Thinh, Nguyen Thi Hong Hue, Tran Dang Quy	Prof. Mai Trong Nhuan
11:40 - 12:00	Building of regional resilience to mercury pollution in ASGM areas of Southeast Asia	Masayuki Sakakibara, Mohamad Jahja, Yuyu Indriati Arifin, Hasriwiani Habo Abbas, Basri Mahmud, Fitri Lihawa, Sayaka Takakura, Koichiro Sera	Prof. Masayuki Sakakibara

#### Disaster Mitigation

Full Presentation (13:00 - 17:00) Room A

No	Time	Title	Authors	Presenter
11	13:00 - 13:20	Mitigation Plan for Banggae Future Tsunami	Achmad Yasir Baeda, Dadang Ahmad Suriamihardja, Hasdinar Umar, Taufiqur Rachman	Achmad Yasir Baeda
12	13:20 - 13:40	Identification of Eruption System on Submarine volcanic products in Sangihe Waters, North-Eastern Indonesia	Bambang Priadi, Haryadi Permana, Nurcahyo Indro Basuki, Hamdan Abidin, Haryadi Permana, Sugiarta Wirasantosa, Tubagus Solihudin	Bambang Priadi
13	13:40 - 14:00	Probability Analysis to Susceptibility of Slope Failure on Malino-Manipi Main Road, South Sulawesi	Muhammad Ramli, Aryanti Virtanti Anas, Meinarni Thamrin	Muhammad Ramli
14	14:00 - 14:20	Simulation of morphological control on debris flow landslide: A case study of the 2013 Mukapayung Landslide, West Java, Indonesia	Imam A. Sadisun, Rendy D. Kartiko, Yunara D. Triana, Sumaryono, Wawan Irawan	Imam A. Sadisun
15	14:20 - 14:40	The spatial of Dam responsiveness based on Peak Ground Acceleration (PGA) Model, Regional Geology and Observation of Instruments surrounding Sermo Dam	Arif Gunawan	Arif Gunawan
16	14:40 - 15:00	System Dynamics Model of Construction Materials Supply and Demand (Case Study: Construction Materials of Jeneberang River, South Sulawesi)	Aryanti Virtanti Anas, D.A. Suriamihardja, Muh. Saleh Pallu, Ulva Ria Irfan	Aryanti Virtanti Anas

Coffee Break (15:00 – 15:20)

15:20 - 15:40	Spatial Planning Mitigation in Earthquake Disaster Prone Area based on study of Landforms and Microtremor in Bantul Regency (Cases of Bantul, Jetis, Imogiri and Kretek Sub-District)	Arif Gunawan	Arif Gunawan
15:40 - 16:00	A Review on The Features of Earthquake Induced landslides in Indonesia	Ruly Resfiandhi, Imam Achmad Sadisun	Ruly Resfiandhi
16:00 - 16:20	The Effect of Sea Level Changes for Nannoplankton Poppulation in Gunung Panti Area, North East java Basin	Wahyu Dwijo Santoso, Halmi Insani, Yan Rizal, Rubiyanto Kapid	Wahyu Dwijo Santoso
16:20 - 16:40	Geochemical Cycling for Forecasting the Big Eruption: Showa Crater, Sakurajima volcano, Southern Kyushu, Japan	Idham Andri Kurniawan, Masayuki Sakakibara, Emmy Suparka, Ryohei Uenosono, and Sayaka Takakura	Idham Andri Kurniawan

### Sustainable Development and Environmental Preservation

Oral Presentation (13:00 - 16:00) Room B

Time	Title	Authors	Presenter
13:00 - 13:20	Optical and structural properties on washed kapok fibers	Mohamad Jahja	Mohamad Jahja
13:20 - 13:40	Mercury Contamination in human hair and health assessment of artisanal gold miners in Northern Gorontalo regency of Gorontalo Province, Northern Sulawesi, Indonesia	Yayu Indriati Arifin, Masayuki Sakakibara, Koichiro Sera, Zuhriana Yusuf, Nanang Paramata	Yayu Indriati Arifin
13:40 - 14:00	Biomonitoring in Sangon River, Kulon Progo, DIY: Concentration of Mercury in the Benthic Macroinvertebrates	Andhika Puspito Nugroho, Rahadyan Aulia	Andhika Puspito Nugroho
14:00 - 14:20	Experimental study on arsenic elution from Cretaceous sedimentary rocks from Hokkaido, Japan	Shusaku Yamazaki, Kenji Okazaki, Shuichi Tamoto, Toshiyuki Kurahashi, Yoshihiko Ito	Shusaku Yamazaki
14:20 - 14:40	Efforts on the purification of wastewater containing with selenium using the plants in civil engineering	Kenji Okazaki, M Shishido, Masayuki Sakakibara, Yuri Sueoka, T Kurahashi	Kenji Okazaki
14:40 - 15:00	Study on the Structure and vibrational properties of boiled kapok fibers as heavy metals adsorber	Khoirul, Mohamad Jahja	Khoirul

Coffee Break (15:00 – 15:20)

15:20 - 15:40	Consideration of the effect of remedying the Selenium using the plants at indoor cultivation experiment	Masahito Shishido, Kenji Okazaki, Toshiyuki Kurahashi, Masayuki Sakakibara, Yuri Sueoka	Masahito Shishido
15:40 - 16:00	A Preliminary Risk Assessment of Zinc in Irrawady Dolphin's ( <i>Orcaella brevirostris</i> ) Prey in the Banten Bay	Muta Ali Khalifa, Mohammad Mukhlis Kamal, Enan Mulyana Adiwilaga, Adriani Sunuddin	Muta Ali Khalifa

9	16:00 - 16:20	Atomic Simulation of AxBi4-xTi4O15 Aurivillius (A = Ca, Sr, and Ba)	Akram La Kilo, Maharani Pakaya, La Alio	Akram La Kilo
10	16:20 - 16:40	Boiled kapok fibers as mercury adsorber	Nurfitri Abdul Gafur, Mohamad Jahja	Nurfitri Abdul Gafur
11	16:40-17:00	Modeling and Risk Assessment of Lead Concentration to Public Health among the Coastal Communities in Makassar City	Agus Bintara Birawida, Veni Hadju, Sumbangan Baja, Armyn Nurdin, Ririh Yudhastuti	Agus Bintara Birawida

### Measure and improvement to urban environmental problems and Food Security

Oral Presentation (13:00 - 16:00) Room C

No	Time	Title	Authors	Presenter
1	13:00 - 13:20	Area Traffic Control using The Macroscopic Fundamental Diagram	Toshio Yoshii	Toshio Yoshii
2	13:20 - 13:40	Identification of lane-changing vehicles using individual vehicle data	Eisuke Fujita, Yasuhiro Shiomi	Eisuke Fujita
3	13:40 - 14:00	Traffic capacity analysis on U-Turn at midblock median openings on urban arterials	Thakonlaphat Jenjiwattanakul, Hiroaki Nishiuchi, Kazushi Sano	Hiroaki Nishiuchi
4	14:00 - 14:20	Impact of The Traffic State on Accident Risk on Urban Expressways	Satoshi Hyodo, Toshio Yoshii	Satoshi Hyodo
5	14:20 - 14:40	Protected value and its impacts on residents' acceptance around public works	Irwan Setiawan, Tsuyohi Hatori	Irwan Setiawan
6	14:40 - 15:00	The Influences of Heterogeneity of Vehicle Size to the Traffic Flow in Heterogeneous Traffic (Case Study: Makassar Traffic on Urip Sumoharjo Street)	Fadly Arirja Gani, Shinya Kurauchi, Toshio Yoshii	Fadly Arirja Gani

Coffee Break (15:00 - 15:20)

7	15:20 - 15:40	The Relationship of Financial Requirement to the Driver's Behavior in the Public Transport Service (Case Study: Makassar Public Transportation)	Hajriyanti Yatmar, Hiroki Kamigaki, Shinya Kurauchi, Toshio Yoshii	Hajriyanti Yatmar
8	15:40 - 16:00	Consideration of speed-density relationship in mixed traffic	Tomoki Watanabe	Tomoki Watanabe

### Food Security

9	16:00 - 16:20	South Sulawesi Provincial Administration Rice Diplomacy in Increasing National Food Security	Aspiannor Masrie	Aspiannor Masrie
---	---------------	----------------------------------------------------------------------------------------------	------------------	------------------

### Poster Presentation (16:30 - 18:30) Poster Hall

#### Disaster Mitigation

No	Title	Authors	Presenter
1-1	Integrated identification method of volcanic ash based on igneous petrology	Chisato Nakamura, Masayuki Sakakibara, Sakae Sano, Idham Andri Kurniawan	Idham Andri Kurniawan



42	Secular variation of East Dogo Hot spring, Ehime Prefecture, Japan –Relation to Crustal condition–	Aina Hino, Sakae Sano, Rie S. Hori	Aina Hino
43	Vulnerability assessment of landslide to human travelling along the national road No.6, northern Vietnam	Ta Thi Hoai, Nguyen Thi Hoang Ha, Mai Trong Nhuan, Tran Dang Quy, Le Thi Thu Hien, Hoang Thi Nhung, Dam Thi Phuong Thao, Vo Thi Lien	Nguyen Thi Hoang Ha

### Sustainable Development and Environmental Preservation

	Title	Authors	Presenter
41	Phytoremediation of heavy metal-contaminated mine drainage by aquatic macrophyte <i>Eleocharis acicularis</i>	Yoshiko Ohkawa, Masayuki Sakakibara, Masatoshi Sakoda, Sakae Sano	Yoshiko Ohkawa
7	Heavy metal accumulation of lichens <i>Stereocaulon extutum</i> and <i>Cladonia spp.</i> on contaminated substrata and maldistribution of the heavy metals in lichen thallus	Yuri Sueoka, Masayuki Sakakibara, Koichiro Sera	Yuri Sueoka
43	Basic experiments of Cs uptake capacity of <i>Eleocharis acicularis</i>	Akinari Takehara, Masayuki Sakakibara, Yuri Sueoka, Yasushi Sato, Sakae Sano	Yuri Sueoka
74	Phytoremediation: Using aquatic macrophyte <i>Eleocharis acicularis</i> to clean up environments	Masayuki Sakakibara, Akinari Takehara, Koichiro Sera	Masayuki Sakakibara
45	A potential ability of <i>Pteris cretica</i> for phytoremediation in abandoned mine site	Hendra Prasetia, Masayuki Sakakibara, Koichiro Sera, Yuri Sueoka	Hendra Prasetia

### Measure and improvement to urban environmental problems

	Title	Authors	Presenter
41	Viscosity properties of coal ash slag melt in Integrated coal Gasification Combined Cycle (IGCC)	Arata Tsuruda, Hiromichi Takebe	Arata Tsuruda

### PROGRAM DAY 2 (September 5)

Full Presentation (09:00 - 11:20) Ballroom

### Sustainable Development and Environmental Preservation

	Time	Title	Authors	Presenter
41	09:00-09:20	Modeling and Health Risks Assessment of Mercury Due to Gold Mine Activity in Sumalata District, Indonesia	Anwar Mallongi	Anwar Mallongi
42	09:20 - 09:40	A Study of Mercury Pollution toward Environment in North Gorontalo Regency	Marike Mahmud, Fitryane Lihawa, Hendri Iyabu, Masayuki Sakaibara	Marike Mahmud
43	09:40 - 10:00	Mercury Concentration of Hair of Inhabitants in Southern Sulawesi Province	Basri Mahmud, Hasriwiani Habo, Yayu Indriati, Masayuki Sakakibara, Koichiro Sera	Basri Mahmud
74	10:00 - 10:20	Duwo fishery at Bone-Bolango rivermouth: a question of sustainability	Aziz Salam	Aziz Salam

<b>10:20 - 10:40</b>	Sustainable Preservation Based on Resources in Makassar Canal	Tigin Dariati, Cri Wahyuni, Nurfaida	Cri Wahyuni
<b>10:40 - 11:00</b>	Anthropogenic input of lead in kangkong ( <i>Ipomoea aquatica</i> ) around the Laguna Lake, Philippines: Evidence from Pb isotope analysis	Satoshi Saito, Ryohei Kada	Satoshi Saito
<b>11:00 - 11:20</b>	Lead Pollution in Indonesia: The Case of the Gulf Yotefa	Muhammad Nadjib Bustan, RidwanAmiruddin, Hasmi	Muhammad Nadjib Bustan

Seasonal variation of East Dogo Hot spring, Ehime Prefecture, Japan –Relation to Crustal condition–	Aina Hino, Sakae Sano, Rie S. Hori	Aina Hino
Vulnerability assessment of landslide to human travelling along the national road No.6, northern Vietnam	Ta Thi Hoai, Nguyen Thi Hoang Ha, Mai Trong Nhuan, Tran Dang Quy, Le Thi Thu Hien, Hoang Thi Nhung, Dam Thi Phuong Thao, Vo Thi Lien	Nguyen Thi Hoang Ha

#### Sustainable Development and Environmental Preservation

Title	Authors	Presenter
Phytoremediation of heavy metal-contaminated mine drainage by aquatic macrophyte <i>Eleocharis acicularis</i>	Yoshiko Ohkawa, Masayuki Sakakibara, Masatoshi Sakoda, Sakae Sano	Yoshiko Ohkawa
Heavy metal accumulation of lichens <i>Stereocaulon enditum</i> and <i>Cladonia spp.</i> on contaminated substrata and maldistribution of the heavy metals in lichen thallus	Yuri Sueoka, Masayuki Sakakibara, Koichiro Sera	Yuri Sueoka
Basic experiments of Cs uptake capacity of <i>Eleocharis acicularis</i>	Akinari Takehara, Masayuki Sakakibara, Yuri Sueoka, Yasushi Sato, Sakae Sano	Yuri Sueoka
Phytoremediation: Using aquatic macrophyte <i>Eleocharis acicularis</i> to clean up environments	Masayuki Sakakibara, Akinari Takehara, Koichiro Sera	Masayuki Sakakibara
A potential ability of <i>Pteris cretica</i> for phytoremediation in abandoned mine site	Hendra Prasetia, Masayuki Sakakibara, Koichiro Sera, Yuri Sueoka	Hendra Prasetia

#### Measure and improvement to urban environmental problems

Title	Authors	Presenter
Viscosity properties of coal ash slag melt in Integrated coal Gasification Combined Cycle (IGCC)	Arata Tsuruda, Hiromichi Takebe	Arata Tsuruda

#### PROGRAM DAY 2 (September 5)

09:00 - 11:20) Ballroom

#### Sustainable Development and Environmental Preservation

Time	Title	Authors	Presenter
09:00-09:20	Modeling and Health Risks Assessment of Mercury Due to Gold Mine Activity in Sumalata District, Indonesia	Anwar Mallongi	Anwar Mallongi
09:20 - 09:40	A Study of Mercury Pollution toward Environment in North Gorontalo Regency	Marika Mahmud, Fitriyane Lihawa, Hendri Iyabu, Masayuki Sakaibara	Marika Mahmud
09:40 - 10:00	Mercury Concentration of Hair of Inhabitants in Southern Sulawesi Province	Basri Mahmud, Hasriwiani Habo, Yayu Indriati, Masayuki Sakakibara, Koichiro Sera	Basri Mahmud
10:00 - 10:20	Duwo fishery at Bone-Bolango rivermouth: a question of sustainability	Aziz Salam	Aziz Salam

## **SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL PRESERVATION**

Number: B1

### **Optical and structural properties on washed kapok fibers**

Mohamad Jahja

Jurusan Fisika, FMIPA, Universitas Negeri Gorontalo

Abilities of chemically modified Kapok fibers ability on adsorbing heavy metals and other water pollutants was reported (Tanaka, 2002; Chung, ; Liu,2012). Unfortunately chemical process instead producing adsorbent, it polutes the environment as well. We studied effects of four physical treatment parameters (soaking time, soap concentration, water temperature and drying time) of kapok fibers on its optical and structural properties. We used fourier transform infra red spectrometer to study the optical properties of treated kapok fibers. The structure of treated kapok fibers was investigated using Scanning Electron Microscope (SEM) and X-Ray Diffraction (XRD). Species of elements adsorbed to the kapok fibers was investigated using EDX and X-Ray Fluorescence (XRF) Spectrometer. There was positive correlation between treatment parameters and optical, structural properties of kapok fibers.

Number: B2

### **Mercury Contamination in human hair and health assessment of artisanal gold miners in Northern Gorontalo regency of Gorontalo Province, Northern Sulawesi, Indonesia**

Yayu I Arifin<sup>1,2</sup>, Masayuki Sakakibara<sup>1</sup>, Koichiro Sera<sup>3</sup>, Zuhriana Yusuf<sup>2</sup>, Nanang Paramata<sup>2</sup>

<sup>1</sup>:Graduate School of Science & Engineering, Ehime University

<sup>2</sup>: University of Gorontalo

<sup>3</sup>:Cyclotron Research Center, Iwate Medical University, Japan

Concentration of Mercury in hair of inhabitants who are living in villages around ASGM sites in Gorontalo Utara regency of Gorontalo Province, Northern Sulawesi, Indonesia, were investigated using proton induced x-ray emission. Hair samples (n=95) were collected between 2012 and 2013 from inhabitants in Anggrek, Sumalata and other of Gorontalo Utara regency. Mercury concentrations of the hair sample from Sumalata, Anggrek, Tolinggula dan Kwandang, were determined to understand the status of contamination. Mean mercury's hairs concentration of group of inhabitants of Sumalata and Anggrek are higher than Tolinggula and Kwandang. Mean of hair mercury of female's inhabitants is higher than male's, in each group. This is showing that female inhabitants are more permeable to mercury contamination compared to male. Neurological examinations performed on 25 participants. From 12 symptoms objectives were searched, there are 3 common symptoms which already absorbed, which are Bluish of gums, Babinski reflex and tremor have been found from miners.

# Optical and structural properties on washed kapok fibers

Mohamad Jahja

Jurusan Fisika, FMIPA, Universitas Negeri Gorontalo

## Abstract

We studied effects of four physical treatment parameters (soaking time, soap concentration, water temperature and drying time) of kapok fibers on its optical and structural properties. We used fourier transform infra red spectrometer to study the optical properties of treated kapok fibers. The structure of treated kapok fibers was investigated using Scanning Electron Microscope (SEM) and Infrared Spectroscopy (IR). Species of elements adsorbed to the kapok fibers was investigated using EDX and X-Ray Fluorescence (XRF) Spectrometer. There was positive correlation between treatment parameters and optical, structural properties of kapok fibers.

Keywords : Kapok fibers, optical, structural properties.

## 1. Introduction

Natural (untreated) kapok fibers are hydrophobic since its surface covered by wax and lignin (Wang, Zheng, and Wang 2012), researchers (Huynh and Tanaka 2003; Chung et al. 2008) used chemical method to remove the wax and lignin and produced hydrophilic kapok fibers. Abilities of chemically modified Kapok fibers ability on adsorbing heavy metals and other water pollutants was reported (Huynh and Tanaka 2003; Chung et al. 2008; Liu et al. 2012). Unfortunately chemical process instead producing adsorbent, it pollutes the environment as well.

## 2. Methods

In this study we washed kapok fibers using common liquid detergent (soap) to remove the wax and lignin from kapok fibers and followed by rinsing in mineral water and dried using hot air from hair drier. The Surface Properties of Kapok fibers were studied using JEOL Scanning Electron Microscope in Sakakibara's Laboratory of Department of Earth Science of Ehime University, Japan. We used also Infra Red spectroscopy to study the optical/vibrational properties of kapok fibers before and after washing. The Shimadzu IR-440 Infra red Spectrometer in the Faculty of Engineering of Ehime University was used. The equipment is available through permission from Prof. Hiromichi Takebe of Ehime University, Japan. The treated kapok fibers later is used to filter the dirty water from polluted river in gold mining site of sumalata, North Gorontalo regency. The simple apparatus is used see Figure 1.

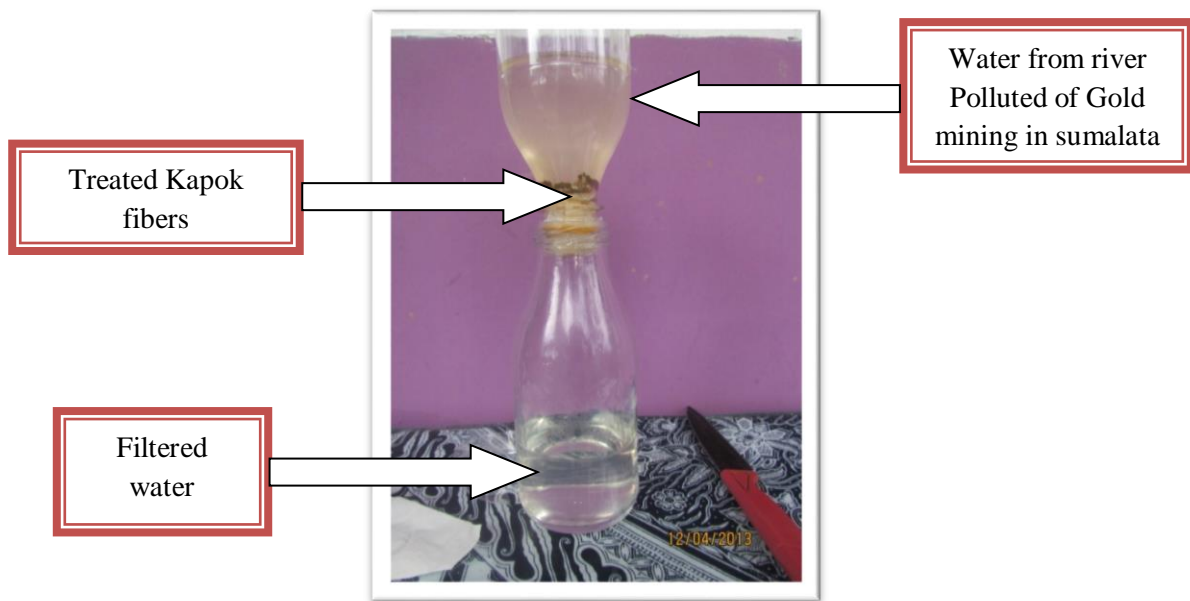
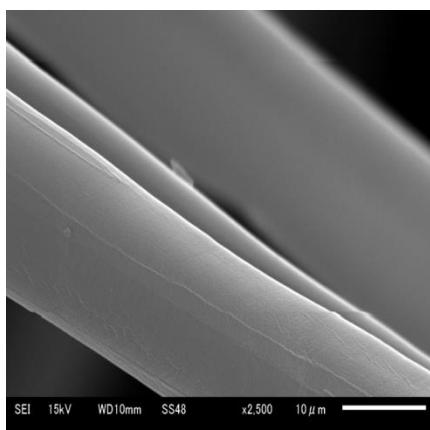


Figure. 1 The filtering process using treated kapok fibers. In principle the filtered water (bottom) become clearer compared to polluted (upper).

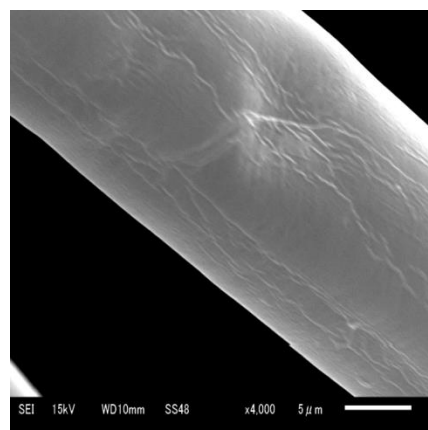
Treated kapok fibers which used to filtered the water then dried again and studied using SEM in Prof. Takebe's laboratory of Ehime University, Japan.

### 3. Results and Discussion

The kapok fibers before and after washed is shown in Fig. 2(a) and (b), respectively. Untreated kapok fibers has smooth surfaces while treated fibers shows some deformation which probably caused by mechanical washing or rinsing.



(a)



(b)

Fig. 2 Scanning Electron Micrograph of Kapok fibers: natural (a) and washed (b). Natural fibers shows smooth surface while the treated one has some deformation on its surface (Photos is taken by Yuri Sueoka from Sakakibara's Laboratory, Department of Earth Science of Ehime University, Japan).

It is no simple way to describe the change on vibrational curves. We used relative absorbance, where absorbance at specific wavenumber ( $\nu$ ) is compared to absorbance at  $1512\text{ cm}^{-1}$  (Bykov, 2008).

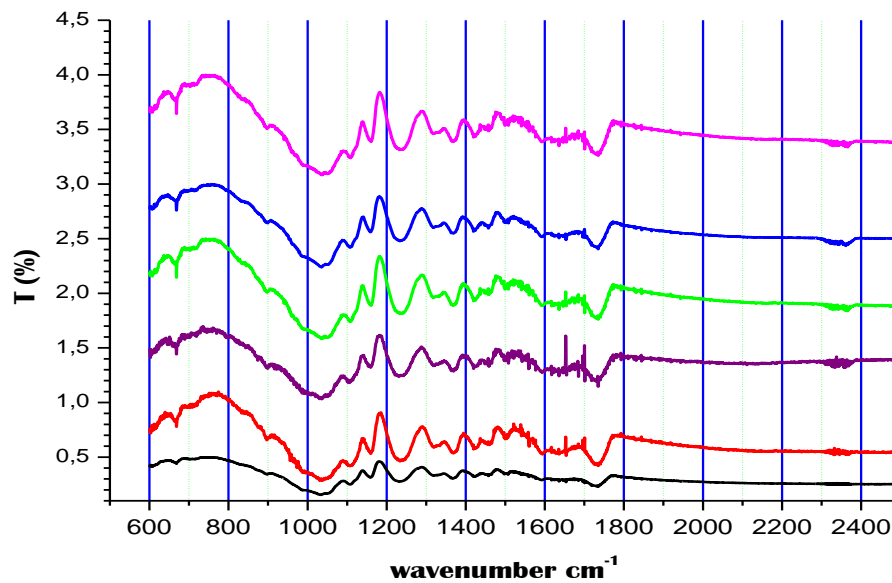


Fig.2 IR Spectra of untreated kapok (black), treated kapok with different washing time (minutes): 30 (red); 60 (purple); 90 (green); 120 (blue) and 150 (pink). Each line is shifted about 1 % in order to make clear.

Table 1. Relatif Absorbance at wavenumber compared to 1512 cm<sup>-1</sup>.

wavenumber (cm <sup>-1</sup> )	Relatif Absorbance						Reference
	SK 0	SK 1	SK 2	SK 3	SK 4	SK 5	
<b>1735-1740</b>	2.8	2.7	2.7	2.0	2.6	3.4	J. Wang 2012
<b>1450-1460</b>	2.5	1.2	0	1.2	1.4	1.2	Liu 2007
<b>1590-1595</b>	0.3	0.5	0.4	0	0.6	0	Liu 2007
<b>1363-1373</b>	0.4	1.7	0.9	1.3	2.0	2.1	J.Wang 2012
<b>1230-1242</b>	10	3.2	2.7	3.8	5.6	5.7	Y. Zeng 2012
<b>1158-1162</b>	7	1.9	1.9	2.5	4	4.4	B. Chung 2008
<b>1105-1107</b>	4.5	0.4	1.6	1.5	2.4	1.7	Y. Zeng 2012
<b>1037-1130</b>	0	0	0.3	0	2.6	3.8	I. Bykov 2008

The following Figures are showing the results.

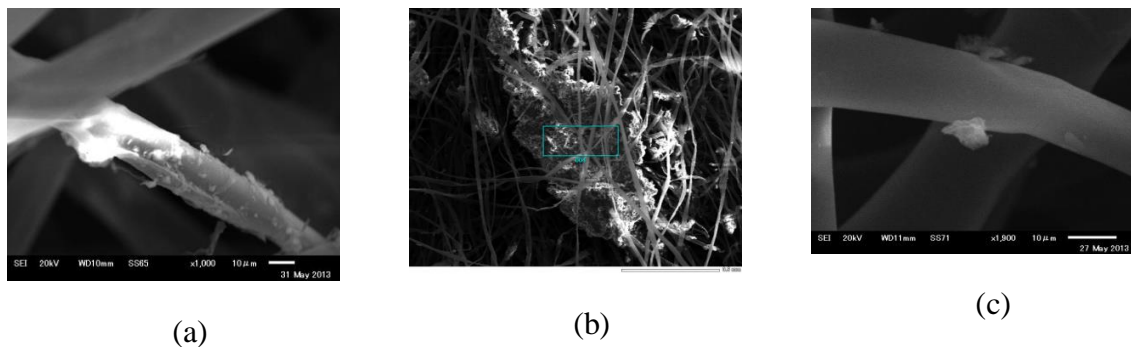


Figure 4. Treated kapok fibers which were used to filter the polluted water showing some particulates are attached to kapok surfaces.

#### 4. Conclusion



The treated (washed) kapok fibers can be used as filter of polluted water. But the capacity and absorbing power of kapok fibers as function of treatment parameters need to be done in the next study. The element or chemical composition of particulate is need to be determined.

## 5. References

- Bykov, Ivan. 2008. *Master Thesis Characterization of Natural Technical Lignins Using FTIR Spectroscopy*. Lulea : Departement of Chemical Engineering and Geosciences
- Chung, Byung Yeoup. 2008. Adsorption of Heavy Metal Ions onto Chemically Oxidized Ceiba petandra (L.) Gaertn. (Kapok) Fibers.51(1):28-35.
- Hyunh, Hai T. dan Mikiya Tanaka. 2003. Removal Of Bi, Cd, Co, Cu, Fe, Ni, Pb, and Zn from Aqueous Nitrate Medium with Bis(2-ethylhexyl)phosphoric Acid Impregnated Kapok Fiber. 42:4050-4054
- Liu, Yi. 2012. Adsorption of Methylene Blue by Kapok Fiber Treated by Sodium Chlorite Optimized with Response Surface Methodology. 184:248-255
- Wang, Jintao. 2012. Effect of Kapok Fiber Treated with Various Solvents on Oil Absorbency. 40:178-174
- Zheng, Yian. 2012. Kapok Fiber Oriented-Polyaniline Nanofibers for Efficient Cr (VI) Removal. 191:154-161.

# CERTIFICATE OF APPRECIATION

This certificate is given to:

**Mohammad Jahja**

as presenter

in recognition of valuable contributions to

International Conference of Transdisciplinary Research on Environmental Problem in Southeastern Asia

**TREPSEA 2014**

4-5 September 2014, Swiss Belinn Hotel, Makassar, Indonesia

Organized by:



Prof. PhD. Masayuki Sakakibara

Prof. Dr. Made Emmy Suparka

Prof. Dr. Dwia Aries Tina Pulubuhu, M.A

Dr. Syamsu Qamar Badu, M.Pd