



ICON▶SCI

The 9th RMUTP  
International Conference

on Science, Technology and Innovation for  
Sustainable Development:  
Challenges Towards the Digital Society

The Sukosol, Bangkok, Thailand, 21-22 JUNE 2018

**Abstract Book**

## Welcome Message



With great pleasure, the Rajamangala University of Technology Phra Nakhon (RMUTP) welcomes you to “The 9<sup>th</sup> RMUTP International Conference on Science, Technology and Innovation for Sustainable Development: Challenges towards the Digital Society 2018 (9<sup>th</sup> RMUTP ICON SCI-2018)”, organized by RMUTP and held on the 21-22 June, 2018 at the Sukosol, Bangkok, Thailand. We also welcome participants from overseas to Thailand and look forward to giving you a taste of Thailand’s culture.

Our conference provides an outstanding international forum to present and discuss progress in research, development, standards, and applications of the topics related to Science, Technology and Innovation for Sustainable Development.

The 9<sup>th</sup> RMUTP International Conference will offer high quality activities including research and poster sessions. We feel sure to provide you an engaging environment with an excellent opportunity to exchange new research results, major ideas and start fruitful collaborations. International visitors are also encouraged to experience the Thai culture and attractions around Bangkok. We take this opportunity to thank you for your participation, we hope you enjoy your time and take advantage of our conference. We look forward to seeing you.

Sincerely Yours,

A handwritten signature in blue ink that reads 'Supatra Kosaiyanont'.

Assoc. Prof. Supatra Kosaiyanont  
President of Rajamangala University of Technology Phra Nakhon  
Conference Chair, The 9<sup>th</sup> RMUTP International Conference

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### **Co-Organizers:**

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Institute for Innovative Learning, Mahidol University (IIL/MU)



## General Information

### Venue:

Place: The Sukosol  
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### Registration Desk

Place: The Sukosol  
Hours: Thursday June 21, 2018 08:00 am – 08:00 pm  
Friday June 22, 2018 09:00 am – 05:00 pm

### Information Desk:

Place: The Sukosol  
Hours: Thursday June 21, 2018 08:00 am – 08:00 pm  
Friday June 22, 2018 09:00 am – 05:00 pm



### **Presentation Instructions:**

**Oral presentations** are required to be made by PowerPoint, which should be controlled by the speaker. The oral presentation will be 15 min plus 5 min questions. All speakers are required to load and check the files before the presentation. A PC-compatible computer and a LCD projector will be provided.

**Poster presentations** are to be mounted at the allocated area. The content of the poster should cover titles, objectives, methodology, results discussion and conclusion. The poster board size should not exceed 90 cm width x 120 cm height.

### **ICON-SCI Awards:**

1. ICON-SCI Best Oral Presentation Awards
2. ICON-SCI Best Poster Presentation Awards

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#### **Session 4: financial markets and economic growth**

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**Program Overviewz**  
**The 9th RMUTP International Conference on Science, Technology and Innovation for Sustainable Development:**  
**Challenges Towards the Digital Society**  
**Thursday June 21, 2018 - Friday June 22, 2018 at The Sukosol Hotel, Bangkok**

<b>Time</b>	<b>Thursday June 21</b>	<b>Time</b>	<b>Friday June 22</b>
08.00-09.00	Registration	09:00-10:00	Oral Presentation & Poster Presentation
09.00-09.30	Opening Ceremony by His Excellency Air Chief Marshal Dr. Prajin Juntong; Deputy Prime Minister cum Minister of Justice		
09.30-10.00	<b>Keynote speaker I:</b> Nick Guang Lu CTO – Industry Solutions Huawei Southern-East Asia Enterprise Business Group Topic: How Innovation Disrupt Education?		
10.00-10.15	Coffee Break	10.00-10.20	Coffee Break
10.15-11.00	<b>Keynote speaker II:</b> Dr. Thomas J Roulet King's College, London, UK Topic: Digitalization and the New Ways of Working	10.20-12.00	Oral Presentation & Poster Presentation
11.00-11.45	<b>Keynote speaker III:</b> Prof. Paresh Narayan Deakin University, Australia Co-Editor, Economic Modelling: The International Journal of Theoretical and Applied Papers on Economic Modelling Topic: Marketing Capability and Corporate Innovation		
11.45-13.00	Lunch Break	12:00-13:00	Lunch Break
13.00-14.00	Oral Presentation & Poster Presentation	13:00-14:00	Oral Presentation & Poster Presentation
14.00-14.20	Coffee Break	14.00-14.20	Coffee Break
14.20-17.40	Poster Presentation	14:20-16:00	Poster Presentation
18.00- 20.00	Welcome Reception	16:00	Research/Posters Award Presentation, Closing Celebration and Welcome to 2019

<b>Thursday June 21</b>					
08.00-09.00	Registration				
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11.45-13.00	<b>Lunch Break</b>				
Time/Place	Kingkamol	Duangkamol	Kamolruedi	Kornkamol 1	2 <sup>nd</sup> Floor
<b>13.00-17.40</b>	<b>Session 1 Sustainability Science</b>  Chair: Dr.Noppakun Sanpo Co-Chair: Dr.Apsit Kositchaiyong	<b>Session 2 Innovative Technology and Sustainability Engineering</b>  Chair: Dr.Amporn Poyai Co-Chair: Dr.Pinit Kidkhunthod	<b>Session 3 Textiles and Clothing Sustainability</b>  Chair: Assoc. Prof. Dr. Chi-wai Kan Co-Chair: Assoc. Prof. Dr. Sheila Shahidi	<b>Session 4 Economic modeling</b>  Chair: Prof. Dr. Paresh Narayan	<b>Poster Session</b>
<b>13.00-13.20</b>	OS001  DEVELOPMENT OF STRUCTURAL HEALTH MONITORING SYSTEM BY USING PIEZOELECTRIC SENSORS Sumit Jirungnimitsakul	<b>Invite speaker 1</b>  Dr.Amporn Poyai	<b>Invite speaker 1</b>  “NON-AQUEOUS DYEING OF COTTON AND WOOL FABRICS”  Assoc. Prof. Dr. Chi-wai Kan		

Time/Place	Kingkamol	Duangkamol	Kamolruedi	Kornkamol 1	2 <sup>nd</sup> Floor
13.20-13.40	OS002 GRAIN SIZE EFFECT ON STRAIN CHARACTERISTIC IN BaTiO <sub>3</sub> CERAMICS  Narit Funsueb			<b>Economic Modelling</b>	<b>Poster Session</b> Innovative Technology and Sustainability Engineering, Textiles and Clothing Sustainability, financial markets and economic growth
13.40-14.00	OS003 DETERMINING THE CONCENTRATION OF SOLUBLE ETHYLENE IN WATER IMMERSION PLANT USING ACIDIFIED POTASSIUM MANGANATE METHOD Wilailack Chayaprasert	OI001 EFFECT OF DIFFERENT TYPES OF WASHES ON THE FABRIC STRENGTH OF DENIM  Hina Gul			
14.00-14.20	Coffee Break				
14.20-14.40	OS004 A NOVEL SACHA INCHI (Plukenetia volubilis L.) SHELL AS A MODIFIED-POROUS ACTIVATED CARBON PRODUCT Patsapon Silasalaisopisth	OI002 RESISTIVE SENSOR FOR VOC DETECTION  Maitree Thawornsin	OT001 STUDY ON LOW TEMPERATURE DYEING OF ULTRASONICALLY TREATED WOOL  Qing Li		
14.40-15.00	OS005 BIOELECTRICITY PRODUCTION FROM RICE NOODLE WASTEWATER USING PLANT MICROBIAL FUEL CELL (PMFC)  Wanida Potawat	OI003 MATCHING IMPEDANCES LARGE SCALE FRESNEL EQUATION CALCULATION  Naphat albutt	OT002 GLOBAL SUSTAINABLE APPROACH TO MINIMIZE COST AND IMPROVE PRINTING PARAMETERS OF REACTIVE AND DISPERSE DYES BY USING MODIFIED THICKENER Shrirang k. Chinta		
15.00-15.20	OS006 THE INVESTIGATION OF DIELECTRIC BARRIERS DISCHARGE PLASMA JET (DBDJ) FOR BACTERICIDAL IN WOUND HEALING Pipath Poramapijitwat	OI004 MULTIPLE REFLECTIONS MODELING FOR MULTI-LAYER OPTICAL STRUCTURES  Suejit Pechprasarn	OT003 DESIGN AND DEVELOPMENT OF ELECTRO-CONDUCTIVE RECTANGULAR TEXTILE ANTENNA USING POLYPROPYLENE FABRIC S. Gangopadhyay		

Time/Place	Kingkamol	Duangkamol	Kamolruedi	Kornkamol 1	2 <sup>nd</sup> Floor
15.20-15.40	OS007 A LOW PRESSURE PLASMA TREATMENT FOR STERILITATION AND QUALITY IMPROVEMENT OF RICE FLOUR Kantamard Lamasai	OI005 OPTICAL DEVICE ADAPTED TO SMARTPHONE FOR DIRECT IMAGING RETINAL BLOOD VESSELS Naphat albutt	OT004 A STUDY ON LOW STRESS MECHANICAL PROPERTIES OF DENIM FABRIC FOR HAND EVALUATION P.O. Laddha	<b>Economic Modelling</b>	<b>Poster Presentation</b> Innovative Technology and Sustainability Engineering, Textiles and Clothing Sustainability, financial markets and economic growth
15.40-16.00	OS008 EFFECT OF Fe <sup>3+</sup> ON BaTiO <sub>3</sub> PEROVSKITE MAGNETIC PROPERTIES Navapun Nanchaisin	OI006 PARALLEL COMPUTING SOFTWARE DESIGN FOR LARGE SCALE ELECTROMAGNETIC SIMULATION Nattha Pensupa	OT005 STUDIES ON NATURAL AND SYNTHETIC ANTIMICROBIAL FINISHING OF TEXTILES Arun K Patra		
16.00-16.20	OS009 MAGNETIC PROPERTIES IN Ba <sub>2</sub> FeMoO <sub>6</sub> DOUBLE PEROVSKITES PREPARED BY SOLID STATE METHOD Vanussanun Aitviriyaphan	OI007 SURFACE PLASMON RESONANCE ANALYSIS USING TRANSMISSION LINE MODEL Naphat albutt			
16.20-16.40	OS010 CORRELATION AND PATH COEFFICIENT FOR ECONOMIC TRAITS OF FRUIT MULBERRY (Morus sp) BASED ON CRITERIA MULBERRY SELECTION Sujaree Nonthakod	OI008 FLUORESCENCE DETECTION OF HYDRAZINE HYDRATE USING CARBON NANODOTS SYNTHESIZED FROM MANDARIN RIND Naphat albutt			
16.40-17.00	OS011 AMPEROMETRIC BIOSENSORS USING DIFFERENT ALCOHOL OXIDASES Manatsapon Tipmanee	OI009 BIOSENSOR IN FOOD TECHNOLOGY Naphat albutt			
17.00-17.20	OS012 COMPARISON OF INDUSTRIAL MICROWAVE DRYING AND FLUIDIZED BED DRYING TECHNIQUES ON THE QUALITY OF JASMINE INSTANT RICE Patsakul Phukasmas	OI010 FOOD WASTE UTILISATION: CASE STUDY IN THAILAND Naphat albutt			
17.20-17.40	OS017 INVESTIGATION OF MAGNETIC PROPERTIES FOR Ca <sub>2</sub> FeMoO <sub>6</sub> DOUBLE PEROVSKITES Worapon Ruangthong	OI017 THE EFFECT OF FUNCTIONALIZED GRAPHENE OXIDE ON ION CONDUCTIVITY AND PERMEABILITY OF VANADIUM REDOX FLOW BATTERIES MEMBRANE BASED ON SULFONATED POLY(ETHER ETHER KETONE) COMPOSITE Narumon Seeponkai			
18.00-20.00	Welcome Reception				

## Friday June 22

Time/Place	Kingkamol	Duangkamol	Kamolruedi	Kornkamol 1	2 <sup>nd</sup> Floor
09.00-12.00	<b>Session 1 Sustainability Science</b>  Chair: Assoc. Prof. Dr.Suejit Co-Chair: Dr. Noppakun Sanpo	<b>Session 2 Sustainability Science and Innovative Technology and Sustainability Engineering</b>  Chair: Dr.Pinit Kidkhunthod Co-Chair: Dr.Anurat Wisitsoraat	<b>Session 3 Innovative Technology and Sustainability Engineering</b>  Chair: Assoc. Prof. Dr. Chi-wai Kan Co-Chair: Assoc. Prof. Dr. Sheila Shahidi	<b>Economic Modelling</b>	<b>Poster Session</b> Sustainability Science
09.00-09.20	<b>Invite speaker 1</b>  Dr.Pinit Kidkhunthod	<b>Invite speaker 2</b>  Dr.Anurat Wisitsoraat	OT006 UP CYCLING FOR PRODUCT DESIGN OF JEANS WASTES WITH AN ECONOMIC AND ENVIRONMENTAL APPROACH Zahra Ahmadi		
09.20-09.40			OT007 APPLICATION OF LASER TREATMENT FOR IMPOROVING THE DYE AND CHEMICAL ADSORPTION ON POLYESTER FABRIC Sheila Shahidi		
09.40-10.00	OS013 PREPARATION OF Al- 5Ti-1B MASTER ALLOY AND ITS INFLUENCE ON MECHANICAL PROPERTIES OF A 356 ALLOY Thee Chowwanonthapunya	OI011 SYNTHESIS AND CHARACTERISATIONS OF Y-DOPED BACEO3 CERAMIC FOR USE AS SOLID ELECTROLYTE IN SOLID OXIDE FUEL CELL Wiset Somkhuan	OT008 IR AND UV PROTECTION FUNTION OF WOVEN FABRICS  Polona Dobnik Dubrovski		
10.00-10.20	<b>Coffee Break</b>				
10.20-10.40	OS014 COMPARISON OF CONVENTIONAL AND ULTRASOUND-ASSISTED EXTRACTION TECHNIQUES FOR EXTRACTION OF PHENOLIC COMPOUNDS FROM COCONUT HUSK FIBER Attapon Nitiwattananon	OI014 COMPARISON OF IEEE 802.11N AND IEEE 802.11AC WIRELESS TECHNOLOGY PERFORMANCES ON 2.4GHZ AND 5GHZ FREQUENCIES  Kittipoom Intaraauksorn	OT009 UV PROTECTION AND ANTIBACTERIAL PROPERTIES OF NATURAL DYED COTTON WITH SAFRAN, CURCUMA AND CINNAMON  Sheila Shahidi		

<b>Time/Place</b>	<b>Kingkamol</b>	<b>Duangkamol</b>	<b>Kamolruedi</b>	<b>Kornkamol 1</b>	<b>2<sup>nd</sup> Floor</b>
<b>10.40-11.00</b>	OS015 EFFECT OF LATEX RUBBER AND RUBBER POWDER AS AN ADMIXTURE ON BENDING STRENGTH OF CEMENT MORTARS Santi Rattanaveeranon	OI015 WEATHER REALATED-HEAT ILLNESS EVENT OVER CHIANGMAI USING AUTOMATIC WEATHER STATION OBSERVED DATA  Parwapath Phunthirawuthi	OT010  A STUDY OF SUITABILITY OF BAMBOO DENDROCALMUS ASPER PULP APPLICATION AS FILLER MATERIAL IN SANITARY PAD MAKING  Alice Waithaka	<b>Economic Modelling</b>	<b>Poster Session</b> Sustainability Science
<b>11.00-11.20</b>	OS016 EFFECTS OF INITIAL MOISTURE CONTENT, INFRARED TEMPERATURE AND PUFFING TIME ON QUALITY OF PUFFED PORK RINDS IN A CONTINUOUS INFRARED-MICROWAVE OVEN Boonjira Bunlangpattama		OT011  APPLICATION OF MICROENCAPSULATED NATURAL ESSENCES OILS IN THE DEVELOPMENT OF FUNCTIONALIZED SUSTAINABLE CLOTHING  Nuno José Ramos Belino		
<b>11.20-11.40</b>	<b>Invite speaker 2</b>				
<b>11.40-12.00</b>					
<b>12:00-13:00</b>	<b>Lunch Break</b>				
<b>13:00-14:00</b>	<b>Poster presentation</b> (Sustainability Science)				
<b>14:00-14:20</b>	<b>Coffee Break</b>				
<b>14:20-16:00</b>	<b>Poster presentation</b> (Sustainability Science)				
<b>16:00</b>	<b>Research/Posters Award Presentation, Closing Celebration and Welcome to ICONSci 2019</b>				

**Program for Oral Presentations  
June 21, 2018**

Room: Kingkamol

Session 1: Sustainability Science

Chairman: Dr.Noppakun Sanpo

Co-Chair: Dr.Apisit Kositchaiyong

Time	Code	Title	Speaker
13:00-13:20	OS001	DEVELOPMENT OF STRUCTURAL HEALTH MONITORING SYSTEM BY USING PIEZOELECTRIC SENSORS	Sumit Jirungnimitsakul
13:20-13:40	OS002	GRAIN SIZE EFFECT ON STRAIN CHARACTERISTIC IN BaTiO <sub>3</sub> CERAMICS	Narit Funsueb
13:40-14:00	OS003	DETERMINING THE CONCENTRATION OF SOLUBLE ETHYLENE IN WATER IMMERSION PLANT USING ACIDIFIED POTASSIUM MANGANATE METHOD	Wilailack Chayaprasert
14:00-14:20	Coffee Break		
14:20-14:40	OS004	A NOVEL SACHA INCHI (Plukenetia volubilis L.) SHELL AS A MODIFIED-POROUS ACTIVATED CARBON PRODUCT	Patsapon Silasalaisopisth
14:40-15:00	OS005	BIOELECTRICITY PRODUCTION FROM RICE NOODLE WASTEWATER USING PLANT MICROBIAL FUEL CELL (PMFC)	Wanida Potawat
15:00-15:20	OS006	THE INVESTIGATION OF DIELECTRIC BARRIERS DISCHARGE PLASMA JET (DBDJ) FOR BACTERICIDAL IN WOUND HEALING	Pipath Poramapijitwat
15:20-15:40	OS007	A LOW PRESSURE PLASMA TREATMENT FOR STERILITATION AND QUALITY IMPROVEMENT OF RICE FLOUR	Kantamard Lamasai
15:40-16:00	OS008	EFFECT OF Fe <sup>3+</sup> ON BaTiO <sub>3</sub> PEROVSKITE MAGNETIC PROPERTIES	Navapun Nanchaisin

Time	Code	Title	Speaker
16.00-16.20	OS009	MAGNETIC PROPERTIES IN $\text{Ba}_2\text{FeMoO}_6$ DOUBLE PEROVSKITES PREPARED BY SOLID STATE METHOD	Vanussanun Aitviriyaphan
16.20-16.40	OS010	CORRELATION AND PATH COEFFICIENT FOR ECONOMIC TRAITS OF FRUIT MULBERRY ( <i>Morus</i> sp) BASED ON CRITERIA MULBERRY SELECTION	Sujaree Nonthakod
16.40-17.00	OS011	AMPEROMETRIC BIOSENSORS USING DIFFERENT ALCOHOL OXIDASES	Manatsapon Tipmanee
17.00-17.20	OS012	COMPARISON OF INDUSTRIAL MICROWAVE DRYING AND FLUIDIZED BED DRYING TECHNIQUES ON THE QUALITY OF JASMINE INSTANT RICE	Patsakul Phukasmas
17.20-17.40	OS017	INVESTIGATION OF MAGNETIC PROPERTIES FOR $\text{Ca}_2\text{FeMoO}_6$ DOUBLE PEROVSKITES	Worapon Ruangthong

**Program for Oral Presentations  
June 22, 2018**

Room: Kingkamol

Session 1: Sustainability Science

Chairman: Assoc. Prof. Dr.Suejit Pechprasarn

Co-Chair: Dr. Noppakun Sanpo

<b>Time</b>	<b>Code</b>	<b>Title</b>	<b>Speaker</b>
09.00-09.40	Invite speaker		Dr.Pinit Kidkhunthod
09.40-10.00	OS013	PREPARATION OF Al-5Ti-1B MASTER ALLOY AND ITS INFLUENCE ON MECHANICAL PROPERTIES OF A 356 ALLOY	Thee Chowwanonthapunya
10.00-10.20	Coffee Break		
10.20-10.40	OS014	COMPARISON OF CONVENTIONAL AND ULTRASOUND-ASSISTED EXTRACTION TECHNIQUES FOR EXTRACTION OF PHENOLIC COMPOUNDS FROM COCONUT HUSK FIBER	Attapon Nitiwattananon
10.40-11.00	OS015	EFFECT OF LATEX RUBBER AND RUBBER POWDER AS AN ADMIXTURE ON BENDING STRENGTH OF CEMENT MORTARS	Santi Rattanaveeranon
11.00-11.20	OS016	EFFECTS OF INITIAL MOISTURE CONTENT, INFRARED TEMPERATURE AND PUFFING TIME ON QUALITY OF PUFFED PORK RINDS IN A CONTINUOUS INFRARED-MICROWAVE OVEN	Boonjira Bunlangpattama
11.20-12.00	Invite speaker		Assoc. Prof. Dr. Somsak Dangtip

**Program for Oral Presentations  
June 21, 2018**

Room: Duangkamol

Session 2: Innovative Technology and Sustainability  
Engineering

Chairman: Dr.Amporn Poyai

Co-Chair: Dr.Pinit Kidkhunthod

Time	Code	Title	Speaker
13:00-13:40	Invite speaker		Dr.Amporn Poyai
13:40-14:00	OI001	EFFECT OF DIFFERENT TYPES OF WASHES ON THE FABRIC STRENGTH OF DENIM	Hina Gul
14.00-14.20	Coffee Break		
14.20-14.40	OI002	RESISTIVE SENSOR FOR VOC DETECTION	Maitree Thawornsin
14.40-15.00	OI003	MATCHING IMPEDANCES LARGE SCALE FRESNEL EQUATION CALCULATION	Naphat albutt
15.00-15.20	OI004	MULTIPLE REFLECTIONS MODELING FOR MULTI-LAYER OPTICAL STRUCTURES	Naphat albutt
15.20-15.40	OI005	OPTICAL DEVICE ADAPTED TO SMARTPHONE FOR DIRECT IMAGING RETINAL BLOOD VESSELS	Naphat albutt
15.40-16.00	OI006	PARALLEL COMPUTING SOFTWARE DESIGN FOR LARGE SCALE ELECTROMAGNETIC SIMULATION	Naphat albutt
16.00-16.20	OI007	SURFACE PLASMON RESONANCE ANALYSIS USING TRANSMISSION LINE MODEL	Naphat albutt
16.20-16.40	OI008	FLUORESCENCE DETECTION OF HYDRAZINE HYDRATE USING CARBON NANODOTS SYNTHESIZED FROM MANDARIN RIND	Naphat albutt
16.40-17.00	OI009	BIOSENSOR IN FOOD TECHNOLOGY	Naphat albutt
17.00-17.20	OI010	FOOD WASTE UTILISATION: CASE STUDY IN THAILAND	Naphat albutt
17.20-17.40	OI017	THE EFFECT OF FUNCTIONALIZED GRAPHENE OXIDE ON ION CONDUCTIVITY AND PERMEABILITY OF VANADIUM REDOX FLOW BATTERIES MEMBRANE BASED ON SULFONATED POLY(ETHER ETHER KETONE) COMPOSITE	Narumon Seeponkai



**Program for Oral Presentations  
June 22, 2018**

Room: Duangkamol

Session 2: Innovative Technology and Sustainability  
Engineering

Chairman: Dr.Pinit Kidkhunthod

Co-Chair: Dr.Anurat Wisitsoraat

<b>Time</b>	<b>Code</b>	<b>Title</b>	<b>Speaker</b>
09.00-09.40	Invite speaker		Dr.Anurat Wisitsoraat
09.40-10.00	OI011	SYNTHESIS AND CHARACTERISATIONS OF Y-DOPED BaCeO <sub>3</sub> CERAMIC FOR USE AS SOLID ELECTROLYTE IN SOLID OXIDE FUEL CELL	Wiset Somkhuan
10.00-10.20	Coffee Break		
10.20-10.40	OI014	COMPARISON OF IEEE 802.11N AND IEEE 802.11AC WIRELESS TECHNOLOGY PERFORMANCES ON 2.4GHZ AND 5GHZ FREQUENCIES	Kittipoom Intaraauksorn
10.40-11.00	OI015	WEATHER REALATED-HEAT ILLNESS EVENT OVER CHIANGMAI USING AUTOMATIC WEATHER STATION OBSERVED DATA	Parwaph Phunthirawuthi



**Program for Oral Presentations  
June 21, 2018**

Room: Kamolruedi

Session 3: Textiles and Clothing Sustainability

Chairman: Assoc. Prof. Dr. Chi-wai Kan

Co-Chair: Assoc. Prof. Dr. Sheila Shahidi

<b>Time</b>	<b>Code</b>	<b>Title</b>	<b>Speaker</b>
13:00-14:00	Invite speaker	“NON-AQUEOUS DYEING OF COTTON AND WOOL FABRICS”	Assoc. Prof. Dr. Chi-wai Kan
14.00-14.20	OT001	STUDY ON LOW TEMPERATURE DYEING OF ULTRASONICALLY TREATED WOOL	Qing Li
14.20-14.40	OT002	GLOBAL SUSTAINABLE APPROACH TO MINIMIZE COST AND IMPROVE PRINTING PARAMETERS OF REACTIVE AND DISPERSE DYES BY USING MODIFIED THICKENER	Shrirang k. Chinta
14.40-15.00	OT003	DESIGN AND DEVELOPMENT OF ELECTRO-CONDUCTIVE RECTANGULAR TEXTILE ANTENNA USING POLYPROPYLENE FABRIC	S. Gangopadhyay
15.00-15.20	Coffee Break		
15.20-15.40	OT004	A STUDY ON LOW STRESS MECHANICAL PROPERTIES OF DENIM FABRIC FOR HAND EVALUATION	P.O. Laddha
15.40-16.00	OT005	STUDIES ON NATURAL AND SYNTHETIC ANTIMICROBIAL FINISHING OF TEXTILES	Arun K Patra

**Program for Oral Presentations  
June 22, 2018**

Room: Kamolruedi

Session 3: Textiles and Clothing Sustainability

Chairman: Assoc. Prof. Dr. Chi-wai Kan

Co-Chair: Assoc. Prof. Dr. Sheila Shahidi

Time	Code	Title	Speaker
09.00-09.20	OT006	UP CYCLING FOR PRODUCT DESIGN OF JEANS WASTES WITH AN ECONOMIC AND ENVIRONMENTAL APPROACH	Zahra Ahmadi
09.20-09.40	OT007	APPLICATION OF LASER TREATMENT FOR IMPOROVING THE DYE AND CHEMICAL ADSORPTION ON POLYESTER FABRIC	Sheila Shahidi
09.40-10.00	OT008	IR AND UV PROTECTION FUNTION OF WOVEN FABRICS	Polona Dobnik Dubrovski
10.00-10.20	Coffee Break		
10.20-10.40	OT009	UV PROTECTION AND ANTIBACTERIAL PROPERTIES OF NATURAL DYED COTTON WITH SAFRAN, CURCUMA AND CINNAMON	Sheila Shahidi
10.40.11.00	OT010	A STUDY OF SUITABILITY OF BAMBOO DENDROCALMUS ASPER PULP APPLICATION AS FILLER MATERIAL IN SANITARY PAD MAKING	Alice Waitthaka
11.00-11.20	OT011	APPLICATION OF MICROENCAPSULATED NATURAL ESSENCES OILS IN THE DEVELOPMENT OF FUNCTIONALIZED SUSTAINABLE CLOTHING	Nuno José Ramos Belino



**Program for Oral Presentations**  
**June 21, 2018**

Room: Kornkamol 1

Session 4: Economic Modelling

Chairman: Prof. Dr. Paresh Narayan

<b>Time</b>	<b>Code</b>	<b>Title</b>	<b>Speaker</b>
13:00-13:30	OE001	THE LINK BETWEEN TERRORIST ATTACKS AND THE CRYPTOCURRENCY MARKET	Krishna Reddy
13:30-14:00	OE002	VOLATILITY IN CRYPTOCURRENCY MARKET	Warattaya Chinnakum
14:00-14:30	Coffee Break		
14.30-15:00	OE003	STOCK MARKET INVESTMENT AND INFLATION: EVIDENCE FROM THE USA AND CANADA	Janesh sami
15.00-15.15	OE004	INTERNATIONAL PORTFOLIO DIVERSIFICATION POSSIBILITIES BETWEEN BRICS AND DEVELOPED STOCK MARKETS	Lei Pan
15:15-15:45	OE005	PER CAPITA OUTPUT CONVERGENCE ACROSS ASIAN COUNTRIES: EVIDENCE FROM COVARIATE UNIT ROOT TEST WITH AND ENDOGENOUS STRUCTURAL BREAK	Takashi matsuki
15.45-16.15	OE006	AUTONATION, TAXES AND TRANSFERS WITH INTERNATIONAL RIVALRY	Yixiao Zhou
16.15-16.45	OE007	IMPACT OF GENETIC DISTANCE ON TECHNOLOGICAL PROGRESS	Baljeet Singh



**Program for Oral Presentations  
June 22, 2018**

Room: Kornkamol 1

Session 4: Economic Modelling

Chairman: Prof. Dr. Paresh Narayan

<b>Time</b>	<b>Code</b>	<b>Title</b>	<b>Speaker</b>
10.00-10.30	OE008	DO RISK PROPENSITY AND MARKET STATES INFLUENCE DISPOSITION? A CASE OF PAKISTANI MUTUAL FUND INVESTORS	Kin Boon Tang
10.30-11.00	OE009	EXCHANGE RATE UNDERVALUATION AND ECONOMIC GROWTH: THE TRADE - VERSUS THE FINANCIAL RISK CHANNEL	Fyyaz Hussain
11.00.11.30	OE010	FOREIGN OFFICIAL HOLDING OF U.S. TREASURIES AND U.S. MORTGAGE RATES	Dingming Liu

## Program for Poster Presentation

June 21, 2018

Place: 2<sup>st</sup> Floor

### Session 2: Innovative Technology and Sustainability Engineering

Poster ID	Abstract Title	Presenter
PI001	FACILE SYNTHESIS OF CeO <sub>2</sub> /SnO <sub>2</sub> N-N HETEROSTRUCTURE	Viruntachar
PI002	IMPACTS OF CURRENT AND VOLTAGE HARMONICS FOR INDUSTRIAL POWER NETWORK	Nattachote Rugthaicharoencheep
PI003	TESTING OF POWER TRANSFORMER USING DISSOLVED GAS ANALYSIS	Nattachote Rugthaicharoencheep
PI004	OPTIMAL REACTIVE POWER CONTROL IN POWER SYSTEM WITH PARTICLE SWARM OPTIMIZATION TECHNIQUE	Manat boonthienthong
PI005	AUTOMATIC MUSHROOM WATERING SYSTEM USING MICROCONTROLLER	Suthada Srigate
PI006	A WEB-BASED BOOKING SYSTEM FOR RAJARUEK PIROM CONFERENCE ROOM	Vipa Jakchaikul
PI007	EFFECT OF AMMONIUM SULPHATE (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> ) ON MICROSTRUCTURE AND MECHANICAL PROPERTIES OF SA-213- Gr.T22 AND SA-210-Gr.A STEEL IN THE WATER TUBE BOILER	Papatsorn Singhatham
PI008	EYE-GAZE TECHNOLOGY ACCESS TO MEDIA FOR DISABLED STUDENT	Veerawan Janthanasub
PI009	DROWSY ALERT SYSTEM USING DIGITAL IMAGE PROCESSING	Jetsada Likitvong
PI010	THE DESIGN AND CONSTRUCTION OF FATIGUE TESTING MACHINE	Prasert Wirotcheewan
PI011	PLANNING OF DISTRIBUTION SUBSTATION WITH GIS APPLICATION	Aroon Charlangsut
PI012	ANALYSIS OF STRESS DISTRIBUTION FOR POWDER COMPRESSION MOLDING BY FINITE ELEMENT METHOD	Prakorb Chartpuk

Poster ID	Abstract Title	Presenter
PI013	ANALYSIS OF STRESS DISTRIBUTION FOR RUN-FLAT BY FINITE ELEMENT METHOD	Prakorb Chartpuk
PI014	PHYSICAL AND MECHANICAL BEHAVIOR OF COBALT OXIDE DOPED BNKT LEAD-FREE CERAMICS	Wilaiwan Leenakul
PI015	STUDY OF SYNTHESIS PARAMETERS OF Ni-rich $\text{LiNi}_{0.75}\text{Mn}_{0.15}\text{Co}_{0.10}\text{O}_2$ POWDER BY CO-PRECIPIATION METHOD	Wilaiwan Leenakul
PI016	DESIGN AND CONSTRUCTION CAPACITOR VOLTAGE DIVIDER FOR AC HIGH VOLTAGE 50 kV RATED TO TEST THE DIELECTRIC STRENGTH	Supawud Nedphokaew
PI017	A CONCEPTUAL FRAMEWORK FOR THE INNOVATIVE DESIGN OF TEMPORARY ACCOMMODATION FOR FLOOD VICTIMS IN THA KORPAI COMMUNITY, WARIN CHAMRAB, UBON RATCHATHANI PROVINCE, THAILAND.	Phudis Hompikul
PI018	ANALYSIS OF STANDARDIZED PRECIPITATION EVAPOTRANSPIRATION INDEX OVER CHIANGRAI AND PHAYAO PROVINCES	Chanattha Saengrattanayon
PI019	DESIGN AND CONSTRUCTION OF A MINI MAGNETIC LEVITATION TRAIN	Sakhon Woothipatanapan
PI020	DESIGN AND CONSTRUCTION THE RF ION SOURCE FOR COMPACT ACCERELATOR WITH 30 KEV ENERGY	Keratiya janpong
PI021	DEVELOPMENT OF A PORTABLE SPOT WELDING	Nitipat Eawsakul
PI022	AN ADSORBENT DEVELOPED FROM BANANA PEELS, WATER HYACINTH, AND KAPOK FOR PHOSPHORUS AND NITROGEN TREATMENT	Manoch Lakthandee
PI023	LEARNING ACTIVITY PROVISION ACCORDING TO 4H LIFE SKILLS PRINCIPLE USING ONLINE LESSONS VIA GOOGLE SITE FOR EDUCATION INFORMATION SYSTEM MANAGEMENT COURSE	Thanatcha Rattanaphant

Poster ID	Abstract Title	Presenter
PI024	DEVELOPMENT OF PROGRAMMED INSTRUCTION LABORATORY FOR APPLICATION IN TELECOMMUNICATION ENGINEERING	Rungaroon Procharoen
PI025	DEVELOPMENT OF RESONANCE CIRCUIT CALCULATION PROGRAM	Rungaroon Procharoen
PI026	THE EFFECT OF LEUCITE CERAMICS ON MECHANICAL PROPERTIES OF SILICONE COATING	Jirasak Tharajak
PI027	INFLUENCE OF CERAMIC ADDITIVES ON MECHANICAL PROPERTIES OF EPOXY COATING	Jirasak Tharajak
PI028	A STUDY ON CHARACTERIZATION OF BIOMASS FLY ASH	Jirasak Tharajak
PI029	THE EFFECT OF SINTERING TEMPERATURE ON PHYSICAL PROPERTY OF LEUCITE CERAMICS	Jirasak Tharajak
PI031	THE EFFECT OF MAGNETIC FIELDS ON ALIGNMENT DIRECTION OF IRON FILLER IN THE EPOXY	Jirasak Tharajak
PI032	THE INFLUENCE OF BAMBOO CHARCOAL TO MECHANICAL PROPERTIES OF EPOXY COATING	Jirasak Tharajak
PI033	EFFECT OF ARGON AND OXYGEN RATIOS AND DC POWER PARAMETER OF SPUTTERING ON DEPOSITION RATE EFFICIENCY OF $\text{La}_{0.8}\text{Sr}_{0.2}\text{MnO}_3$ THIN FILMS	Jirasak Tharajak
PI034	THE EFFECT OF SPRAY DISTANCE ON PHASE TRANSITION OF CHROMIUM OXIDE COATINGS BY FLAME SPRAY PROCESS	Jirasak Tharajak
PI035	DEVELOPMENT OF READING ACTIVITIES FOR KINDERGARTEN 2 STUDENTS	Variya Yenporng
PI036	ANALYSIS OF THE DENSITY DISTRIBUTION OF CERAMIC ARMOR PLATES BY FINITE ELEMENT METHOD	Prakorb Chartpuk
PI037	DESIGN AND WEIGHT OPTIMIZATION OF RUN - FLAT WHEEL FOR THE ARMORED SMALL TRUCK BY FINITE ELEMENT METHOD	Prakorb Chartpuk

### Session 3: Textiles and Clothing Sustainability

Poster ID	Abstract Title	Presenter
PT001	DYE EXTRACTION FROM COFFEE SLUDE AND APPLICATION ON HEMP FABRIC DYEING USING ULTRASONIC TECHNIQUE	Rattanaphol Mongkhorrattanasit
PT002	A STUDY OF WICKABILITY OF QUICK DRY INNER WEAR	Chi-wai Kan, Irada Soodsung, Rattanaphol Mongkhorrattanasit
PT003	AN ANALYSIS OF RELATIVE HAND VALUE OF QUICK DRY INNER WEAR	Chi-wai Kan, Suchitra Chanuntawaree
PT004	DETERMINE THE THERMAL CONDUCTIVITY AND Q-MAX PROPERTIES OF QUICK DRY INNER WEAR	Chi-wai Kan, Usa Thangtham, Rattanaphol Mongkhorrattanasit
PT005	AN EXPERIMENTAL STUDY OF WATER VAPOUR TRANSMISSION OF QUICK DRY INNER WEAR	Chi-wai Kan, Wasana Changmuong, Rattanaphol Mongkhorrattanasit
PT006	AIR PERMEABILITY PROPERTY STUDY OF QUICK DRY INNER WEAR	Chi-wai Kan, Wipada Krajangpo, Rattanaphol Mongkhorrattanasit
PT007	EVALUATION ON THE PROPERTIES OF ULTRAVIOLET RADIATION AND AIR PERMEABILITY OF COTTON T-SHIRTS	Chi-wai Kan, Saowanee Thaokitkun, Rattanaphol Mongkhorrattanasit
PT008	EVALUATION ON THE DURABILITY OF ON-LINE AND PHYSICAL SHOP COTTON T-SHIRTS	Chi-wai Kan, Jaruwat Diswat,
PT009	COMPARATIVE STUDY OF MOISTURE MANAGEMENT AND THERMAL CONDUCTIVITY PROPERTIES OF COTTON T-SHIRTS BETWEEN ON-LINE AND OFF-LINE SHOPS	Chi-wai Kan, Nongnut Sasitsorn

<b>Poster ID</b>	<b>Abstract Title</b>	<b>Presenter</b>
PT010	EFFECT OF PLASMA PRE-TREATMENT ON THE DYEABILITY OF SILK FABRIC WITH METAL-COMPLEX DYE	Chi-wai Kan, Pichitphol Jaroensappayanant, Rattanaphol Mongkholrattanasit
PT011	EVALUATION OF THERMAL CONDUCTIVITY PROPERTY OF SOCKS	Chi-wai Kan, Naruepon Phaisarntantiwong, Sampas Suwankere, Rattanaphol Mongkholrattanasit
PT012	A STUDY OF THE AIR PERMEABILITY OF SOCKS	Chi-wai Kan, Kongkiat Maha-in, Rattanaphol Mongkholrattanasit
PT013	AN ANALYSIS OF WATER VAPOUR TRANSMISSION ABILITY OF SOCKS	Chi-wai Kan, Maturud Viengsima, Nittaya Wansopa, Rattanaphol Mongkholrattanasit
PT014	AN EXPERIMENTAL STUDY OF MOISTURE MANAGEMENT PROPERTY OF SOCKS	Chi-wai Kan, Kornchanok Buntorn, Rattanaphol Mongkholrattanasit
PT015	AN INVESTIGATION OF ABRASION RESISTANCE OF SOCKS	Chi-wai Kan, Chamlong Sarikanon, Rattanaphol Mongkholrattanasit
PT016	EFFECT OF PLASMA PRETREATMENT OF DYEABILITY OF SILK WITH ACID DYE	Chi-wai Kan, Cholthicha Sarikanon, Rattanaphol Mongkholrattanasit
PT017	WICKABILITY OF GAUZE PRODUCTS FOR INFANT	Chi-wai Kan, Kittisak Ariyakuare, Rattanaphol Mongkholrattanasit
PT018	A STUDY OF AIR PERMEABILITY OF GAUZE PRODUCTS FOR INFANT	Chi-wai Kan, Kasem Manarungwit, Krailerck Visephan
PT019	AN EVALUATION OF HAND FEEL OF GAUZE PRODUCTS FOR INFANT	Chi-wai Kan, Sarun Jankaew, Sudakan Yabdee, Rattanaphol Mongkholrattanasit

<b>Poster ID</b>	<b>Abstract Title</b>	<b>Presenter</b>
PT020	ENZYMATIC IMPROVEMENT OF PINEAPPLE FIBER QUALITY	Rungsima Chollakup
PT021	NATURAL INDIGO DYEING USING GLUCOSE AS REDUCING AGENT IN ALKALINE CONDITION FOR COTTON YARN	Rungsima Chollakup, Nattadon Rungruangkitkrai
PT022	THE COMPARISON OF MALEIC ACID, ITACONIC ACID AND BUTANE TETRACARBOXYLIC ACID AS ANTI-CREASE AGENT FOR COTTON FABRICS	Rungsima Chollakup
PT023	EFFECT OF YARN COUNT AND FABRIC DENSITY VARIATION ON MECHANICAL PROPERTIES OF SILK FABRICS	Pimpawan Kumphai, Rungsima Chollakup
PT024	DEMAND FACTORS OF NATURAL DYES OF SMEs/ OTOP AND START-UP ENTREPRENEURS FOR TEXTILE PRODUCT DEVELOPMENT	Nawarat Chartvivatpornchai
PT025	THERMAL INSULATION PROPERTY OF NONWOVEN FROM BLENDED BORASSUS FRUIT FIBER/ POLYESTER	Rattanaphol Mongkholrattanasit
PT026	THE STUDY AND DEVELOPMENT OF TOOLS FOR TRANSPORTING CHILDREN AT THE AGE OF 1-3 YEARS	Kasem Manarungwit
PT027	A STUDY AND DEVELOPMENT OF THE TAI-LUE'S WOVEN FOR TEXTILE PRODUCT WITH EMBROIDERY TECHNIQUES	Kasem Manarungwit
PT028	A COSTUME DESIGN OF LADIES' PARTY STYLE INSPIRED BY THE SHADOW PUPPET FROM NAKHON SRI THAMMARAT	Sampas Suwankeree, Naruepon Phaisarntantiwong,
PT029	DESIGN PARTY WOVEN WEAR INSPIRED BY PA KAO MAH FROM NONG PHOK DISTRICT, ROI ET PROVINCE, THAILAND	Naruepon Phaisarntantiwong, Maturod Viengsima, Krailerck Visephan

## Session 4: financial markets and economic growth

Poster ID	Abstract Title	Presenter
PE001	DETERMINING THE CONCENTRATION OF SOLUBLE ETHYLENE IN WATER IMMERSION PLANT USING ACIDIFIED POTASSIUM MANGANATE METHOD	Ni Putu Maha Lina, Kwanruetai Boonyasana
PE002	COST EFFECTIVENESS IN MEASURES FOR CONTROL OF H5N1 AVIAN INFLUENZA DISEASE IN THAILAND	Chinapratha Sitikornchayarpong, Siripen Supakankunti

## Program for Poster Presentation

June 22, 2018

Place: 2<sup>st</sup> Floor

### Session 1: Sustainability Science

Poster ID	Abstract Title	Presenter
PS001	OLEAGINOUS YEAST ISOLATED FROM MANGROVE FOREST IN CHANTHABURI PROVINCE AND ITS LIPID PRODUCTION	Puthita Chokreansukchai
PS002	DETERMINATION OF TOTAL ARSENIC USING MICROWAVE DIGESTION TECHNIQUE-GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROPHOTOMETRY	Woravith Chansuvarn
PS003	COMPARISON OF ADSORPTION EFFICIENCY OF MODIFIED FILTER CAKE FOR REMOVAL OF COPPER AND ZINC FROM AQUEOUS SOLUTION	Woravith Chansuvarn
PS004	APPLY COCONUT PROTEIN RESIDUE FROM PRODUCTION OF COCONUT OIL WITH EXTRACTED CURCUMA LONGA AS FOODS FOR REARING JUVENILE RED CLAW CRAYFISH	norasing penprapai
PS005	LOW-COST SPUTTERING PROCESS FOR CARBON NANOTUBES SYNTHESIS	Theerapol Thurakitseree
PS006	CHARACTERIZATION OF MECHANICAL AND PHYSICAL PROPERTIES OF BLEACHING PAPER FROM RICE STRAW	Udomdeja Polyium
PS007	A FACILE SYNTHESIS OF SELF-CATALYTIC PVP/PVA/CITRIC ACID HYDROGEL USING SODIUM HYDROGENCARBONATE AS A GELLING AGENT	Supachai Thongsuksaengcharoen
PS008	IMPROVEMENT OF MECHANICAL PROPERTIES AND WATER ABSORPTION IN WHEAT GLUTEN BY EPOXIDIZED NATURAL RUBBER	Kantima Chaochanchaikul
PS009	COOPERATIVE EFFECT BETWEEN GLYCEROL AND EPOXIDIZED NATURAL RUBBER IN WHEAT GLUTEN	Kantima Chaochanchaikul

Poster ID	Abstract Title	Presenter
PS010	THE OPTIMUM CONDITIONS FOR THE CARBOXYMETHYL CELLULOSE BIOPLASTIC FILM FROM JACKFRUIT USING NATURAL RUBBER AND GELATIN AS ADDITIVE SUBSTANCES.	Orasa Chaisaeng
PS011	ASSESSING THE EFFICIENCY OF DOMESTIC WASTEWATER TREATMENT BY USING TANNIN FROM BANANA LEAF SHEATH, LEUCAENA AND BENGAL ALMOND	Woranuch Deelaman
PS012	DESIGNING AND APPLICATION OF PLASMONIC INTERFEROMETRY	Chatchawal Sripakdee
PS013	THE STUDY OF WGM - PLASMON INTERACTION WITHIN A MICRO PANDA RING RESONATOR	Chatchawal Sripakdee
PS014	NEAR INFRARED SPECTROSCOPY ANALYSIS OF MIXED RAW AND PARBOILED RICE BRAN	Wirongrong Maksawasd
PS015	ALUMINA THIN FILM SYNTHESIS FOR IMPROVING SEMI-PRECIOUS STONE QUALITY WITH PLASMA ENHANCED ATOMIC LAYER DEPOSITION (PE-ALD)	Chanitda Prapaipong
PS016	FABRICATION AND CHARACTERIZATION OF PARTICLE BOARD FROM COFFEE HUSK WASTE	Nisakorn Nuamsrinuan
PS017	TEMPERATURE DEPENDENCE ON MECHANICAL, DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF BST-MODIFIED BNKT CERAMICS	Pharatree Jaita
PS018	DESIGNED TO MEET THE CONDITIONS OF USE FOR PEOPLE WITH DISABILITIES AND DISABILITY CASE STUDYS: IMPROVING THE ENVIRONMENT OF THE CENTER FOR SOCIAL WELFARE DEVELOPMENT ELDERLY HOME KHAE. BANGKOK	Kornpong Thongsri
PS019	THE DESIGN ENVIRONMENT TO RESPOND TO APPLICATIONS FOR BABY APHASIA CASE STUDY: BABIES APHASIA AND INTELLIGENCE. "NONTAWITH HOME LANDSCAPE," PAK KRET DISTRICT SOME MAKETS. NONTHABURI	Kornpong Thongsri

Poster ID	Abstract Title	Presenter
PS020	THE STUDY AND DESIGN OF THE PHYSICAL ENVIRONMENT IN RESPONSE TO APPLICATIONS FOR DISABLED CHILDREN IN EDUCATION: IMPROVING THE ENVIRONMENT OF THE ORPHANAGE FOR DISABLED CHILDREN IN PAK KRET, NONTHABURI.	Kornpong Thongsri
PS021	THE STUDY AND DESIGN OF THE PHYSICAL ENVIRONMENT IN RESPONSE TO APPLICATIONS FOR THE ELDERLY: A CASE STUDY TO IMPROVE THE PHYSICAL ENVIRONMENT OF THE CENTER FOR SOCIAL WELFARE DEVELOPMENT ELDERLY. PATHUM THANI	Kornpong Thongsri
PS022	MECHANICAL AND ELECTRICAL PROPERTIES OF BZT MODIFIED BY BARIUM HAZZAFERRITE	Supalak Manotham
PS023	THE EFFECTS OF BIOCHAR ADDITIVE ON THE PROPERTIES OF GEOPOLYMER MATERIALS	Phitchayanin Khamlue
PS024	PREPARATION AND CHARACTERIZATION OF DIATOMITE-BASED GEOPOLYMER MATERIALS	Suwanan Thammarong
PS025	PREPARATION AND CHARACTERIZATION OF CERAMIC WASTE -BASED GEOPOLYMER CERAMIC COMPOSITES FOR SUBSTRATE CULTURE APPLICATION	Kannikar Kaewapai
PS026	PREPARATION OF $BaFeTiO_3$ PEROVSKITE BY SOL-GEL MATHOD FOR MEASURING MAGNETIC PROPERTIES	Naphat Albutt
PS027	PREPARING BY SOLID STATE METHOD OF $Ca_2FeMoO_6$ DOUBLE PEROVSKITE MEASURED MAGNETIC PROPERTIES	Naphat Albutt
PS028	A DEVELOPING BIOFILM FOR SOIL SOLARIZATION	Patarika Soongsombat
PS029	CHARACTERIZATION OF ANTIFERROMAGNETISM IN DOUBLE PEROVSKITES $Ba_2FeMoO_6$ PREPARED BY SOLID STATE METHOD	Naphat Albutt
PS030	ALTERNATIVE ENERGY FROM FRESH WATER WEED, HYDRILLA VERTICILLATA	Sangwoei Sawekwiharee

Poster ID	Abstract Title	Presenter
PS031	ODOR ABSORBING MATERIAL PRODUCED FROM FRESH PLANT FLOWERS WASTE AT THAI TEMPLE IN THAILAND	Sangwoei Sawekwiharee
PS032	STUDY, MAGNETIC PROPERTIES OF BaTiFeO <sub>3</sub> PEROVSKITE PREPARED BY SOLID STATE MATHOD	Naphat Albutt
PS033	THE APPLICATION OF REMOTE-CONTROLLED ASSISTED SURFACE WATER SAMPLING	Sirichai Saramanus
PS034	UTILIZATION OF EGGSHELL ASH FOR REMOVAL OF ORGANIC MICROPOLLUTANTS IN CONTAMINATED WATER	Varinthorn Boonyaroj
PS035	UTILIZING AGRICULTURAL WASTE AS AN ENVIRONMENTALLY FRIENDLY CEMENT COMPOSITE	Varinthorn Boonyaroj
PS036	EFFECT OF SYSTEM OF RICE INTENSIFICATION (SRI) ON GROWTH AND YIELD COMPONENT IN KDML105	Chontira Sangsiri
PS037	THE FABRIC DESIGN OF THE LADY'S PARTY ATTIRE INSPIRED AND MADE BY THE LOINCLOTH IN NON PHOK DISTRIC, ROI ET	Naruepon Phaisarntantiwong
PS038	THE INFLUENCE OF PREBIOTIC TYPES (GOS AND FOS) AND FAT CONTENT ON THE CHEMICAL, PHYSICAL AND SENSORY CHARACTERISTIC OF YOGHURT ICE CREAM AND MIX	Watcharaporn Toommuangpak
PS039	EFFECT OF THERMAL TREATMENT TEMPERATURE ON PHASE FORMATION AND BIOACTIVITY OF GLASS-CERAMICS BASED ON THE SiO <sub>2</sub> -Na <sub>2</sub> O-CaO-P <sub>2</sub> O <sub>5</sub> SYSTEM	Nuttapon Pisitpipathsin
PS040	NUTRITIONAL PROPERTIES, ANTIOXIDANT AND ANTI-ACETYLCHOLINESTERASE ACTIVITIES OF PLEUROTUS OSTREATUS	Siriphatr Chamutpong

Poster ID	Abstract Title	Presenter
PS041	PHYTOCHEMICALS AND PHARMACOLOGICAL ACTIVITIES FROM BANANA FRUITS OF SEVERAL MUSA SPECIES FOR USING AS COSMETIC RAW MATERIALS	Chanai Noysang
PS042	EVALUATION OF PHYTOCHEMICALS AND PHARMACOLOGICAL ACTIVITIES OF BEN-CHA-LO-KA-WI-CHIAN REMEDY	Teerarat Pummarin
PS043	CONSTRUCTION AND CHARACTERIZATION OF ELECTRON CYCLOTRON RESONANCE OXYGEN PLASMA MACHINE FOR TOURMALINE TREATMENT	Chaipipat Pangkasorn
PS044	MEDIUM DENSITY FIBER BOARD FROM RENEWABLE WATER HYACINTH FIBER	Supaphorn
PS046	PHYTOCHEMISTRY AND ANTIOXIDANT ACTIVITY OF MOLINERIA LATIFOLIA HERB. EXTRACTS	Kunthasaya Akkarasiritharattana
PS047	PRELIMINARY PHYTOCHEMICALS AND PHARMACOLOGIC ACTIVITIES ASSESSMENT OF WHITE AND PINK NELUMBO NUCIFERA GAERTN FLOWERS	Chanai Noysang
PS048	THE APPLICATION OF ACETOBACTER SPECIES IN SWEET GLUTINOUS RICE FERMENTATION FOR BACTERIAL CELLULOSE PRODUCTION	Duongruitai Nicomrat
PS049	BIODEGRADATION OF WATER HYACINTH DURING SUPPORTING FOR HYDROPONIC VEGETATION	Duongruitai Nicomrat
PS050	THE ACTIVITY OF INDEGENOUS MICROBIAL CONSORTIUM INTERACTING WITH ACETIC ACID BACTERIA STARTER AFFECTING VENIGAR PRODUCTION	Duongruitai Nicomrat
PS051	LACTOBACILLI DIVERSITY AS AN POTENTIAL INDICATOR FOR THE KIMCHI QUALITY	Duongruitai Nicomrat
PS052	EFFECTS OF A BIOFERTILIZER MADE OF FERMENTED EGGS ON SOIL MICROBIAL COMMUNITY OF RICE PADDY	Duongruitai Nicomrat

<b>Poster ID</b>	<b>Abstract Title</b>	<b>Presenter</b>
PS053	CHARACTERISTICS OF ISOLATED SPECIES OF CELLULOLYTIC BACTERIA LOCALIZED IN THE GOAT RUMENS	Duongruitai Nicomrat
PS054	SHELF LIFE STABILITY OF FREEZING DRIED LACTOBACILLI ISOLATES FROM FERMENTED DAIRY	Duongruitai Nicomrat
PS055	HIGH SALT AND SEQUENTIAL ACIDITY REQUIREMENT IN HOMEMADE PICKLE FERMENTED PRODUCTS AFFECTING ON DIMINISHED INDIGENOUS PATHOGENS	Duongruitai Nicomrat

**KEYNOTE SPEAKERS**

**and**

**INVITED SPEAKERS**



## **ICON-SCI Keynote Speakers**

**Nick Guang Lu**

CTO – Industry Solutions

Huawei Southern-East Asia Enterprise Business Group

**Topic: How Innovation Disrupt Education?**

**Dr. Thomas J Roulet**

King's College, London, UK

**Topic: Digitalization and the New Ways of Working**

**Prof. Paresh Narayan**

Deakin University, Australia

Co-Editor, Economic Modelling: The International Journal of  
Theoretical and Applied Papers on Economic Modelling

**Topic: Marketing Capability and Corporate Innovation**



## ICON-SCI Invited Speakers

### **Dr.Amporn Poyai**

Thai Microelectronics Center  
51/4 Moo 1, Wangtakien District,  
Amphur Muang, Chachoengsao,  
Thailand 24000, Thailand

### **Dr.Anurat Wisitsoraat**

Nanoelectronics and MEMS Laboratory (MEM)  
National Electronics and Computer Technology Center:NECTEC  
Address: 112 Phahonyothin Road, Khlong Nueng,  
Khlong Luang District, Pathumthani 12120, Thailand.

### **Dr.Pinit Kidkhunthod**

Synchrotron Light Research Institute,  
Suranaree University of Technology  
111 University Ave, Muang District, Nakhon Ratchasima, 30000  
Thailand.

### **Assoc. Prof. Dr. Somsak Dangtip**

Department of Physics  
P603 (P Building) Faculty of Science, Mahidol University  
Rama 6 Rd., Payathai Rajathewee Bangkok 10400, Thailand

## High-Performance Gas Sensors based on Carbon/Metal-oxide Nanocomposites

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### Abstract

Metal oxide/carbon nanostructures and their composites are promising for various gas-sensing applications due to their huge specific surface area, excellent electronic/chemical characteristics and high environmental stability. Over the past several years, we have developed highly sensitive gas sensors based on carbon-incorporated metal-oxides prepared by different methods. Firstly, carbon-nanotubes (CNTs)-metal oxide (SnO<sub>2</sub>, WO<sub>3</sub> and MoO<sub>3</sub>) nanocomposites are developed by means of powder mixing and electron beam evaporation. Appropriate compositions of the nanocomposites lead to enhance responses towards gases such as NO<sub>2</sub>, ethanol, acetone and H<sub>2</sub>. Secondly, carbon-doped metal oxide nanostructures such as WO<sub>3</sub> nanorods are produced by sputtering with glancing angle deposition (GLAD) and demonstrated to offer a significantly higher gas-sensing response compared with conventional undoped dense thin film prepared by conventional sputtering method. Thirdly, carbon-coated 3D ZnO nanotetrapods fabricated by two-step vapor phase transport shows considerably enhanced response towards NO<sub>2</sub> compared with uncoated ZnO nanotetrapods. Lastly, graphene-metal oxides (SnO<sub>2</sub> and WO<sub>3</sub>) composite thick film gas sensors are fabricated based on one-step flame spray pyrolysis (FSP), electrolytic exfoliation and spin coating. The gas-sensing characteristics towards ethanol, acetone and NO<sub>2</sub> gases of the composite are found to be significantly improved with optimal graphene loading concentrations in the range of 0.5–5 wt%.

**Keywords:** Carbon-Metal oxide nanostructures, Nanocomposite, Gas sensor.



## **An Application of Synchrotron-based X-ray Absorption Spectroscopy Study on Advanced Functional Materials**

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### **Abstract**

The investigation of the local geometric and electronic structure of probing element in bulk samples is the most extensive field of application in X-ray Absorption Spectroscopy (XAS). XAS consists of two main regions which are X-ray Absorption Near Edge Structure (XANES) and Extended X-ray Absorption Fine Structure (EXAFS). The former region is used to explain the local geometry and oxidation states of selected element in a sample whilst the latter one is used to address the local structure around probing element in samples. In my talk, applications of synchrotron-based XAS on advanced functional materials will be introduced in order to obtain the accuracy of their locally structural information which cause that such properties in these materials.

**Keywords:** advanced functional materials; Local structure; X-ray absorption spectroscopy; XANES; EXAFS

Dr. Pinit Kidkhunthod is a beamline scientist in charge at SUT-NANOTEC-SLRI XAS beamline (BL5.2), Synchrotron Light Research Institute (Public Organization), Nakhon Ratchasima, Thailand. His research of interest is in the fields of structural studies of advanced functional materials such as carbon-based ferrite composite materials and novel glasses using an X-ray absorption spectroscopy (XAS) technique. Dr.Pinit Kidkhunthod received his B.Sc. (Physics), first class honors 3.99 from Khon Kaen University, Thailand in 2008, and Ph.D. (Physics) from Bristol University, U.K in 2012. He was one of two Thai students representative for DESY summer program, Germany, in 2007. Recently, Dr.Kidkhunthod has received research grants for young scientist from Thailand Research Fund (TRF2013), Ministry of Science and Technology (2014) and SUT-Center of Excellent on advanced functional materials (SUT-COE-AFM) from 2015-present. He is the author of over 80 papers in ISI journals for structural studies of advanced functional materials using XAS technique.

## Development of Glass-Ceramics Produced from Soda Lime Silica Glass Waste by Single-Step Sintering

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### Abstract

Soda lime silica glass (SLG) waste has high potential as starting materials for glass-ceramics (GC) production. The substantial viscous flow of the glass led to dense products for rapid treatments at relatively low temperatures (900–1,000°C). SLG powder was mixed with SiO<sub>2</sub> and was processed in the presence of precursors such as TiO<sub>2</sub>, ZnO, and CuO, etc. The single step sintering process were carried out at various temperatures in the range of 700 – 1100 °C. X-ray diffraction (XRD) showed higher degree of crystallinity and larger crystallite size of  $\alpha$ -SiO<sub>2</sub> while shrinking to smaller d100 spacing after sintering. XRD peaks from other oxide than SiO<sub>2</sub> decreased dramatically after sintering; possibly transition into the silica network. Microstructure of the sintered samples was carried out by using scanning electron microscope (SEM) and SEM/energy dispersive X-rays spectroscopy (SEM/EDX). The glass/metal powder interactions seems to result in the formation of color agent crystals, an enhancement of optical properties. This may lead to other potential functionalities like artificial gemstone application.

**Keywords:** Recycle; Soda lime silica glass; Sintering; Glass-ceramics; Imitation gemstone.

# **BOOK OF ABSTRACTS**

**ORAL PRESENTATION  
ABSTRACTS**



# **Oral Session I**

## **Sustainability Science**

## DEVELOPMENT OF STRUCTURAL HEALTH MONITORING SYSTEM BY USING PIEZOELECTRIC SENSORS

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### Abstract

Structural health monitoring (SHM) refers to the monitoring of structure failure identification in real time. The obvious advantages of using a SHM method over traditional inspection are security and reducing financial cost of maintenance. Piezoelectric materials are most commonly used in structural health monitoring because of piezoelectric effects which can transform mechanical energy into electrical energy or vice versa. This study was to investigate the generated electrical signal from piezoelectric sensor by using stimulation in transient mode which is one single pulse. The experiment varied some parameters such as external resistor, position of stimulation and installation of sensor. The experimental result is expected to explain physical mechanism for structural health monitoring application.

**Keywords:** Structural Health Monitoring, Piezoelectric, Sensor

## GRAIN SIZE EFFECT ON STRAIN CHARACTERISTIC IN $\text{BaTiO}_3$ CERAMICS

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### Abstract

Barium titanate ( $\text{BaTiO}_3$ ) ceramic were fabricated by mixed-oxide method via a vibro-milling technique. The pellets were then placed in a high purity alumina crucible in air and sintered at 1350, 1375 and 1400 °C for 2h. X-ray diffraction technique was used to investigate phase formation of  $\text{BaTiO}_3$  ceramics. Grain size was measured by scanning electron microscopy (SEM). The computer-controlled dielectric measurement system consisted of a high precision LCR-meter. Electric field induced polarization and strain were measured by using a modified Sawyer-Tower circuit with strain measurement system, which consisted of linear variable differential transformer (LVDT), DSP lock-in amplifier, high voltage power supply and computerized control and data acquisition. In this study, we will focus on the material engineering approach (structure- properties relations) for micromechatronic actuator application .

**Keywords:** barium titanate, grain size, strain characteristic, electrical properties

## **DETERMINING THE CONCENTRATION OF SOLUBLE ETHYLENE IN WATER IMMERSION PLANT USING ACIDIFIED POTASSIUM MANGANATE METHOD**

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### **Abstract**

Ethylene is plant growth regulator (PGR) that mainly influences on growth and development of plant and their agricultural productivity, so a monitoring level of ethylene is necessary process for research and commercial processes. Current method to measure ethylene hormone is costly and take a long time. This research established a new method to detect ethylene by using an oxidative reaction between oxidizing agent ( $\text{KMnO}_4$ ) and alkene functional group of ethylene under acidic solutions, and then quantitatively evaluated the leftover  $\text{KMnO}_4$  by spectrophotometry method in compared to standard curve. The purple intensity inversely relates with the concentration of ethylene. Water immersion leaves and flowers of samples which are different in ethylene emission performed under this method. The result showed the different in ethylene emission between plant varieties (normal tobacco and less-ethylene emission tobacco), plant organs (leaf and flowers) and also organ senescent levels. The result indicates that the concentration of ethylene in water are concordant with the physiology of tobacco leaf and flower. Therefore, ethylene level in water of plant sample can be estimated under this method.

**Keywords:** ethylene detection, stress, simply method, plant,  $\text{KMnO}_4$

## A NOVEL SACHA INCHI (*Plukenetia volubilis* L.) SHELL AS A MODIFIED-POROUS ACTIVATED CARBON PRODUCT

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### Abstract

Activated carbon (AC) has been an ideal material for the separation of a variety of chemical pollutants. Its extensive use is limited due to the cost of production, which has triggered the researches on the possible option for cost-effective production, especially using low cost materials. This study aimed at the development of activated carbon derived from industrial processing residue for sustainable waste management. The optimized condition for carbonization of inner Sacha inchi (*Plukenetia volubilis* L.) shell after oil extraction process was conducted by varying combustion temperature between 500-700 °C under air atmosphere for 1 hr. Chemical activation using *o*-phosphoric acid with impregnation ratio of 1.5 was performed. The AC was characterized by iodine and methylene blue adsorption, FT-IR and scanning electron microscopy (SEM) measurements. The results showed that the inner shell of Sacha inchi was proved to be more promising AC materials due to high percentage of fixed carbon and lignin contents (29.93% and 72.66%, respectively). The optimum pyrolysis temperature was found to be 500°C with the yields of 74.8% and the iodine number was resulted as 864 mg/g. The adsorption capacities and isotherm towards methylene blue have been investigated. The functional groups were also studied for further application in cosmetic and nutraceutical products.

**Keywords:** activated carbon, sacha inchi shell, agricultural waste utilization

## BIOELECTRICITY PRODUCTION FROM RICE NOODLE WASTEWATER USING PLANT MICROBIAL FUEL CELL (PMFC)

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### Abstract

The environmental pollution and energy depletion caused by an increasing of human demands and consumptions required the need for new eco-friendly, sustainable and cost effective energy sources. Microbial fuel cell (MFC) has been investigated for bioelectricity production through organic degradation of wastewater by microbial consortium. Many modifications of MFC have been developed, including plant microbial fuel cell (PMFC) which has gained a lot of interests recently. Due to practical limitations, however, PMFCs are still unsuitable for high energy demands which need more studies. In this study, PMFC using 3 plant species; *Canna indica* L. (PMFC<sub>1</sub>), *sagittaria latifolia* L. (PMFC<sub>2</sub>) and *Barleria lupulina* Lindl (PMFC<sub>3</sub>) were conducted for rice noodle wastewater treatment and bioenergy production. Lab-scale PMFC reactors were constructed with 242 cm<sup>2</sup> of aluminium sheets as the electrodes. It was found that the internal resistance of PMFC<sub>1</sub>, PMFC<sub>2</sub> and PMFC<sub>3</sub> were 10918.09, 14023.16 and 15118.58 ohms, respectively. Power generation from rice noodle wastewater using *Canna indica* L. showed the maximum power density and current density of 45.84 mW/m<sup>2</sup> and 0.36 mA/m<sup>2</sup>, with the highest COD removal efficiency of 66.4%. The electrical energy production from wastewater using PMFC could offer an economical solution for the environmental problems and energy crisis in the near future.

**Keywords:** Wastewater treatment, Electricity generation, Microbial fuel cell

## THE INVESTIGATION OF DIELECTRIC BARRIERS DISCHARGE PLASMA JETS (DBDJS) FOR BACTERICIDAL IN WOUND HEALING

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### Abstract

The atmospheric pressure plasma technique has been recognized in health care for bactericidal in wounds, wound healing enhancement and patient's pain relieving without side effects. In this study, dielectric barrier discharge plasma jets (DBDJs) were used for bactericidal in vitro and the bacteria killing efficiency then they were investigated using *Staphylococcus Aureus* (*S. aureus*) and *Pseudomonas Aeruginosa* (*P. aeruginosa*). The DBDJs plasma used He gas at flow rate of 1 l/min, pulse frequency of 50 to 110 Hz and time of treatment 15 to 60 s. The studies of DBDJs utilized an Optical Emission Spectroscopy (OES) to identify radical species in the plasma. The results of the OES studies found N<sub>2</sub>, NO, He and OH radical groups; They play an important role in bactericidal, including wound healing. The intensity of radicals in a plasma depends on the applied frequency. The efficiency of bacteria killing was using the Colony Forming unit (CFU) method. The results show the frequency and time of plasma exposure were drastically reduced when increasing the frequency from 50 to 110 Hz and time from 15 to 60 s for bactericidal; the rate reduction of bacteria increased up to 100%. Therefore, the efficiency of bacteria killing depends on two factors, frequency and time of sterilization.

**Keywords:** Dielectric barrier discharge plasma jets, Bactericidal, Chronic wounds, *Staphylococcus Aureus*, *Pseudomonas Aeruginosa*

## A LOW PRESSURE PLASMA TREATMENT FOR STERILITATION AND QUALITY IMPROVEMENT OF RICE FLOUR.

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### Abstract

Nowadays, rice products are studied to enhance its value such as in medicine and cosmetics. This research uses low pressure plasma (LPP) to study the properties of rice flour after plasma treatment. Rice flour samples were treated at various powers, 50, 75, 100, 125 and 150 watts. During the deposition process the OES was observed the plasma species. The major optical emission lines from OH, CH, H<sub>2</sub> radicals and Ar atom were observed and the emission intensities of each species increased by increasing of plasma energy. Surface morphology was studied by scanning electron microscope, the fine grains found on the surface after plasma treatment, the effect of the roughness and fine grains on the surface of rice powder increased. Then, the surface chemistry were analy by ATR-FTIR and XPS. After plasma treatment, the water and oil absorption were increased due to the roughness of surface and addition of functional groups. Moreover, LPP has the ability to sterilize rice flour. In conclusion, LPP can be a promising technology for improving functionality of flour and enhance its value in various new products.

**Keywords:** Low pressure plasma, Rice, Medicine and Cosmetics.

## EFFECT OF Fe<sup>3+</sup> on BaTiO<sub>3</sub> PEROVSKITE MAGNETIC PROPERTIES

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### Abstract

Barium titanate (BaTiO<sub>3</sub>) is a very interesting perovskite known as a multiferroic material. BTO samples were prepared by solid state reaction involving compression. Doping with Fe<sup>3+</sup> into the BTO to enhance the magnetic property was investigated by VSM. The largest hysteresis loop was found for the calcine at 800 °C for 2 hours. The value of magnetization was reduced at a lower temperature calcine. Higher applied temperature reduced the hysteresis loop and the Ms for each condition decreases. Finally, the Ms and Mr of the high temperature calcine indicate ferromagnetic behaviour in this material.

**Keywords:** BTO, perovskite, Fe

## MAGNETIC PROPERTIES IN DOUBLE $\text{Ba}_2\text{FeMoO}_6$ PEROVSKITES

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### Abstract

The magnetic properties of  $\text{Ba}_2\text{FeMoO}_6$  (BFMO) double perovskite are investigated. BFMO samples were prepared by solid state reaction method through compression and sintering. The phase structure was determined from XRD analysis. Magnetic properties are influenced by electron environments of the  $\text{Fe}^{3+}$  and  $\text{Mo}^{5+}$  ions within the perovskite structure.

**Keywords:** Composite, double perovskite, BFMO

## **CORRELATION AND PATH COEFFICIENT FOR ECONOMIC TRAITS OF FRUIT MULBERRY (*Morus sp*) BASED ON CRITERIA MULBERRY SELECTION**

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### **Abstract**

This study was conducted to analyze the correlation between traits of fruit mulberry from 71 hybrid accessions. The results revealed that the fruit yield (FY) had intermediately positive correlated to branch per trunk (BPT,  $r = 0.459$ ). Fruit width (FW) had very highly positive correlated to fruit length (FL,  $r = 0.769$ ) and fruit weight (FW,  $r = 0.864$ ). Fruit length (FL) had highly positive correlated to fruit weight (FW,  $r = 0.910$ ) but had slightly negative correlated to bud per branch (BPB,  $r = -0.279$ ). Fruit weight (FW) had slightly positive correlated to branch length per trunk (BLPT,  $r = 0.271$ ) but had slightly negative correlated to bud per branch (BPB,  $r = -0.290$ ). Finally, branch length per trunk (BLPT) had intermediately negative correlated to bud per branch (BPB,  $r = -0.389$ ). Additionally, the economic traits which had highly positive direct effect through fruit yield was branch length per trunk (BLPT, path coefficient = 0.433). This result showed the relationship among traits and making indirect criteria for selection fruit mulberry in breeding system.

**Keywords:** Correlation, Economic traits, Mulberry selection, Path coefficient.

## AMPEROMETRIC BIOSENSORS USING DIFFERENT ALCOHOL OXIDASES

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### Abstract

Amperometric biosensors were fabricated by immobilizing alcohol oxidases (AOX) from two different sources onto glutaraldehyde (GA)-activated supports. Alcohol oxidases from *Hansenula sp.* and from *Pichia pastoris* were used for immobilization. The biosensor with AOX from *Hansenula sp.* showed a linear response to ethanol in the concentration range of 0.1-0.6 mM with a sensitivity of 88.534  $\mu\text{A mM}^{-1} \text{cm}^{-2}$ . In comparison, the biosensor with AOX from *P. pastoris* showed a linear response from 0.1-0.5 mM ethanol with a sensitivity of 76.886  $\mu\text{A mM}^{-1} \text{cm}^{-2}$ . The study of stability of biosensors revealed that after 90 measurements, the biosensor with AOX from *Hansenula sp.* retained 97% of its original current response whereas the current response of the biosensor with AOX from *P. pastoris* decreased to 81% of its initial value. The biosensor with AOX from *Hansenula sp.* demonstrated similar sensitivity, but higher stability than the biosensor with AOX from *P. pastoris*.

**Keywords:** alcohol oxidase, ethanol, biosensor

## COMPARISON OF INDUSTRIAL MICROWAVE DRYING AND FLUIDIZED BED DRYING TECHNIQUES ON THE QUALITY OF JASMINE INSTANT RICE

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### Abstract

Nowadays, most people are living with busy schedule. Consequently, people have to select the most convenient option to save their time. Instant rice is considered as one of the possible solutions to serve most people present lifestyle. However, the problems with instant rice including slow rehydration and poor quality affect the consumer acceptability. This research focused on drying methods in order to improve the quality of instant rice. Two drying methods were investigated: Industrial microwave drying (IMD) and fluidized bed drying (FBD). The results of quality evaluation revealed that whiteness and texture of IMD had no significant difference with freshly cooked rice. In addition, IMD had better quality of product compared to FBD in term of texture and whiteness. IMD (6,400 watt, 2,450 MHz) was appropriate drying method to produce instant rice because of the fast rehydration time for 3 minutes by boiling water while FBD (85°C 60 min) took slower rehydration time for 8.5 minutes. Furthermore, after rehydration, the rice physical appearance of FBD and IMD were not coagulated and not broken and good quality. Therefore, instant rice processing by IMD is recommended for the instant rice production at the industrial scale.

**Keywords:** fluidized bed drying, industrial microwave drying, instant rice, quality

## **PREPARATION OF Al-5Ti-1B MASTER ALLOY AND ITS INFLUENCE ON MECHANICAL PROPERTIES OF A 356 ALLOY**

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### **Abstract**

In this study, an Al-5Ti-1B master alloy was produced using a melt reaction method. The as-prepared master alloy was then employed to refine the grain structures of A356 alloy. The structures of the master alloy and its influence on the mechanical properties of A356 alloy were investigated. The results show that Al-5Ti-1B master alloy consisted of the uniform distribution of lump-like TiB<sub>2</sub> and network of TiAl<sub>3</sub> on  $\alpha$ -Al matrix. The addition of the Al-5Ti-1B master alloy can reduce the grain size of A356 alloy from about 4,742  $\mu\text{m}$  to 789  $\mu\text{m}$  without fading within 30 min. The mechanical properties of A356 alloy, i.e. ultimate tensile strength, yield strength and elongation were also improved. The use of Al-5Ti-1B master as a grain refiner in the casting process of A356 alloy can effectively enhance the grain refinement and thus improve the mechanical performance of A356 alloy.

**Keywords:** A356 alloy, grain refinement, mechanical properties

## COMPARISON OF CONVENTIONAL AND ULTRASOUND-ASSISTED EXTRACTION TECHNIQUES FOR EXTRACTION OF PHENOLIC COMPOUNDS FROM COCONUT HUSK FIBER

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### Abstract

In this study, ultrasound-assisted extraction (UAE) was compared with conventional extraction methods, including conventional solvent extraction without agitation (CSE), conventional solvent extraction with agitation at 50 rpm (CSE50) and 150 rpm (CSE150), for the extraction of phenolic compounds from coconut (*Cocos nucifera* L.) husk fiber. The extraction yield, total phenolic content (TPC) and total flavonoid content (TFC) were examined. The antioxidant capacity of *C. nucifera* extracts was determined by using 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) and 2,2'-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assays. Experimental results showed that UAE gave the highest extraction yield, TPC, TFC and antioxidant capacities (ABTS and DPPH), followed by CSE150, CSE50 and CSE, respectively. UAE was found to be more effective than conventional extraction methods. Conventional solvent extraction with agitation showed higher extraction efficiency than that without agitation. Conventional solvent extraction with higher agitation speed exhibited higher extraction efficiency.

**Keywords:** coconut husk fiber, ultrasound-assisted extraction, phenolic compounds antioxidant capacity

## **EFFECT OF LATEX RUBBER AND RUBBER POWDER AS AN ADMIXTURE ON BENDING STRENGTH OF CEMENT MORTARS**

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### **Abstract**

This paper reported the effect of latex rubber (LR) and rubber powder (RP) on the bending strength of cement mortars containing fly ash silica (FAS) prepared from sugarcane bagasse. The bending strengths of the cement mortars with the addition of LR and RP were compared. The study was conducted by adding 5-10 wt% of each admixture into cement mortar specimens and left in air atmosphere for 28 days before measuring their bending strength. At 5 wt%, both LR or RP could significantly reinforce the bending strength of the mortar. The bending strength of cement mortars decreased when the proportion of the LR and RP were higher than 5 wt%. In addition, at 10 wt%, LR provided better bending strength than that of RP, i.e. the bending strength of mortar contained LR was 550 ksc, whereas that contained RP was 85 ksc. The bending strength of mortar with LP was much higher than that of the pure cement mortar (20 wt% FAS : 80 wt% cement) which was about 62 ksc. The low bending strength of the mortar with 10 wt% RP may be due to the decrease of Si-O-Si hybrid compounds which was inhibited by the hydroxyl group during the hydrolyzation process.

**Keywords:** Latex rubber, bending strength, rubber powder, silica

## **EFFECTS OF INITIAL MOISTURE CONTENT, INFRARED TEMPERATURE AND PUFFING TIME ON QUALITY OF PUFFED PORK RINDS IN A CONTINUOUS INFRARED-MICROWAVE OVEN**

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### **Abstract**

Nowadays, traditional deep fat frying is a popular method to puff pork. However, amount of oil is increased to 1/3 of the total food product by weight which causes many problems. A new method to puff the product that can reduce oil content is important. This research combined microwave and infrared radiation heating to increase the expansion ratio and quality of pork rinds. The objective of this study was to characterize the effects of initial moisture content, infrared temperature and puffing time on final moisture content, expansion ratio, water activity and texture of puffed pork rinds. In this experiment, 4 levels of initial moisture contents (11.46, 10.06, 9.95 and 9.49% wet basis), 3 levels of infrared temperature (170°C, 190°C and 210°C) and 2 levels of puffing time (80 and 135 seconds) were studied. The results showed that infrared temperature, initial moisture content and the puffing time had significant effects on qualities of pork rinds. The optimum condition for puffing was 9.95% wet basis of moisture content, 190°C of infrared radiation temperature and 135 seconds of puffing time. This knowledge can be applied in the commercial production.

**Keywords:** Puffing, Pork Rinds, Infrared, Microwave, Quality

## INVESTIGATION OF MAGNETIC PROPERTIES FOR $\text{Ca}_2\text{FeMoO}_6$ DOUBLE PEROVSKITES

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### Abstract

$\text{Ca}_2\text{FeMoO}_6$  (CFMO) double perovskites possess magnetic properties. CFMO ceramics were prepared by solid state reaction involving compression and high temperature calcine. The magnetic properties arise from the environments of the Fe 3+ and Mo 5+ oxidation states which can be modified. The highest saturation magnetization was 1.575 emu/g for samples calcined at 700 °C for 2 hours. Values of  $M_s$  and  $M_r$  of samples calcined at high temperature indicate ferromagnetic behaviour. The extent of magnetization decreased with lower calcining temperature. Samples under a lower applied temperature presented greater magnetization than at room temperature.

**Keywords:** Composite, double perovskite, CFMO



## **Oral Session II**

# **Innovative Technology and Sustainability Engineering**

## **EFFECT OF DIFFERENT TYPES OF WASHES ON THE FABRIC STRENGTH OF DENIM**

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### **Abstract**

Experimental Design (DOE) economically maximizes information; we deliberately change one or more process variables (looms) in order to observe the effect the changes have on one or more response fabric properties. In DOE obtained data can be analyzed to yield valid and objective conclusions. An Experimental Design is lying out of a detailed experimental plan in advance and maximizes the amount of "information" that can be obtained for a given amount of experimental. Fabric of 36 inches having following weaves was used. 3/1 twill, warp cotton (10.5 den), weft Lycra (16 spandex \* 70 den) Ends per inch 86, Picks per inch 52 and washes process includes Stone wash, Rinse wash, Bleaching and Enzyme wash.

Once the samples were ready, they were subjected to tensile and tear strength tests, for these two kinds of samples were considered. One washed fabric samples of warp direction type and other type of the samples was weft direction. Then five samples from each were considered for tensile and tear strength tests separately then takes the mean value.

The results found that the lowest strength damaged in the weft direction observed by tensile strength test & Enzyme wash. Maximum breaking load of the enzyme washed fabric sample was 42 kg.

### **Keywords:**

## RESISTIVE SENSOR FOR FOR VOC DETECTION

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### Abstract

Early detection of hazardous or flammable gasses/volatiles reduces the potential risks to personnel, such as development of respiratory health problems. A polymer film of poly(styreneco-maleic acid) with embedded carbon nanotubes was investigated as a simple robust resistive sensor device. The response of the sensor was assessed with several volatile solvents and commercial motor vehicle fuels. All vapours were detected by inducing an increased resistance of the polymer film. Standard microfabrication techniques were used, enabling cost effective production of the sensor. A warning system for a wide range of volatile solvents could be based on this sensor design for hazard control in industry and gas leak detection

**Keywords:** gas sensors, industrial, volatile solvents.

## MATCHING IMPEDANCES LARGE SCALE FRESNEL EQUATION CALCULATION

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### Abstract

In this paper, we will show that by adding two identical additional layers on the input and the output port of a simulated layer. We can do the same for different layers. These will allow us to cascade these layers in any order and calculate the corresponding reflection and transmission coefficients using Fresnel equations with no requirement of recalculating each of the structure separately. This technique is not limited to the Fresnel equations. It is also applicable to more sophisticated simulation techniques as well.

**Keywords:** Optics, Biosensor, Matching impedance, Fresnel equation

## MULTIPLE REFLECTIONS MODELING FOR MULTI-LAYER OPTICAL STRUCTURES

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### Abstract

Optical devices consisting of multiple uniform layers of materials are usually used in waveguiding, biosensings, optical resonators and biosensors. These multiple layer devices are designed and simulated using Fresnel equations. In this paper, we will demonstrate that by working out reflection coefficient and transmission coefficient for each of the interface. Accurate reflectance and transmittance can be calculate by propagating the coefficients with the proper layer phase thickness. The results are exactly the same as calculated using Fresnel equations. The reflection coefficients from each of the interfaces allow us to get an insight of how each devices work and what the sensitivity mechanism of the device is.

**Keywords:** Biosensor, Optics, Multiple platform, Fresnel equation

## OPTICAL DEVICE ADAPTED TO SMARTPHONE FOR DIRECT IMAGING RETINAL BLOOD VESSELS

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### Abstract

To obtain the ophthalmic findings for diagnosis and treatment, the ophthalmologist has been allowed to observe with a handheld ophthalmoscope in which the medical photos of findings cannot be recorded. Here, the simple optical system has been designed and implemented a prototype using 3D printing that can adapt to the smartphone with conventional app camera for direct imaging retinal blood vessels. A plano-convex lens of +20D was used to adjust the lens power of the smartphone camera. The lens wheel containing 16 lenses ranging from -8D to +8D and blank of 0D was used to compensate for tolerances and errors in human eye sight. As a result, the prototype was able to capture images of the retinal blood vessels in subject's eyes having been either nearsighted or farsighted vision. This optical technique provides the simple, portable and inexpensive prototype adapted to smartphone and can take advantage of global networks resource for telemedicine.

**Keywords:** Retinal imaging, Optical device, Ophthalmoscopy, Smartphone

## PARALLEL COMPUTING SOFTWARE DESIGN FOR LARGE SCALE ELECTROMAGNETIC SIMULATION

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### Abstract

Electromagnetic simulation software that solves exact solution to Maxwell's equations, can be done by Finite element methods and analytical approaches. The finite element methods include Finite difference time domain method (FDTD) and Transmission line model (TLM). For the analytical approaches, these include Fresnel equation and Rigorous Wave Coupled Analysis (RCWA). We will show in this paper, how the parallel computing can be employed to enhance the computational speed.

**Keywords:** Electromagnetic simulation, Rigorous Wave Coupled Analysis, Parallel computing

## SURFACE PLASMON RESONANCE ANALYSIS USING TRANSMISSION LINE MODEL

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### Abstract

Surface Plasmon Resonance (SPR) has been a gold standard tool for biological binding kinetics measurement. The SPR sensors is usually made of a uniform gold layer with the thickness around 50 nm sputtered on a glass substrate. The calculation for the SPR sensors are usually calculated using Fresnel equations. In this paper, we will show that how the transmission line model can be employed to work out the reflection coefficients and give the results agree with the Fresnel equations.

**Keywords:** Biosensor, Optical sensor, Surface plasmon resonance

## FLUORESCENCE DETECTION OF HYDRAZINE HYDRATE USING CARBON NANODOTS SYNTHESIZED FROM MANDARIN RIND

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### Abstract

Hydrazine hydrate is a highly toxic chemical widely used in agricultural and pharmaceutical industries. Exposure to hydrazine can induce an irritation of respiratory tract, blindness, damage of the DNA and central nervous system. In this paper, we will show the hydrazine hydrate detection using fluorescence carbon nanodots synthesized from mandarin rind. Highly sensitive detection can be seen by naked eyes in a fluorescence red-shifting and by analyzing absorption spectrum for a case of a simple test in hydrazine hydrate solutions.

**Keywords:** Fluorescence carbon nanodots, Hydrazine hydrate detection



## BIOSENSOR IN FOOD TECHNOLOGY

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### Abstract

In this paper, we review the current technology used in food technology including biosensor for food processing, Food packaging, Food safety. We will discuss the pros and cons of the current technology and how the technology can be improved. We discuss our design in food sensor based on Surface Plasmon Resonance and discuss how the Surface Plasmon Resonance can lend itself to the field of food sensing technology.

**Keywords:** Optics, Biosensor, Chemical sensors, Food safety



## FOOD WASTE UTILISATION: CASE STUDY IN THAILAND

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### Abstract

In this paper, we review quantitative nutrients data in food waste. We also discuss possibilities of utilizing the food waste in several fields and current situation of the food waste management and the current state of the art management technology and policies.

**Keywords:** Food waste, Waste management, Environmental impact,  
Waste management policy

## SYNTHESIS AND CHARACTERISATIONS OF Y-DOPED $\text{BaCeO}_3$ CERAMIC FOR USE AS SOLID ELECTROLYTE IN SOLID OXIDE FUEL CELL

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### Abstract

Fuel cell is an electrochemical cell which converts chemical energy into electricity via electrochemical reaction of hydrogen and oxygen gases. It is also an alternative energy with environmental friendly. Generally, the fuel cell consists of many parts. Electrolyte is an important part for fuel cell because the electrolyte with high ion conductivity leads to increase electrical conductivity for the fuel cell. In case solid oxide fuel cell, barium cerate based ceramics have been much attention due to their good properties for the fuel cell. In this work, barium cerate ( $\text{BaCeO}_3$ ) was synthesized by solid state reaction process where 20% mol. of yttrium was doped to form  $\text{BaCeY}_{1-x}\text{O}_{3-\delta}$  ceramics, in order to improve ion conductivity. The samples were sintered at high temperature of 1500 °C with various soaking times. The crystalline phase structure was investigated by X-ray diffraction technique and Raman spectroscopy. The surface morphologies and grain size were observed by a scanning electron microscope. The electrical properties including conductivity, dielectric and impedance were measured by LCR meter. The obtained results suggested that the studied materials can be used as a part of the fuel cell.

**Keywords:**  $\text{BaCeO}_3$ , Ceramic electrolyte, Solid state reaction

## COMPARISON OF IEEE 802.11N AND IEEE 802.11AC WIRELESS TECHNOLOGY PERFORMANCES ON 2.4GHZ AND 5GHZ FREQUENCIES

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### Abstract

This study compares the performances of different wireless interoperable technologies, at standard IEEE 802.11n and IEEE 802.11ac on 2.4GHz and 5GHz frequencies. Performance tests were executed using testbeds with various adjustable parameters such as channel bandwidth, distance between client and server, obstacle, and some extra techniques. Eight experiments were conducted to measure the signal strength and throughput in each of the mentioned scenario to determine performance comparison. Experimental results showed several interesting standpoints. By adjusting channel bandwidth, the throughput could be improved up to 28.8%. UDP and IPv4 returned greater throughput than those of TCP and IPv6, respectively. Authentication mode could lower the throughput with the maximum of 11.8%. IEEE802.11ac should be employed in the outdoor area with distance between client and access point not over 20 m, but IEEE802.11n should be engaged in the indoor area having with aforementioned distance over 20 m. Signal strength could be deterred by placing the 20 cm thick concrete wall with the loss of 26 dB and 35 dB by using IEEE802.11n and IEEE802.11ac, respectively. Beamforming and MU-MIMO technologies would improve throughput up to 33%. With proper technologies, features, and parameter settings, optimal outputs from wireless devices can be achieved.

**Keywords:** Wireless Technology, Throughput, Wireless Standards Performance, IEEE 802.11n and IEEE 802.11ac Performances

## **WEATHER REALATED-HEAT ILLNESS EVENT OVER CHIANGMAI USING AUTOMATIC WEATHER STATION OBSERVED DATA**

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### **Abstract**

The aim of this research is to study time periods which people in Chiangmai are likely to be suffered from health affected by heat. This research used three-year observed data in between 2015-2017, from Automatic Weather Stations (AWS) which is under the control of Thai Meteorological Department (TMD) and provides real time data for 24 hours. In addition, two parameters were needed for heat index calculation, temperature and relative humidity. Analyzed heat index would be arranged by its intensity and then applied on heat illness warning. It demonstrated that likelihood of local people and visitors in Chiangmai suffering from heat illness was in between March and June. The greatest vulnerability to that was in May, in daytime especially from 10.00 AM – 8.00 PM which was the longest period among other months. This research could be used to develop real time Heat Illness Alert System (HIAS) furthermore.

**Keywords:** heat index, heat illness warning, automatic weather station

## THE EFFECT OF FUNCTIONALIZED GRAPHENE OXIDE ON ION CONDUCTIVITY AND PERMEABILITY OF VANADIUM REDOX FLOW BATTERIES MEMBRANE BASED ON SULFONATED POLY(ETHER ETHER KETONE) COMPOSITE

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### Abstract

Sulfonated graphene oxide (sGO) was used as a filler to enhance the performance of sulfonated poly(ether ether ketone) (sPEEK) membranes. The sGO was first prepared by treating graphene oxides (GO) with sulfonic acid at 70 °C for 20 h. The sGO was characterized by FTIR and XPS techniques. Composite membranes of various amounts of sGO were fabricated via the solution casting method. The properties of composite membranes were investigated by measuring ion exchange capacity (IEC), water uptake, ion conductivity, and vanadium ion permeability. From the results, it was found that the IEC and water uptake of the membranes increased after adding the sGO. The ion conductivity of the sPEEK membrane also increased from  $8.94 \times 10^{-3} \text{ Scm}^{-1}$  to  $10.55 \times 10^{-3} \text{ Scm}^{-1}$ . Moreover, the vanadium permeability through the composite membranes was decreased. These composite membranes exhibit great potential for vanadium redox flow battery applications.

**Keywords:** Graphene oxide, poly(ether ether ketone), sulfonation, proton conductivity

## **Oral Session III**

# **Textiles and Clothing Sustainability**

## STUDY ON LOW TEMPERATURE DYEING OF ULTRASONICALLY TREATED WOOL

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### Abstract

Ultrasonic technology has shown the potential to reduce the cost and environmental impact of textile wet processing. This work investigates the effects of ultrasonic irradiation as a pre-treatment on wool and its application in low temperature dyeing. A significant increase in dye uptake and colour strength was observed on the fabric ultrasonically pre-treated at 40 kHz, followed by that at 80 kHz and conventionally treated sample, in both acid dyeing and reactive dyeing. This could be due to the changes of fibre surface structure and modification of chemical structure in the cell membrane complex (CMC) as a result of ultrasonic pre-treatment. In acid dyeing, a 20% increase in dye uptake was achieved at 70°C upon applying ultrasonic pre-treatment at 40 kHz. By applying both ultrasonic pre-treatment and leveling agent, the uptake of dye can be doubled at the early stage of low temperature dyeing (up to 70°C) in reactive dyeing. Ultrasonic pre-treatment can be applied in raw wool scouring and fabric scouring in the industrial scale to achieve an efficient dye uptake in the subsequent dyeing process, and these were also discussed in the paper.

**Keywords :** ultrasonics; wool; Pre-treatment; low temperature dyeing; scouring

## GLOBAL SUSTAINABLE APPROACH TO MINIMIZE COST AND IMPROVE PRINTING PARAMETERS OF REACTIVE AND DISPERSE DYES BY USING MODIFIED THICKENER

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### Abstract

Textile printing is the most versatile and important of the methods used for introducing colour and design to the textile substrates. The main objective of printing is to produce coloured design in one or more colours on textile materials without spreading of the dye beyond the boundaries of the design wherein thickener plays an important role. The main function of the thickener is to adhere or hold the dye particles in the desired place on the fabric until the transfer of dye into the fabric and its fixation is complete. Tamarind gum is mainly used as sizing agent for jute and cotton warps due to its excellent binding and film forming properties. It is used as substitute of starch due to its lower cost and better weaving efficiency. The unique property of tamarind gum i.e. high viscosity at low concentration and low molecular weight compared to other polysaccharide may be useful to make it suitable as thickener in textile printing. Main drawbacks of Tamarind gum are poor keeping property and in reactive printing it interferes with the reactive dye. This paper deals with improving the thickening properties of tamarind gum chemically to extend its application in disperse printing on polyester and reactive printing on cotton fabrics. The thickener has been chemically modified and used both for reactive and disperse dye printing and various print parameters were studied and was found to replace costliest sodium alginate in the case of reactive printing and gum AGBV in the case of disperse dye. The properties studied indicates very good washing fastness both on printed and unprinted white portion which is the indication of removal of hydrolysis of reactive dye and proper fixation of disperse dye without affecting aesthetic views of prints. Acrylated tamarind gum can be used as substitute of sodium alginate thickener in reactive printing and gum AGBV in disperse printing. Acrylated tamarind thickener shows very good keeping properties even after 30 days and exhibits good adhesivity.

**Keywords:** global sustainable; reactive dyes; disperse dyes; printing; modified thickener

## DESIGN AND DEVELOPMENT OF ELECTRO-CONDUCTIVE RECTANGULAR TEXTILE ANTENNA USING POLYPROPYLENE FABRIC

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### Abstract

In this work, an attempt has been made to design a wearable antenna which is completely made up of textile materials. The electro-conductive fabrics are used as conducting patch and ground plane. They are made up of conductive yarns of cotton and copper filament twisted together to form an assembled fabric. Apart from this, a polypropylene based non- woven fabric is used as a substrate for the antenna designed at a target frequency of 2 GHz. The simulated and measured results are in good agreement.

**Keywords:** wearable antenna; electro-conductive fabric; textile Antenna.

## A STUDY ON LOW STRESS MECHANICAL PROPERTIES OF DENIM FABRIC FOR HAND EVALUATION

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### Abstract

Denim is widely used by every age of people all over the world. As the use of denim is increasing progressively, till now the handle properties of denim fabric not reported at significant level. In the present study, five commercial denim fabric samples were used. Denim samples ranging from 8.5oz/sq yds to 14.5 oz/sq yds. weight were processed as per standard commercial procedure for denim. These finished denim samples were tested on Kawabata Evaluation System(KES) for low stress mechanical properties. The results of KES values are used for calculation of Total Hand value(THV) using equation for summer suit. The obtained result for THV using equation for summer suit for denim samples is in the range from 1.62 to 3.3. These values of low stress mechanical properties values given by KES, can be used to engineer the denim fabric for bottom wear.

**Keywords:** Denim; Handle Value; KES; Objective evaluation.

## STUDIES ON NATURAL AND SYNTHETIC ANTIMICROBIAL FINISHING OF TEXTILES

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### Abstract

In the recent times hygiene in textiles has gained wide currency. The ramification of bacterial attack on textile fabrics being evident, more and more experimental research is called for. Among the textile materials, cotton and wool are most prone to the microbial attack and hence these two materials have been worked on in the present investigation. The work was aimed to study the finish effect with natural as well as synthetic antimicrobial agents. Natural antimicrobials were extracted from Neem leaves and Amla powder and applied to the fabrics in combination with copper sulphate as mordant. The synthetic antimicrobial agents such as Triclosan and Silver based commercially available product are also used on the substrates to study their effects. These finishes applied at different concentrations were then tested for the antimicrobial property through qualitative and quantitative analysis. Moreover, colour strength and FTIR tests are also carried out. The antimicrobial activities of both natural and synthetic agents have been tested against the microorganisms *Staphylococcus aureus* and *Escherichia coli*. The antibacterial effect of the plant extracts is found to be lower as compared to synthetic ones for both the fabric qualities. The natural extract treated fabrics are found to lose activity upto twenty washes. The Triclosan and silver treatments lead to produce excellent antimicrobial properties with no adverse effect on the colour of the fabrics. The mordanted natural finishes resulted in better antimicrobial activity as compared to unmordanted ones although the former has a definite demerit of staining.

**Keywords:** antimicrobial; cotton; wool

## UP CYCLING FOR PRODUCT DESIGN OF JEANS WASTES WITH AN ECONOMIC AND ENVIRONMENTAL APPROACH

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### **Abstract**

The excessive use of clothing by the people of the community has led to a large amount of waste entering the waste disposal area every day, while producing a meter of fabrics that make up this clothing, it consumes a lot of water and energy and enter a lot of contaminates to the environment.

The emergence of environmental problems in the world has led to an increasing trend of communities towards environmental issues and are looking for ways to improve their terrestrial ecosystem. Up cycling is one of the solutions mentioned in recent years. Up cycling is a process in which waste products are converted into products of higher quality and value. Therefore, the present study aims at identifying the history of the up cycling in Iran in the past, as well as reviewing the process of designing products using jeans waste according to economic and environmental issue. Information from analytical-descriptive methods and literature review was used designing the new products.

The findings of the research confirm that our country's culture is not alien to this concept. Also, based on the life cycle assessment system, the product compared to the production of the same product in normal condition, water consumption and carbon dioxide emissions are about zero, and according to environmental sustainability, production of these products is also economically justified in terms of cost-benefit assessment.

So it is possible and feasible, using the up cycling method to redesigned with a better application and a higher value product, and returned to the consumption cycle, in fact, by changing the approach of "waste of unusable textile" to approach taken for "up cycling for unusable textile" sustainability goals in textiles will be happen.

**Keywords:** upcycling; textile waste; jean

## APPLICATION OF LASER TREATMENT FOR IMPOROVING THE DYE AND CHEMICAL ADSORPTION ON POLYESTER FABRIC

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### Abstract

In the last decade, considerable effort has been made in developing surface treatments such as UV irradiation, plasma, electron beam, and ion beam to modify the properties of textile materials. Laser modification on material surface is one of the most studied technologies. It has been shown that materials like polymers, woods, metals, semiconductors, dielectrics, and quartz modified by laser irradiation often exhibit physical and chemical changes in the material's surface. Recently, laser technology is a potential finishing technology in textile industry which can provide different surface effect on fabric without the use of water and chemical. Laser finishing is a completely dry process and, with careful control of laser processing parameters, it can provide fast and accurate production with good reproducibility and repeatability. Laser technology can also be used for improving dyeability since it is well known that the UV output from lasers can modify the surface of synthetic fibers.

In this research, polyester fabrics were exposed to CO<sub>2</sub> laser under different intensities. The morphology of the samples after laser treatment were investigated using Scanning Electron Microscope (SEM). The hydrophilic and hydrophobic properties of samples were studied by recording the water absorption time. The main aim of this research, is to study the effect of laser on adsorption of CuO nano particles (as antibacterial agent) on polyester fabrics. For comparing the amount of adsorbed CuO nano particles on polyester fabrics, Inductive Couple Plasma method has been used. Also the dye ability of fabrics after treating with laser, were studied.

**Keywords:** laser treatment; dye adsorption; chemical adsorption; polyester; fabric



## IR AND UV PROTECTIVE FUNCTION OF WOVEN FABRICS

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### Abstract

Nowadays, it is well known that exposure to ultraviolet radiation can have harmful effects. These effects include mainly sunburn (erythema) and tanning (pigment darkening), as well as premature aging of the skin, suppression of the immune system, damage to the eyes, and skin cancer. Currently, between 2 and 3 million cases of non-melanoma skin cancer and 132 000 cases of melanoma skin cancer occur globally each year. Fabric is the most basic and one of the best means of sun protection, however not all fabrics offer sufficient UV protection. In hot weather conditions, the use of UV-resistant materials is not enough. At the same time, a thermophysiological wear comfort is also desired, so clothing should be made from fabrics that protect the body against penetration and absorption of infrared radiation. The proposed paper describes the influence of fabric constructional parameters on IR and UV radiation transmittance.

## UV PROTECTION AND ANTIBACTERIAL PROPERTIES OF NATURAL DYED COTTON WITH SAFRAN, CURCUMA AND CINNAMON

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### Abstract

With the growing public health awareness of the pathogenic effects, malodors and stain formations caused by microorganisms, there is an increasing need for antibacterial materials in many application areas. The interests for antimicrobial textiles aimed for use in long-lasting contact with a skin significantly increased in the last several years. Natural textiles are often considered to be more vulnerable to microbe attack than manmade fibers because of their hydrophilic porous structure and moisture transport characteristics. Thus, the use of antibacterial agents to prevent or retard the growth of bacteria is becoming a standard finishing for textile goods. On the other point of view, Ultraviolet (UV) protection by fabrics has recently become the focus of great interest as well, particularly in connection with environmental degradation or ozone layer depletion. Fabrics provide simple and convenient protection against UV radiation, but not all fabrics offer sufficient UV protection. In this research work, Natural dyes (Safran, Curcuma and Cinnamon) were used for dyeing. Effect of natural dyes on UV protection properties and antibacterial activity of cotton samples were investigated.

**Keywords:** UV Protection; antibacterial; natural dyed; cotton; safran; curcuma; cinnamon

## **A STUDY OF SUITABILITY OF BAMBOO DENDROCALMUS ASPER PULP APPLICATION AS FILLER MATERIAL IN SANITARY PAD MAKING**

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### **Abstract**

Absorbent hygiene products (AHP) are used to absorb, retain and keep the user dry and hygienic. They range from baby diapers, feminine care products such as sanitary pads, breast pads, panty liners and incontinence pads. The products have similar basic construction design and components constitution. They comprise of three set of layers: A top permeable breathable layer made from polypropylene (PP), absorbent insert mostly wood pulp and non-permeable polyethylene (PE) bottom layer that prevents leakage.

The wood pulp insert used in AHP is mostly enhanced with chemical additives to improve on the product performance. Chemical additives such as rewetting agents, hydrogels and superabsorbent polymers are used to enhance fluid absorption and retention under pressure. These additives essentially impact on the product cost, besides causing skin irritations and allergies on some users. The pulp is bleached with chlorine based bleaches to attain a glow white look.

A study was done on extracted chemical free bamboo pulp to establish its suitability as wood pulp alternative. Bamboo regenerates faster than woody trees. The fibre are reported to possess inherent antibacterial agent referred to as “bamboo kun”, high water absorbency and retention, comfortable and silky feel as well as anti-odour properties which this study investigated for application in making of chemical free sanitary pad.

Chemical analyses were done on bamboo pulp extracted from one year old *Bamboo Vulgaris* and *Bamboo Dendrocalmus Asper* harvested from Kenya Forest Research Institute (KEFRI) forest, Nairobi. *Bamboo Vulgaris* was found have 22% lignin content, 3 seconds water absorbency and 4.6% solvent extractives compared to *Bamboo Dendrocalmus Asper* with 25% lignin content, 3.5 seconds water retention and 5% solvent extractives. The pulp was bleached using Total Chlorine Free (TCF) method. The sanitary pad prototype developed using the extracted pulp absorbent insert was tested for standards compliance against KES 507:2005, ICS 59.080.30 and found compliant. Bamboo pulp was therefore found to be appropriate alternative for wood pulp.

**Keywords:** Bamboo; pulp; sanitary pads

## **APPLICATION OF MICROENCAPSULATED NATURAL ESSENCES OILS IN THE DEVELOPMENT OF FUNCTIONALIZED SUSTAINABLE CLOTHING**

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### **Abstract**

Today's life style, particularly in countries belonging to the 1st world is characterized by sedentarism and low physical activity. This behavioral pattern implies a huge cost for the national health system due the increasing number of cardiac diseases and metabolic syndromes such as obesity and diabetes. Massive information's campaigns about the risks of this behavior raised the society awareness regarding this problem. It is easily perceived by the population that health related institutions and several industries have developed a strategic orientation to create services/products which promote a healthy life-style, notably, concerning to the continuous practice of physical exercise. Currently, society faces another major problem which is the lack of concern for the environment and the natural resources limitations thereof. The way things are being conducted has already caused a huge impact in the ecosystem and is impairing the quality of life of today's generation and may seriously compromise our future. It is clear by now that even small actions such as buying cloths have an impact at this level. Bearing in mind these considerations the authors sought to create a functional and sustainable piece of sportive cloth, to promote a new and more active lifestyle. Therefore, we conceived and developed a model of leggings which incorporate a new finishing treatment based upon microcapsules of  $\beta$ -cyclodextrins whose core has a blend of natural essential oils with analgesic, anti-inflammatory and refreshing properties so as their user feel comfortable and stimulated to practice of physical activity.

**Keywords:** microencapsulation; natural essences Oils; clothing



# **Poster Session IV**

## **Economic modelling**



## **THE LINK BETWEEN TERRORIST ATTACKS AND THE CRYPTOCURRENCY MARKET**

Krishna Reddy

### **Abstract**

Following the bubble in Bitcoin prices, we have seen an emergence of cryptocurrencies. With limited knowledge about the fundamental values of these cryptocurrencies, terrorist activities, money laundering, noise trading, speculation, manipulation and greed have been blamed for the boom experienced in this product. We explore whether 22 terrorist attacks affect the risk and return of cryptocurrencies. Using event study methodology and a batteries of robustness tests, we estimate the abnormal returns associated with terrorist activities in the cryptocurrency market. Asset pricing models are fitted with interaction variables and GARCH, TARCH, EGARCH and PARCH are used to determine changes in systematic risk. Our results confirm terrorist attacks affect the risk and return of the cryptocurrency market. We identify a (1) potential terrorist sponsor and supporter effects and (2) decrease in the risk of the cryptocurrency following terrorist attacks.



## **VOLATILITY IN CRYPTOCURRENCY MARKET**

Warattaya Chinnakum

### **Abstract**

This paper investigates cryptocurrency returns volatility spillovers in 5 largest cryptocurrencies, namely Bitcoin, Ethereum, Ripple, Bitcoin cash and Litecoin, using multivariate-GARCH (MGARCH) models. The period under examination goes from Jul 23, 2017 to Apr 02, 2018, for a total of 254 observations. Major findings reveal that correlations of returns vary across markets, with the highest correlation of 78.7% between Bitcoin and Ethereum, medium correlation of 61.2% between Bitcoin and Ripple and low correlations of 49.9% between Ripple and Bitcoin cash; thus, investors may benefit by allocating their assets in cryptocurrency markets.

## **STOCK MARKET INVESTMENT AND INFLATION: EVIDENCE FROM THE USA AND CANADA**

Janesh Sami

### **Abstract**

This paper undertakes an empirical investigation of the relationship between good prices and stock prices to understand whether stock market investment can help hedge against inflation in the United States of America (USA) and Canada using annual time series data from 1960-2016. We use a suite of unit root tests that allows for multiple structural breaks and find that stock prices and goods prices are integrated of mixed order in both countries. We employ autoregressive distributed lag (ARDL) cointegration test developed by Pesaran, Shin, and Smith (2001) and find strong evidence of a meaningful long-run economic relationship between stock prices and good prices in both countries. The estimated cointegrating relationship between stock prices and good prices is found to be positive, statistically significant and stable in both countries. We find that long-run elasticity of stock prices with respect to good prices is 1.50 for the USA and 0.44 for Canada. This suggests that the stock market is affected by developments in the good prices.

## INTERNATIONAL PORTFOLIO DIVERSIFICATION POSSIBILITIES BETWEEN BRICS AND DEVELOPED STOCK MARKETS

Lei Pan

### **Abstract**

We investigate the diversification possibilities between BRICS and developed stock markets during the volatile periods. Using the minimum Lagrange multiplier unit root tests with structural breaks, our results suggest that all stock markets are sensitive to both internal and external shocks. Cointegration and causality analysis are conducted for long-term and short-term investors respectively. The findings of Maki's (2012) cointegration test with multiple structural breaks reveal that apart from China and India, the remaining BRICS equity markets are desired places for long-term investors to diversify portfolio risks during the periods of crisis. The full sample bootstrap Granger causality tests results indicate that developed stock markets have predictive power for most BRICS markets. Both the long-run and short-run parametric stability tests suggest that the full sample parameters are unstable hence unreliable. The bootstrap rolling window estimations outline the causalities between stock markets are increasing during the crisis periods and vary over different sub-samples. Overall, our causality findings imply that the short-term diversification possibilities are very limited.

## **PER CAPITA OUTPUT CONVERGENCE ACROSS ASIAN COUNTRIES: EVIDENCE FROM COVARIATE UNIT ROOT TEST WITH AN ENDOGENOUS STRUCTURAL BREAK**

Takashi Matsuki

### **Abstract**

This study investigates the long-run convergence of per capita output across ten Asian countries over 1960–2014. To confirm the existence of output convergence toward reference countries in the region, several unit root testing methods are employed. Moreover, to determine possible growth factors responsible for setting Asian countries on a long-term steady-state growth path, the study uses some stationary covariates for the tests. In addition, the study allows for the presence of an endogenous structural change in the time series under investigation, to capture sharp drops in per capita outputs, which may be brought about by influential economic events such as serious economic slumps in domestic economies or the global financial crises in 1997–98 and 2008–09. The limiting distribution of the covariate unit root test which permits a structural break is also derived here. The results show significant evidence to support the convergence hypothesis. In particular, asymptotically absolute convergence holds among Hong Kong, Korea, Singapore, and Taiwan. In addition, Thailand shows a convergence tendency in terms of asymptotically relative convergence toward Singapore. Certain potential growth determinants, such as the trade/gross domestic product ratio, government expenditure/gross domestic product ratio, and quality of human capital, may help these countries achieve and maintain the long-run convergence process toward the reference countries in the region.



## **AUTOMATION, TAXES AND TRANSFERS WITH INTERNATIONAL RIVALRY**

Yixiao Zhou

### **Abstract**

Declines in low-skill labour value added shares have been generic in the OECD and associated with rising inequality. In this paper these trends are reviewed and a six-region global macro model with three household groups is constructed to examine their future implications and the ways in which macro policy responses will interact across regions. Over decades the decline in the low-skill share has tended to favour professional skill. Currently, however, while the low-skill share decline continues everywhere, capital shares are rising. Anticipating that robotics and AI will perpetuate this pattern, modelling experiments are conducted that confirm the risk of unemployment at extraordinary levels, including in China. Regional economic performances are shown to depend negatively on the rate of decline in the low-skill share and positively on the (separable) rate of growth in TFP. Moreover, trade-offs are shown to exist between the pace of technical change at the regional level and the financing of fiscal policy responses to high unemployment or low wages. Taxing capital (“robots”) to finance transfers is not an attractive option in a global context in the absence of reliable coordination, with indirect taxation offering a less strategically sensitive response in both the OECD regions and China.



## **IMPACT OF GENETIC DISTANCE ON TECHNOLOGICAL PROGRESS**

Baljeet Singh

### **Abstract**

This paper examines the impact of diffusion barriers on technological innovation through an index of economic complexity. The barriers are captured by genealogical distance from the world's technological frontier. We hypothesize that countries whose populations are genetically distant from the innovator display lower levels of technological innovations. Utilizing data for 100 countries, our empirical results provide strong support for the negative effect of genetic distance from the technological frontier on innovation. Our results hold up to a battery of robustness checks. These results provide support to the barriers effect of genetic distance to the frontier whereby it prevents the diffusion of productivity enhancing innovations across countries by influencing the country's ability to adopt and adapt frontier technologies and innovations.

## **DO RISK PROPENSITY AND MARKET STATES INFLUENCE DISPOSITION? A CASE OF PAKISTANI MUTUAL FUND INVESTORS**

Kin Boon Tang

### **Abstract**

Investors seem to hold their losing stocks to a greater extent than they hold their winning stock. This well documented behavioral irregularity is termed disposition effect. This paper examines the presence of disposition effect in mutual fund investors of Pakistan for the period of 2010 to 2017. Subsequently, we explore disposition effect from two aspects. Firstly, we examine the influence of risk propensity on disposition effect by segmenting the funds into risk categories. Secondly, we examine how disposition effect varies across market states by segregating the sample period into neutral, bear and bull periods. The findings suggest that Pakistani mutual fund investors are disposition prone in their trading decisions. Furthermore, the disposition effect varies with level of risk; investors show weaker disposition tendencies in higher risk funds and stronger disposition tendencies in lower risk funds. Moreover, our results suggest that investors are disposition prone under the bull and bear market and show stronger disposition tendencies under the bear market. Conversely, when the market is neutral, investors are not disposition prone in their trading behavior. The findings of this study provide important implications for the making of sound and integrative theoretical frameworks, portfolio optimization methods and risk management strategies.



## **EXCHANGE RATE UNDERVALUATION AND ECONOMIC GROWTH: THE TRADE- VERSUS THE FINANCIAL RISK CHANNEL**

Fayyaz Hussain

### **Abstract**

Using a dataset for 40 middle-income countries, we find that the textbook expansionary effect of an undervalued exchange rate is more than offset when we introduce a proxy for risk-taking channel-the idea that depreciation increases exchange-rate sensitive sovereign risk-premium thereby adversely impacting economic growth. Overvalued exchange rate is of no help either as it is associated with deindustrialization that is bad for growth. Findings of the study imply that these economies should move their currencies toward equilibrium by following crawling peg or crawling bands exchange rate regimes that allow limited volatility in exchange rates.

## **FOREIGN OFFICIAL HOLDINGS OF U.S. TREASURIES AND U.S. MORTGAGE RATES**

Duminda Kuruppuarachchi, Hai Lin, I. M. Premachandra

### **Abstract**

We propose a test to measure market efficiency while estimating the time-varying risk premiums of commodity futures, given that the prices are heteroscedastic. The risk premium is estimated using a state-space model with a Kalman filter modified for heteroscedasticity. Using 79 commodity futures traded on 16 exchanges worldwide during the period 2000–2014 and a Monte Carlo simulation, we demonstrate that the proposal produces robust and superior results compared with conventional approaches. The global financial crisis has improved the efficiency and affected the trading volumes of commodity futures, but it has had no effect on the average or the volatility of risk premiums.

**POSTER PRESENTATION  
ABSTRACTS**



# **Poster Session I**

## **Sustainability Science**

## OLEAGINOUS YEAST ISOLATED FROM MANGROVE FOREST IN CHANTHABURI PROVINCE AND ITS LIPID PRODUCTION

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### Abstract

Intracellular lipid content of 8 yeast strains; *Candida visiwanathii* YMTW12-2, *Debaryomyces vanriijiae* NS4-2, SFL10-1 and SFL17-2SF, *Geotrichum* sp. SRM6-1, *Kodamaea ohmeri* NS9-1, *Pseudozyma tsukubaensis* YWT 7-2, *Rhodospiridium toruloides* FRL2-4; isolated from mangrove forest in Chanthaburi province which showed high lipid accumulation by Nile red staining were quantitatively analysed. The result revealed that *P. tsukubaensis* YWT 7-2 was oleaginous yeasts. Lipid content and lipid yield of the *P. tsukubaensis* YWT 7-2 in high C/N ratio medium (lipid production medium) was compared to those in glucose solution at room temperature (28-30°C), 200 rpm for 6 days. The highest lipid content and lipid yield of the *P. tsukubaensis* YWT 7-2 were 21.90, 18.73 %, w/w (dry cell weight) and 3.35, 1.70 g/l in lipid production medium and glucose solution at 6 and 3 days, respectively. This result indicated that lipid accumulation of the *P. tsukubaensis* YWT 7-2 was growth-associated.

**Keywords:** oleaginous yeast, *Pseudozyma tsukubaensis*, lipid accumulation, growth-associated, glucose solution

## VALIDATION METHOD FOR DETERMINATION OF TOTAL ARSENIC USING MICROWAVE DIGESTION TECHNIQUE

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### Abstract

The aim of this work was to validate the sample preparation using a microwave digestion for determination of total arsenic in a spiked soil. Graphite furnace atomic absorption spectrophotometer (GFAAS) technique was used to determine the total arsenic using palladium nitrate, Pd(NO<sub>3</sub>)<sub>3</sub>, as a modifier agent. The instrumental detection was performed under the condition steps of drying, ashing, atomizing and cleaning to be 100, 1200, 2250 and 2600 °C. The external calibration curve was constructed using the automatic program based on the master standard of arsenic with 20 ppb. It was found that linearity range was in the range of 1 to 20 ppb with R<sup>2</sup>>0.999. Based on microwave digestion condition, the sample preparation with and without HF was also compared the total arsenic in the spiked soil with a 10 ppb. The result showed that the arsenic content obtained from the preparation with and without HF did not significantly differ at the 95% confidence limit. The recovery was 80.3 and 82.3% for the spiked sample with 2.5 and 10 ppb, respectively. The relative standard deviation was 2.15% (n=11). The results of this work can also confirm that the preparation method using microwave digestion provided the more advantages, such as rapid, a little volume of reagents, completely digestion.

**Keywords:** Validation method, microwave digestion, total arsenic

## COMPARISON OF ADSORPTION EFFICIENCY OF MODIFIED FILTER CAKE FOR REMOVAL OF COPPER AND ZINC FROM AQUEOUS SOLUTION

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### **Abstract**

This work was focused the potential of filter cake which is the residual waste from sugarcane on adsorbing of copper and zinc ions from aqueous solution. Filter cake was also prepared under different conditions i.e. carbonized filter cake (CFC), based filter cake (BFC) and acidic filter cake (AFC). Based on batch experiment under room temperature, the adsorption capacity of three adsorbents was investigated as a function of the initial pH, contact time, dosage and initial metal ion concentration. Under optimum condition, the maximum monolayer adsorption capacities of CFC, BFC and AFC were estimated as 12.86, 5.42 and 8.33 mg/g, respectively. The adsorption isotherms of Langmuir and Freundlich models was used to describe the equilibrium isotherm. It is observed that the data from both adsorbents fitted well to the Freundlich isotherm.

**Keywords:** Filter cake, Copper, Zinc, Adsorption isotherm

## APPLY COCONUT PROTEIN RESIDUE FROM PRODUCTION OF COCONUT OIL WITH EXTRACTED *CURCUMA LONGA* AS FOODS FOR REARING JUVENILE RED CLAW CRAYFISH

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### Abstract

Coconut protein residue from production of coconut oil with extracted *curcuma longa* had high antioxidant as curcuminoids and high protein which need to growth performance and survival rate of Juvenile red claw crayfish. The objective of this work was to study the effect coconut protein residue from production of coconut oil with extracted *curcuma longa* in feed to growth performance and survival rate of Juvenile red claw crayfish. The experiment was carried out using aquaria plastic tank systems with four treatment conditionbs: T1 used pellet (control); T2 used cream protein from virgin coconut oil (VCO); T3 and T4 used 10% and 20% of cream protein from coconut oil with extracted *Curcuma longa* (COC), respectively. Feed with cream protein from COC and VCO has significant effect on weight gain and feed conversion ratio (FCR) of Juvenile red claw crayfish when compared to Juvenile red claw crayfish in the control diet. FCR in the control group was significantly ( $p<0.05$ ) higher than those of the treated groups. Weight gain was highest in the T4. Survival rates of every treatment was 100%. The result indicated cream protein from COC with high protein and high antioxidant is potential additive in the Juvenile red claw crayfish diet.

**Keywords:** coconut protein residue, coconut oil with extracted *curcuma longa*, Juvenile red claw crayfish

## LOW-COST SPUTTERING PROCESS FOR CARBON NANOTUBES SYNTHESIS

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### Abstract

According to their wonderful properties, carbon nanotubes (CNTs) have been well known for decades. The synthesis process and catalyst deposition method have also drawn attention to control the nanotube structure and properties. Sputtering method is then one promising option to grow the nanotubes in mass production. This method is, however, still costly. Here, we have presented a simple low-cost custom-made DC magnetron sputtering for catalyst thin film deposition. Three different metal thin films (Fe, Ni, Cu) deposited on Si substrates have been employed to investigate nanotube production. Prior to deposition of the catalysts, Al was used as supporting layer. (Al/Fe, Al/Ni, Al/Cu). CNTs were grown by chemical vapor deposition process at 800°C. Ethanol was used as carbon precursor. It was found that CNTs could be successfully grown from only Al/Ni catalysts in our system with the diameter of approximately 200 nm. A large D-band at 1338 cm<sup>-1</sup> with broader G-band at 1582 cm<sup>-1</sup> from Raman spectra give a rise to multi layers growth of sp<sup>2</sup> carbon walls. Such dimension suggests that it is the characteristic of multi-walled carbon nanotubes.

**Keywords:** custom-made DC magnetron sputtering, carbon nanotubes, CNTs

## CHARACTERIZATION OF PHYSICAL AND MECHANICAL PROPERTIES OF BLEACHING PAPER FROM RICE STRAW

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### Abstract

This paper aimed to determine the characteristics of physical and mechanical properties of rice straw paper. The conditions of making paper hand sheet composed of pulping time: 2 hours, 4 hours, pulping temperature: 100°C, 130°C, pulping solvent: 2wt% NaOH, 4wt% NaOH and bleaching: unbleached pulp, bleached pulp with 2% H<sub>2</sub>O<sub>2</sub>. The paper hand sheet were tested based on TAPPI methods, The results showed that the optimal conditions of rice straw paper hand sheet including pulping time: 2 hours, pulping temperature: 100°C, pulping solvent: 2 wt% NaOH, and bleaching: unbleached pulp gave the highest the physical and mechanical properties form other conditions. This conditions showed as the basic weight 62.27 g/m<sup>2</sup>, thickness 259.30 μ, opacity 93.34 ISO%, burst strength 64.75 kPa.m<sup>2</sup>/g, tensile strength 95.33 N.m/g, and tear strength 473.55mN.m<sup>2</sup>/g. In this condition, the paper hand sheet is used at the lowest concentration and non-bleached, which reduces environmental pollution.

**Keywords:** physical properties, mechanical properties, rice straw paper

## A FACILE SYNTHESIS OF SELF-CATALYTIC PVP/PVA/CITRIC ACID HYDROGEL USING SODIUM HYDROGENCARBONATE AS A GELLING AGENT

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### Abstract

A simple and economic method for PVA/PVP/Citric acid hydrogel preparation using microwave-assisted irradiation is presented. The different ratios of starting components and also microwave irradiation parameters were studied to obtain hydrogel with high levels of gel fraction and a degree of swelling suitable for the application of wound dressings. The optimum conditions for hydrogel synthesis was 6:6:3 % (w/v) of PVA/PVP/Citric acid under 120 °C for 3 minutes of microwave irradiation. The ionic liquid-like structure of PVP- Citric acid possibly play an important role in terms of the crosslinking process. In addition, NaHCO<sub>3</sub> applied to the synthesized hydrogel also showed a significant effect in enhancing gel formation. The mechanism for three-dimensional network formation based on esterification and hydrogen-bonding interaction was also proposed in this work.

**Keywords:** gelling agent, hydrogel, microwave irradiation, self-catalytic synthesis

## **IMPROVEMENT OF MECHANICAL PROPERTIES AND WATER ABSORPTION IN WHEAT GLUTEN BY EPOXIDIZED NATURAL RUBBER**

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### **Abstract**

The aims of this research work were to improve toughness and water resistance of wheat gluten (WG) by the addition of epoxidized natural rubber (ENR) compared to glycerol. WG specimens were mixed and prepared by internal mixer and compression molding machine, respectively. ENR and glycerol were varied from 10 to 40 phr. Effect of modifier types and contents on WG were evaluated by tensile, impact and water absorption testing, microstructure and thermal analysis. The increase of ENR or glycerol contents led to the increase toughness by considering the increase of impact strength and elongation at break. Glass transition temperature of WG tended to decreased with the increase of ENR or glycerol contents, especially for glycerol. The presence of glycerol affected on the decomposition temperature values whereas that of ENR was unchanged. ENR improved water resistant of WG specimen but trend of glycerol showed the opposite behavior. Weight loss of modified WG with glycerol was found at immersion time of 2880 min.

**Keywords:** wheat gluten, epoxidized natural rubber, toughness, water absorption

## COOPERATIVE EFFECT BETWEEN GLYCEROL AND EPOXIDIZED NATURAL RUBBER IN WHEAT GLUTEN

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### Abstract

This work was to study the effect of cooperative function between epoxidized natural rubber (ENR) and glycerol in wheat gluten (WG). ENR : glycerol ratios were varied from 0:30 to 30:0 phr in WG resins of 70 phr. Test specimens were mixed and prepared by internal mixer and compression molding machine, respectively. Mechanical, thermal and physical properties of modified WG specimens at various ENR:glycerol ratios were investigated for cooperative effect. The result indicated that glycerol enhanced tensile resistances but suppressed impact and water resistances of modified WG by ENR. Size and dispersion of ENR particles were improved by the addition of glycerol. Glass transition and decomposition temperature values of modified WG by ENR and glycerol tended to increase when ENR fractions were increased. The presence of ENR suppressed effectiveness of glycerol acting as plasticizer.

**Keywords:** wheat gluten, epoxidized natural rubber, glycerol, plasticizer

## THE OPTIMUM CONDITIONS FOR THE CARBOXYMETHYL CELLULOSE BIOPLASTIC FILM FROM JACKFRUIT USING NATURAL RUBBER AND GELATIN AS ADDITIVE SUBSTANCES

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### Abstract

This research was to study on The Optimum Conditions for The Carboxymethyl Cellulose Bioplastic Film from Jackfruit using Natural Rubber and Gelatin as Additive Substances. Extracted cellulose with the existence of sodium hydroxide (4, 6, 8, 10 and 12 % w/v). The results showed that 10% NaOH the maximum yield of cellulose pulp was 3.66% with white powder and light weight. The synthesis of CMC from jackfruit pulp the above reaction was preformed under various amounts of NaOH (25, 30, 35 and 40% w/v). The properties of yield, Degree of substitution (D.S.), viscosity, and Solubility was monitored. The results found that at the NaOH concentrations at 30% gave the maximum of yield percent age at 124.03%, Degree of substitution at 0.74, viscosity at 14.65 cPs, and solubility at 96.9%. Then, the best result of the carboxymethyl cellulose to form a bioplastic film containing natural rubber and gelatin as additives Substances to find the optimal conditions for production. Bioplastic film from physical properties such as transparency, thickness, Water vapor permeability, water solubility, scanning Electron Microscopy. Mechanical properties as Tensile strength.

**Keywords:** jackfruit pulp, Carboxymethyl Cellulose, Bioplastic Film

**ASSESSING THE EFFICIENCY OF DOMESTIC WASTEWATER  
TREATMENT BY USING TANNIN FROM BANANA LEAF SHEATH,  
LEUCAENA AND BENGAL ALMOND**

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**Abstract**

The objective of this research was to examine effect of tannin extract from leaf sheaf of banana leaf sheath, leucaena and bengal almond by using different types of solvents (50% acetone, 80% ethanol and 50% ethyl alcohol). The results showed that the maximum tannin extract was obtained from bengal almond exhibiting the highest tannin extraction about 0.0306 mg/l. In addition, tannin extract from banana leaf sheath and leucaena can produce tannin extraction 0.032 and 0.0306 mg/l, respectively. Moreover, the efficiency of waste water treatment demonstrates that tannin extraction from banana leaf sheath at 10 mg/l has the highest efficiency of waste water treatment. Generally, the standard water quality parameters composed of turbidity is 17.30 NTU, Suspended solids are 15.00 mg/l, DO is 8.16 mg/l, BOD 0.02 mg/l, pH 6.74 and fat and oils are 0.03 mg/l.

**Keywords:** Banana Leaf Sheath, Leucaena, Bengal Almond, Tannin, Wastewater



## DESIGNING AND APPLICATION OF PLASMONIC INTERFEROMETRY

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### Abstract

In this work, plasmonic interferometry is designed and studied via virtue of micro ring resonator application. Its applications has diversity in many fields especially in a precision bio-medicine sensors. The theoretical method and some specific experiment testing results are given and analyzed together to seek for the optimum designing. By previous iterate process, many results show prominent acceptable from the designed micro resonant sensor to be used for the new cheapest and precise bio sensor.

**Keywords:** plasmonic, micro ring resonator, interferometry

## THE STUDY OF WGM – PLASMON INTERACTION WITHIN A MICRO PANDA RING RESONATOR

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### Abstract

The coupling between whispering gallery mode with surface plasmonic within a micro PANDA ring resonator was studied and analyzed. The system Hamiltonian of photon-plasmon interaction for WGM and surface plasmonics was established and studied by using a stochastic method applied to study the time revolution of system. It found that the characteristic of nonlinearity susceptibility response determined the variety application in such device especially in biosensors or chemosensory.

**Keywords:** plasmonics, whispering gallery mode, micro ring resonator

## NEAR INFRARED SPECTROSCOPY ANALYSIS OF MIXED RAW AND PARBOILED RICE BRAN

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### Abstract

Near infrared spectroscopy (NIRS) can be used as a rapid and non-destructive method to determine food compositions. The aim of this study was to employ NIRS for the prediction of mixed rice bran properties. NIR reflectance spectra in the range of 3,600-12,500  $\text{cm}^{-1}$  were recorded. Partial least square (PLS) regression was used to develop a calibration equation which was tested with a validation set. The determination coefficient ( $R^2$ ) for calibration model for moisture, protein, lipid, fiber, ash, carbohydrate, phytic acid, acid value, bulk density and whiteness index was 0.95, 0.96, 0.96, 0.82, 0.89, 0.93, 0.97, 0.96, 0.96, and 0.98, respectively. Root mean square error calibration (RMSEC) was 0.24, 0.19, 0.94, 0.67, 0.30, 1.76, 0.10, 7.63, 0.01, and 0.92, respectively. In addition, The internal validation showed that NIR could be successfully used to reasonably predict moisture, protein, lipid, fiber, ash, carbohydrate, phytic acid, acid value, bulk density and whiteness index

**Keywords:** Near-infrared spectroscopy (NIRS), rice bran, parboiled rice bran

## ALUMINA THIN FILM SYNTHESIS FOR IMPROVING SEMI-PRECIOUS STONE QUALITY WITH PLASMA ENHANCED ATOMIC LAYER DEPOSITION (PE-ALD)

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### Abstract

In semi-precious stone quality improvement to be resistant with scratches and factors as a result of making ornamental bodies, alumina thin film is another alternative to be used for coating surface of semi-precious stone because alumina is hard and transparent. Plasma enhanced atomic layer deposition technique is selected for synthesizing film. Films are originated from the deposition of trimethylaluminum and plasma of oxygen. In the experiment, it will be a study of suitability in being applied on semi-precious stone such as increasing hardness and transparency of film that does not affect color of the stones. According to the study, it will be an examination of X-ray diffraction analysis, atomic force microscopy, hardness testing and UV-visible spectroscopy.

**Keywords:** alumina thin film, semi-precious stone, plasma enhanced atomic layer deposition

## FABRICATION AND CHARACTERIZATION OF PARTICLE BOARD FROM COFFEE HUSK WASTE

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### Abstract

The purpose of this research was to fabricate the particle board from the coffee husk. The coffee husk from Chumphon province of Thailand was collected, prepared and separated into four groups such as outer husk, inner husk, the mixture of inner and outer husk and husk from the milling process. The coffee husk particle sheet was formed by the compression molding with the heater. Then the coffee husk particle sheets were the mechanical properties testing. The results showed the coffee husk particle sheet from milling process pass the Thai industrial standard (TIS.876/2547). The effect of coffee husk particle size on mechanical properties was clarified. The coffee husk particle sheet from the particle size of 2, 4 and 6 mm was mechanical testing and follow TIS.876/2547. The coffee particle size of 2 mm showed the passing the standard. Moreover, the effect of isocyanate adhesive on mechanical properties was investigated. The weight percentage range of isocyanate on coffee husk from 7 to 13 %wt was carried out. The weight percentage of 9, 11 and 13 showed according to TIS.876/2547. From the experiment indicated that the coffee husk could be applied to the wood particle board industrial.

**Keywords:** Coffee husk, Isocyanate adhesive, Mechanical properties, Particle board

## TEMPERATURE DEPENDENCE ON MECHANICAL, DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF BST-MODIFIED BNKT CERAMICS

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### Abstract

In this research, temperature dependence on mechanical, dielectric and piezoelectric properties of BST modified-BNKT ceramics were investigated. The lead-free of  $0.97\text{Bi}_{0.5}(\text{Na}_{0.80}\text{K}_{0.20})_{0.5}\text{TiO}_3\text{-}0.03(\text{Ba}_{0.70}\text{Sr}_{0.30})\text{O}_3$  (abbreviated BNKT-0.03BST) ceramic were prepared by a solid-state reaction method and sintered at various temperatures from 1100 to 1150°C in order to clarify the optimal sintering temperature for mechanical, dielectric and piezoelectric properties. Grain size tended to increase with increasing the sintering temperature. The maximum hardness ( $HK = 5.3$  GPa,  $HV = 4.1$  GPa,  $E = 62$  GPa, and  $K_{IC} = 1.35$  MPa.m<sup>1/2</sup>), dielectric ( $\epsilon' = 1525$ ,  $\tan \delta = 0.0566$ ), piezoelectric properties ( $S_{max} = 0.33$  %,  $d_{33}^* = 660$  pm/V,  $d_{33} = 172$  pC/N, and  $g_{33} = 12 \times 10^{-3}$  Vm/N) were obtained for the ceramic sintered at optimum sintering temperature of 1125°C.

**Keywords:** lead-free ceramics, sintering temperature, BNKT, electrical properties



**DESIGNED TO MEET THE CONDITIONS OF USE FOR PEOPLE  
WITH DISABILITIES AND DISABILITY CASE STUDYS:  
IMPROVING THE ENVIRONMENT OF THE CENTER FOR SOCIAL  
WELFARE DEVELOPMENT ELDERLY HOME KHAE. BANGKOK**

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**Abstract**

This research is designed to meet the conditions of use for people with disabilities and disability case studies: improving the environment of the Center for Social Welfare Development elderly home Khae. Bangkok This study is designed to improve the environment and for people with disabilities and disability. The objectives of the study are as follows: 1. The physical characteristics of the building affects the behavior of the elderly, the disabled and the house sitter. 2. Try to find sizes and spatial patterns of response to living habits and satisfaction with the environment simulation. 3. Summary and guidelines to improve the physical environment in response to the use of the handicapped and disabled. This study has defined the scope of the variables is disabled and disability Phrapradaeng variable was formed to operate the facility safe for the user and the lives of disabled people and disability indicators. is satisfied that affect the welfare of people with disabilities and disability.

**Keywords:** Environments, applications, people with disabilities and disability.

**THE DESIGN ENVIRONMENT TO RESPOND TO APPLICATIONS  
FOR BABY APHASIA CASE STUDY: BABIES APHASIA AND  
INTELLIGENCE. "NONTAWITH HOME LANDSCAPE," PAK KRET  
DISTRICT SOME MAKETS. NONTHABURI**

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**Abstract**

This research is designed to respond to the environment for baby aphasia Case Study: Babies aphasia and intelligence. "Nontawith home landscape," Pak Kret district some markets. Nonthaburi This study is designed to improve the environment for children and young aphasia. The objectives of the study are as follows: 1. The physical characteristics of the building affects the behavior of toddlers in the baby home for the mentally disabled. 2. Try to find sizes and spatial patterns of response to living habits and satisfaction with the environment simulated by 3. Summary and guidelines to improve the physical environment in response to the use of infant mental retardation. This study has defined the scope of the variable from the infant aphasia variable was formed to operate the facility safe for the use and existence of infant aphasia indicators are good. satisfied that affect applications babies aphasia.

**Keywords:** Environments, applications, Baby aphasia and intelligence.

**THE STUDY AND DESIGN OF THE PHYSICAL ENVIRONMENT IN  
RESPONSE TO APPLICATIONS FOR DISABLED CHILDREN IN  
EDUCATION: IMPROVING THE ENVIRONMENT OF THE  
ORPHANAGE FOR DISABLED CHILDREN IN PAK KRET.  
NONTHABURI.**

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**Abstract**

This research is the study and design of the physical environment in response to applications for disabled children in education: improving the environment of the orphanage for disabled children in Pak Kret. Nonthaburi is continuing to design and improve the environment for people with disabilities and disability. The objectives of the study are as follows: 1. The physical characteristics of the building affects the behavior of children with disabilities. 2. Try to find sizes and spatial patterns of response to living habits and satisfaction with the environment simulation. 3. Summary and guidelines for improving the physical environment to meet the child's disability. This study has defined the scope of the variable from a disabled dependent variable was formed to operate the facility safe for the user and the lives of disabled children a measure of satisfaction that effect. for children with disabilities.

**Keywords:** Environments, applications, disabled children.

**THE STUDY AND DESIGN OF THE PHYSICAL ENVIRONMENT IN RESPONSE TO APPLICATIONS FOR THE ELDERLY: A CASE STUDY TO IMPROVE THE PHYSICAL ENVIRONMENT OF THE CENTER FOR SOCIAL WELFARE DEVELOPMENT ELDERLY. PATHUM THANI**

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**Abstract**

This research is the study and design of the physical environment in response to applications for the elderly: a case study to improve the physical environment of the Center for Social Welfare Development elderly Thani Province. This study is designed to improve the environment for the elderly and the objectives of the study are as follows: 1. The physical characteristics of the building affects the behavior of the elderly. 2. Try to find sizes and spatial patterns of response to living habits and satisfaction with the environment simulation. 3. Summary and guidelines to improve the physical environment in response to the deployment of the elderly, research has defined the scope of the variables is the elderly, the dependent variable is the type of user convenience, safety benefits. and the livelihood of the elderly is a measure of satisfaction that affects the welfare of the elderly.

**Keywords:** Environments, applications, elderly.

## MECHANICAL AND ELECTRICAL PROPERTIES OF BZT MODIFIED BY BARIUM HEXAFERRITE

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### Abstract

In this work, the effects of barium hexaferrite ( $\text{BaFe}_{12}\text{O}_{19}$ ) on the microstructure, dielectric, piezoelectric and mechanical properties of  $\text{BaZr}_{0.07}\text{Ti}_{0.93}\text{O}_3$  ceramics were systematically investigated. The  $(\text{BaZr}_{0.07}\text{Ti}_{0.93}\text{O}_3-x)(\text{BaFe}_{12}\text{O}_{19})$  or  $\text{BZT}/x\text{BF}$  (where  $x = 0, 0.1, 0.5$  and  $1.0$  mol%) ceramics were prepared via a solid state reaction technique. All ceramics sample present pure perovskite phase with orthorhombic structure. Microstructure analysis also indicated that the BF have an influence on microstructure, the average grain size decreased with increasing BF content. The BF also show an improvement in dielectric properties and reach a maximum at  $1.0$  mol% BF. Furthermore, the composition  $1.0$  mol% BF content displayed a high piezoelectric coefficient ( $d_{33}$ ) of  $135 \mu\text{C}/\text{N}$ . In addition, the mechanical properties characteristics in terms of Vickers ( $HV$ ) and Knoop hardness ( $HK$ ), the hardness and Young's modulus values increase with increasing BF concentration and show highest at  $1.0$  mol% BF. The improvement properties were related with the change in microstructure.

**Keywords:** barium hexaferrite, piezoelectric properties, mechanical properties

## THE EFFECTS OF BIOCHAR ADDITIVE ON THE PROPERTIES OF GEOPOLYMER MATERIALS

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### Abstract

In this research, the effects of biochar additive on the properties of geopolymer materials were investigated. Biochar microparticles were prepared from waste materials under a pyrolysis condition. The geopolymer materials were prepared by mixing metakaolin and aluminum oxide in alkaline activator solutions of  $\text{Na}_2\text{SiO}_3$  and  $\text{NaOH}$ . Biochar was mixed with the geopolymer by 0, 10, 20 and 30% weight of binder. A  $\text{NaOH}$  concentration of 15M and  $\text{Na}_2\text{SiO}_3/\text{NaOH}$  ratios of 1.5 by weight were used. The density, shrinkage, and weight of geopolymer were measured. The phase formation and microstructure of the samples were characterized using X-ray diffraction (XRD) and scanning electron microscopy (SEM). The adsorption capacity of each sample was determined by methylene blue adsorption tests. The obtained results revealed that the studied materials exhibited high adsorption capacity.

**Keywords:** biocher, geopolymer, adsorption

## PREPARATION AND CHARACTERIZATION OF DIATOMITE-BASED GEOPOLYMER MATERIALS

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### Abstract

Geopolymers are aluminosilicate inorganic polymers. In this study, the properties of diatomite based geopolymer materials were investigated. The geopolymer materials were prepared by leaching diatomite (from Lampang province) and pure aluminum oxide with alkaline activator solutions. The fresh slurry was cast in plastic molds with a cubic shape and then cured at high temperatures. Effects of ratios between  $\text{Na}_2\text{SiO}_3$  and  $\text{NaOH}$  were investigated. Furthermore, influences of  $\text{NaOH}$  on the properties of the studied samples were also determined. Many techniques for material characterization such as DTA, XRF, XRD, and SEM were employed in this work. For mechanical property, the compressive strength of the geopolymers was tested after the curing. It was found that many properties of the samples were improved at some ratios of  $\text{Na}_2\text{SiO}_3$  and  $\text{NaOH}$ .

**Keywords:** diatomite, geopolymer, compressive strength

## PREPARATION AND CHARACTERIZATION OF CERAMIC WASTE -BASED GEOPOLYMER CERAMIC COMPOSITES FOR SUBSTRATE CULTURE APPLICATION

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### Abstract

The present study focuses on the new application of geopolymer ceramic composites as substrate culture. Geopolymer was synthesized using the geopolymerization method from ceramic wastes and pure alumina oxide by a reaction with an alkaline solution. For comparison purposes in substrate culture applications, the samples were produced by different amount of porous. The properties of all samples were investigated. The densities was determined using Archimedes' method. The porosity and water absorption of all samples were also measured. The phase formation was carried out using an X-ray diffraction technique (XRD). The microstructures were examined using a scanning electron microscopy (SEM). The mechanical properties were investigated by using compression machine.

**Keywords:** ceramic waste, geopolymer, substrate culture

## PREPARATION OF BaFeTiO<sub>3</sub> PEROVSKITE BY SOL-GEL METHOD FOR MEASURING MAGNETIC PROPERTIES

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### Abstract

The magnetic properties of BaFeTiO<sub>3</sub> (BTFO) sol gel perovskite are investigated. BTFO samples were prepared by sol gel and solid state reaction method through compression. Magnetic properties are influenced by electron environments of the Fe<sup>3+</sup> ions within the perovskite structure. Furthermore, the values of Ms and Mr indicate ferromagnetic behaviour in BTFO ceramics calcined temperature, resulting of BTFO sol gel calcined at the high temperature of 600 °C for 2 hours exhibited the high Ms~3.153emu/g at 50 K and Ms ~2.360emu/g at room temperature, but coercive force (Hc) at 50K presents soft magnetic BTFO sol gel sample. Using the Curie-Weiss law fitting for investigate  $\mu_{\text{eff}} \sim 23.083 \mu\text{B}$  high spin of Fe, negative of  $\theta$  present to antiferromagnetic characteristics of BTFO sol gel sample. Finally, BTFO calcined at the temperature of 600 °C for 2 hours exhibited the high Ms~3.150emu/g at 50 K and ~1.350 emu/g at room temperature. **Keywords:** BTFO, perovskite, Sol-gel

## PREPARING BY SOLID STATE METHOD OF $\text{Ca}_2\text{FeMoO}_6$ DOUBLE PEROVSKITE MEASURED MAGNETIC PROPERTIES

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### Abstract

The magnetic properties of  $\text{Ca}_2\text{FeMoO}_6$  (CFMO) double perovskite are investigated. CFMO samples were prepared by solid state reaction method through compression. Magnetic properties are influenced by electron environments of the  $\text{Fe}^{3+}$  and  $\text{Mo}^{5+}$  ions within the perovskite structure. CFMO was sintered at 800 °C exhibited the largest hysteresis loop at 50 K. In addition, the CFMO sintering at the high temperature of 800 °C for 10 hours exhibited the high  $M_s \sim 1.494$  emu/g at 50 K and  $\sim 0.601$  emu/g at room temperature. Using the Curie-Weiss law fitting for investigate  $\mu_{\text{eff}} \sim 28.121 \mu_B$  high spin of Fe and Mo, negative of  $\theta$  present to antiferromagnetic characteristics of CFMO sample.

**Keywords:** Composite, double perovskite, CFMO

## A DEVELOPING BIOFILM FOR SOIL SOLARIZATION

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### Abstract

Nowadays, in trend of green technology application is increasing to reduce the global warming. The objective of this research was thus to develop the biofilm for solarization application in agricultural fields. In the study, the biofilm made of chitosan as a main ingredient was tried out for the optimal ratio and tested for their physical properties. The process was started with the gelatinization chitosan solution dissolved with 1% acetic acid ( $\text{CH}_3\text{COOH}$ ) before mixing with cassava and glycerol, common residues in agricultural products and frozen industry, in three following formulas (v/v/v): formula 1 (100: 0: 0), formula 2 (80: 20: 0), and formula 3 (80: 10: 10). Comparison of physical properties including transparency test, thickness test, tensile strength test, water absorption test and biodegradability testing were determined.. According to studies, all samples with these three ratios were good for being film production, however, based on the physical properties, formula 1 (100: 0: 0) was the most suitable for agricultural applications since its viscosity thickness, and tensile strength was 1.83, 0.03 mm, and 0.56 Newton per square millimeter, respectively. Additionally, its water absorption was 91.4% and especially, its biodegradability, indicated by complete water solubilization, was reached to 10-12 days comparing to others, formula 2 (80: 20: 0) and formula 3 (80: 10: 10) that were 5-7 days and within 1 days, respectively. Therefore, this green application of only chitosan made biofilm will be further developed and added other stabilizers before testing for solarization purpose.

**Keyword:** Solarization, Chitosan, Soil, Biofilm

## CHARACTERIZATION OF ANTIFERROMAGNETISM IN DOUBLE PEROVSKITES $Ba_2FeMoO_6$ PREPARED BY SOLID STATE METHOD

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### Abstract

The magnetic properties of  $Ba_2FeMoO_6$  (BFMO) double perovskite are investigated. BFMO samples were prepared by solid state reaction method through compression. Magnetic properties are influenced by electron environments of the  $Fe^{3+}$  and  $Mo^{5+}$  ions within the perovskite structure. BFMO was sintered at 800 °C exhibited the largest hysteresis loop at 50 K. In addition, the values of  $M_s$  and  $M_r$  indicate ferromagnetic behaviour in BFMO ceramics sintered at 800 °C for many sintering time. Using the Curie-Weiss law fitting for investigate  $\mu_{eff} \sim 30\mu_B$  high spin of Fe and Mo, negative of  $\theta$  present to antiferromagnetic characteristics of BFMO sample.

**Keywords:** double perovskite, BFMO

## **ALTERNATIVE ENERGY FROM FRESH WATER WEED, *HYDRILLA VERTICILLATA***

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### **Abstract**

In this work, we investigated ethanol production from the common aquatic plant hydrilla by hydrolysis process. This was achieved using a fermentation medium mixed with aqueous solutions of H<sub>2</sub>SO<sub>4</sub> (0.5%) and NaOH (1%). Firstly, fermentation medium was obtained from washing rice. Samples were left to ferment in the acidic and basic solutions for different time scales and tested for alcohol concentration. The resulting of producing ethyl alcohol were at 4.0% for H<sub>2</sub>SO<sub>4</sub> cont. 0.5% , 3.5% for NaOH cont. 1% and 5.0% for H<sub>2</sub>O solution at measuring of time ~6 hours.

**Keywords:** hydrilla verticillata, alternative energy, fresh water

## **ODOR ABSORBING MATERIAL PRODUCED FROM FRESH PLANT FLOWERS WASTE AT THAI TEMPLE IN THAILAND**

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### **Abstract**

Fresh plant flower waste is abundant following religious rituals in Thailand. The conversion of this waste to charcoal material for absorbing foul odors is investigated. Charcoal from burning the plant material was compressed into blocks with a starch binder. Three different starting morphologies of charcoal were prepared by grinding and compared with SEM. Blocks of powdered charcoal performed best, removing an ammonia odor from a small sealed vessel within 24 hours. A vision for packaging of the product is presented, providing an avenue for recycling the flowers waste into odor absorbers.

**Keywords:** odor absorber, flower waste, recycle

## STUDY, MAGNETIC PROPERTIES OF BaTiO<sub>3</sub> PEROVSKITE PREPARED BY SOLID STATE METHOD

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### Abstract

The magnetic properties of BaFeTiO<sub>3</sub> (BTFO) perovskite are investigated. BTFO samples were prepared by solid state reaction method through compression. Magnetic properties are influenced by electron environments of the Fe<sup>3+</sup> ions within the perovskite structure. Furthermore, the values of Ms and Mr indicate ferromagnetic behaviour in BFMO ceramics sintered at 800 °C for sintering as 800 °C for 6 hours at 1.898 emu/g, which is magnetization strength material more than sintering at 4 hours, 8 hours, 10 hours as 1.794 emu/g, 1.333 emu/g and 1.192 emu/g at measured of low temperature. Using the Curie-Weiss law fitting for investigate  $\mu_{\text{eff}} \sim 38 \mu\text{B}$  high spin of Fe, negative of  $\theta$  present to antiferromagnetic characteristics of BTFO sample. Finally, BTFO sintering at the high temperature of 800 °C for 6 hours exhibited the high Ms ~ 1.898 emu/g at 50 K and ~ 1.216 emu/g at room temperature.

**Keywords:** BTFO, perovskite, Fe<sup>3+</sup>

## THE APPLICATION OF REMOTE-CONTROLLED ASSISTED SURFACE WATER SAMPLING

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### Abstract

Water is a natural resource that is important for both human health and the environment. However, the routine activities of the municipal and industrial sectors can result in the contamination of water resources. The application of remote control water sampling is therefore useful for environmental field work by employing a remote control water sampler in a 700 m radius to collect three samples at once time during a sampling collection within 15 sec at various depths, including 0.50 m, 0.75 m and 1.00 m in depth, respectively (500 ml/sample). Remote control water sampling works with a water flow rate of  $35.11 \pm 0.08$  L/sec on average. For comparison, the performance of the remote control water sampling and a hand-held water sampler were evaluated. The basic water quality parameters involved temperature, pH, dissolved oxygen, total dissolved solids, electrical conductivity and coliform bacteria, which the results showed were mostly quite similar. This machine functions as an alternative water sampler and is useful for field work applications. Moreover, it provides many advantages, such as reduction of workers, cost benefits, time savings, and reduction of health risks.

**Keywords:** Remote control, water sampler, water quality

## UTILIZATION OF EGGSHELL ASH FOR REMOVAL OF ORGANIC MICROPOLLUTANTS IN CONTAMINATED WATER

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### Abstract

Rapid development of advanced technology in Thailand has resulted in increased impacts from micropollutant accumulation through wastewater. Phenolic compounds, which generally originate from synthetic and plastic products, have been frequently detected in industrial and municipal wastewater. These compounds may be released into the environment and affect the human body at trace levels. In terms of the economic perspective and environmental considerations, filtration is a process that is appropriate for wastewater treatment. This research was conducted in order to investigate a filtration process using filtration material made from eggshell ash in various proportions for organic micropollutant removal. The mechanical strength of the filtration material derived from eggshell ash was evaluated in terms of compressive strength. For the fabrication process, the different proportions were composed in a range of 40% – 60% of eggshell ash. Moreover, the permeability and water treatment efficiencies of the filtration material were also investigated in a batch experiments.

**Keywords:** Eggshell ash, organic micropollutant, filtration

## UTILIZING AGRICULTURAL WASTE AS AN ENVIRONMENTALLY FRIENDLY CEMENT COMPOSITE

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### Abstract

Utilizing coconut coir fiber can offer an alternative method of adding value to agricultural wastes and help to conserve the environment with green products. The aim of this research was to investigate the potential use of coconut coir fiber as an eco-friendly material for cement composites. The properties of these cement composites mixed with varying proportions of paper waste were compared to ordinary white Portland cement. In addition, the surface structure and chemical characteristics of the samples were examined with a scanning electron microscope (SEM) and an energy-dispersive x-ray spectrometer (EDS). The results showed that the cement composites consisted mainly of the elements carbon (C), oxygen (O), and calcium (Ca) in the range of 34-44%, 42-49%, and 11-19% by weight, respectively. The density of 50% coconut coir fiber cement composite was 1.66 g/cm<sup>3</sup> at 28 days curing. Moreover, the compressive and flexural strength of the cement composites decreased with an increase in the coconut coir fiber volume fraction.

**Keywords:** Agriculture waste, coconut coir fiber, cement composite

## **EFFECT OF SYSTEM OF RICE INTENSIFICATION (SRI) ON GROWTH AND YIELD COMPONENT IN KDML105**

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### **Abstract**

This research aimed on the effects of spacing and no. of seedling hill<sup>-1</sup> on growth and yield component of rice cv. Khao Dok Mali 105 (KDML105) in system of rice intensification. The experimental design was in a randomized completed block design with three replications. Two factors included 25 × 25 cm, 30 × 30 cm, 40 × 40 cm, and 50 × 50 cm with single seedling hill<sup>-1</sup>, two seedlings hill<sup>-1</sup>, and three seedlings hill<sup>-1</sup>, respectively. The data were recorded on tillering, no. of panicle hill<sup>-1</sup>, plant height, canopy, panicle length, no. of seed panicle<sup>-1</sup>, seed width, seed length, 100 seed weight, seed weight hill<sup>-1</sup>. The experiment found that the no. of seedlings hill<sup>-1</sup> and spacing that have influence on the tillering and no. of panicle hill<sup>-1</sup>. Moreover, the no. of seedlings hill<sup>-1</sup> has effected on the seed weight hill<sup>-1</sup>. There was no interaction between spacing and seedlings hill<sup>-1</sup>. The three seedling hill<sup>-1</sup> condition showed the highest in tillering (avg. = 24.94 tillers hill<sup>-1</sup>), no. of panicle hill<sup>-1</sup> (avg. = 17.46 panicle hill<sup>-1</sup>) and seed weight hill<sup>-1</sup> (avg. = 76.18 g. hill<sup>-1</sup>). The single seedling hill<sup>-1</sup> showed the lowest in tillering, no. of panicle length and seed weight hill<sup>-1</sup>. The 50 x 50 (cm) plant spacing was the highest in tillering (avg. = 22.60 tillers hill<sup>-1</sup>) and the plant spacing, with 40 x 40 cm showed the highest in no. of panicle hill<sup>-1</sup> (avg. = 18.20 panicle hill<sup>-1</sup>). From the result indicated that optimized seed hill<sup>-1</sup> and plant spacing in KDML105 cultivated system.

**Keywords:** Yield component, Khao Dok Mali 105, Plant spacing, Number of seedling hill<sup>-1</sup>

**THE FABRIC DESIGN OF THE LADY'S PARTY ATTIRE  
INSPIRED AND MADE BY THE LOINCLOTH IN NON PHOK  
DISTRIC, ROI ET**

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**Abstract**

This research aims to design a lady's attire in the form of party-ware inspired by the loincloth of Nong Phok, Roi Et. The loincloth was the main component in this costume design and thus combined with the materials which had main weaving of cotton mixed with silk and decorated with gold strips. Moreover, the materials were additionally blended with innovative reflective water fabric types to make new special features of the fabrics. The promoted research declares the possibility in the use of loincloth to apply in cloth products. In this study. Analytical tools of loincloth pattern of Nong Phok district, Roi Et Province were used and divided into four areas, consisting of fabric's structures, patterns, colors, and materials and thus following with the style sets of Christian Dior Brand. Finally, the results of the analysis after the cloths were created as a costume and provided, revealed that the structure and color patterns and materials of the loincloth from this place displayed the unique design of the fabric itself in combination with the other previous described materials could create new appearance of the that fit the trend of the series of the brand Christian Dior Collection New Look described in Year 1950.

**Keywords:** Loincloth of Nong Phok, Party Attire, Fabric

## THE INFLUENCE OF PREBIOTIC TYPES (GOS AND FOS) AND FAT CONTENT ON THE CHEMICAL, PHYSICAL AND SENSORY CHARACTERISTIC OF YOGHURT ICE CREAM AND MIX

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### Abstract

Yogurt ice cream (YIC) containing prebiotics as nutrient enhancing sources for probiotics has been popular due to its taste and its advantage on gastrointestinal tract. However, using galacto-oligosaccharides (GOS) and fructo-oligosaccharides (FOS) (0, 1, and 2%) as prebiotic and varying fat content (2 and 10% as LYIC and FYIC, respectively) in YIC might affect its chemical, physical and sensory properties. The results showed that pH of FYIC mix was lower than that of LYIC mix. Fat content and prebiotic type did not significantly affect the total acidity of the mix. The increase of fat content significantly increased the fat particle size however, both prebiotics could reduce the size of fat in FYIC mix. Higher fat content and prebiotic types gave a higher solid-like behavior of YIC mix however, FOS seemed to enhance the solid-like behavior rather than GOS. When the mix was whipped and frozen, GOS or FOS could reduce hardness of YIC however, FOS seemed to enhance the hardness rather than GOS. High fat content significantly decreased melting rate of the ice cream. The highest hedonic sensorial score on overall acceptance was found in FYIC with 2% FOS, compared to the rest of all samples. Conclusively, prebiotics and fat content used in this study truly impacted to the chemical, physical and sensorial characteristics of the ice cream mix and YIC.

**Keywords:** galacto-oligosaccharides, fructo-oligosaccharides, yogurt ice cream, fat-content

## EFFECT OF THERMAL TREATMENT TEMPERATURE ON PHASE FORMATION AND BIOACTIVITY OF GLASS-CERAMICS BASED ON THE $\text{SiO}_2\text{-Na}_2\text{O-CaO-P}_2\text{O}_5$ SYSTEM

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### Abstract

In this work, the glass-ceramics based on the  $\text{SiO}_2\text{-Na}_2\text{O-CaO-P}_2\text{O}_5$  system which using rice husk ash as natural raw materials instead of commercial  $\text{SiO}_2$  have been studied in order to investigate the influence of thermal treatment temperature (700 to 1000°C) on phase formation and bioactivity of these glass-ceramics. Moreover, the physical properties such as density, porosity and mechanical properties were systematically performed. It was found that the increasing of heat treatment temperature leading to both of continuously increasing the  $\text{Na}_2\text{Ca}_2\text{Si}_3\text{O}_9$  phase and obtaining better bioactive after incubation of glass-ceramics in simulated body fluid (SBF) for 7 days.

**Keywords:** bioglass, bioactive, thermal treatment, natural raw materials

## NUTRITIONAL PROPERTIES, ANTIOXIDANT AND ANTI-ACETYLCHOLINESTERASE ACTIVITIES OF *PLEUROTUS OSTREATUS*

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### Abstract

*Pleurotus ostreatus*, the worldwide edible mushroom, has a potent economic values and medicinal properties. In this study, nutritional properties, antioxidant, and anti-acetylcholinesterase activities of *P. ostreatus* were investigated. The extracts were prepared by maceration and soxhlet extraction of ethanol solvent and decoction. Nutritional analysis showed that *P. ostreatus* has high content of fibers (45.5%), proteins (20.8%) and carbohydrates (68.4%) with low content of lipids (0.56%). HPLC analysis revealed that *P. ostreatus* has high content of the potential health effect of  $\beta$ -glucan (42.8%). Acetylcholinesterase (AChE) is a key enzyme in nervous system. Inhibition of this enzyme is used for the symptomatic treatment of Alzheimer's disease (AD), the most common disease in aging population. Ellman colorimetric method was used to determine Acetylcholinesterase inhibitory (AChEI) activity. All extracts found containing high AChEI activity ( $IC_{50} = 1.75$ - $5.91$  mg/ml). Oxidative stress plays a major role in the pathogenesis of AD, thus antioxidant activity was also performed in this study. DPPH assay exhibited all *P. ostreatus* extracts had high antioxidant activity ( $IC_{50} = 0.59$ - $5.47$  mg/ml). The results suggested that *P. ostreatus* should be beneficial for AD treatment and the most efficient nutraceutical and functional foods.

**Keywords:** *Pleurotus ostreatus*, nutrition, antioxidant, acetylcholinesterase

## PHYTOCHEMICALS AND PHARMACOLOGICAL ACTIVITIES FROM BANANA FRUITS OF SEVERAL *MUSA SPECIES* FOR USING AS COSMETIC RAW MATERIALS

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### Abstract

The phytochemicals of the ethanolic extracts of unripe pulp and peel of banana fruit from several banana cultivars belonging to the *Musa acuminata* species (namely 'Kluai Namwa', 'Kluai Hom', 'Kluai Leb Mu Nang', and 'Kluai Khai') were studied by color reaction test and HPTLC analysis. The Kluai Khai pulp showed a highest amounts of ethanolic extractives (ca.  $9.70 \pm 5.84\%$  of dry material weight). The peel several banana showed similar qualitative phytochemicals. The major of phytochemicals identified in these extracts were alkaloids, flavonoids, tannins, and polyphenols. The antioxidant activity was assessed using the 2,2-diphenyl-1-picrylhydrazyl assay. The analyzed Kluai Khai peel extract showed a highest antioxidant activity at  $IC_{50} = 0.57 \mu\text{g/ml}$  and Kluai Khai pulp extract showed a highest tyrosinase inhibitory effect at  $IC_{50} = 2.25 \mu\text{g/ml}$ . Kluai Khai could be provide a potential natural source of bioactive compounds and could be beneficial to the cosmetic properties.

**Keywords:** *Musa spp.*, Phytochemicals, Antioxidant, Antityrosinase

## EVALUATION OF PHYTOCHEMICALS AND PHARMACOLOGICAL ACTIVITIES OF BEN-CHA-LO-KA-WI- CHIAN REMEDY

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### Abstract

Ben-Cha-Lo-Ka-Wi-Chian (BLW) remedy is a Thai traditional medicine that has been notified in the List of Medicine Products of the National List of Essential Drugs A.D. 2006 and has long been used as an antipyretic. The phytochemicals of the 70% and 95% ethanolic extracts of were studied by color reaction test and HPTLC analysis. The BLW remedy showed a highest amounts of 70% ethanolic extractives (ca. 3.99 % of dry material weight). The several ethanolic extracts showed similar qualitative phytochemicals. The major of phytochemicals identified in these extracts were alkaloids, flavonoids, tannins, and polyphenols. The antioxidant activity was assessed using the 2,2-diphenyl-1-picrylhydrazyl assay. The analyzed 70% ethanolic extract showed a highest antioxidant activity at  $IC_{50} = 526.09 \mu\text{g/ml}$  and both extracts not showed tyrosinase inhibitory effect. The 95% ethanolic extract showed the greatest anti- anti-*Propionibacterium acnes* activity with inhibition zone of  $10.10 \pm 0.45$  mm and minimum inhibitory concentration (MIC) was 5.05 mg/ml.

**Keywords:** Benchalokawichian remedy, Phytochemicals, Pharmacologicals

## CONSTRUCTION AND CHARACTERIZATION OF ELECTRON CYCLOTRON RESONANCE OXYGEN PLASMA MACHINE FOR TOURMALINE TREATMENT

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### Abstract

Generally, Plasma consists of ions, electrons and neutrals. Neutrals are the product produced much higher than other two products, but only ions and electrons are used for surface material modification. Electron cyclotron resonance is one of the techniques to apply external magnetic field in order to increase ions and electrons of produced plasma. This work aim to study influence of external magnetic field to a number of produced ions and electrons from a new construction of Electron Cyclotron Resonance for oxygen plasma. The assumption of increased ions and electrons density affect to advantage of plasma solid interaction, which is used for tourmaline treatment application. Plasma irradiation characterization will be used to investigate optical emission spectrum..

**Keywords:** Electron Cyclotron Resonance, optical emission spectrum, tourmaline

## MEDIUM DENSITY FIBER BOARD FROM RENEWABLE WATER HYACINTH FIBER

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### Abstract

Natural fiber of water hyacinth was renewable as reinforcing fiber for preparing a medium density fiber board (MDF). Water hyacinth was washed, ground then treated in NaOH and dried. Urea formaldehyde resin and isocyanate resin were used as binders in MDF. The contents of the binders were varied from 10 wt% to 18 wt%. MDF from water hyacinth and the binder were prepared in 1 mm-thick and 3 mm-thick by hot press machine with a pressure set of 20 bar. The composites sheet properties were characterized by density measurement, moisture contents, swelling and mechanical testing. Density and moisture increased with increasing the binders contents regarding with the thickness. The maximum values of modulus of rupture and modulus of elasticity were found at the binders content of 12 wt%. Overall properties were investigated according to TISI standard No. 966-2547. From the results, MDF from water hyacinth passed through TISI standard. It can be noted that this MDF is possible for preparing as an environmental friendly material for further applying in industries.

**Keywords:** binder, fiber board, swelling, thickness

## PHYTOCHEMISTRY AND ANTIOXIDANT ACTIVITY OF *MOLINERIA LATIFOLIA* HERB. EXTRACTS

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### Abstract

*Molineria latifolia* is a perennial-monocotyle-donous herb and it is well-known in the treatment of melasma in Thai traditional medicine. The purpose of this study was to determine the phytochemicals and antioxidant activity in the aerial parts and the underground parts of *M. latifolia* by ethanolic, ethyl acetate and aqueous extracts. The phytochemicals were analyzed by HPTLC. The antioxidant activity was measured by using the 2, 2-diphenyl-1-picrylhydrazil (DPPH) free radical scavenging, the ferric reducing antioxidant power (FRAP) assays and Total phenolic content was measured by Folin-Ciocalteu.

The result showed the highest antioxidant activity of the underground parts (RW) were extracted by aqueous at  $EC_{50} = 245.03 \pm 6.59 \mu\text{g/mL}$  (DPPH) and  $640.03 \pm 0.36 \text{ Fe}^{2+}/\text{mg}$  (FRAP). Consequently, the highest phenolics content was found in the aqueous extract of the aerial parts (LW) ( $191.70 \pm 1.64 \mu\text{g FA/mg}$ ). *M. latifolia* extracts contain a bioactive compound of Tannin, Flavonoids and Steroid. Tannin and Flavonoid were found in both of parts. In the aerial parts were found steroid extracting by ethyl acetate and ethanolic, as the underground parts were seen steroid extracting by aqueous. It was found that *M. latifolia* has high bioactive compounds and moderate antioxidant activity.

**Keywords:** *Molineria latifolia*, Phytochemistry, Antioxidant activity

## PRELIMINARY PHYTOCHEMICALS AND PHARMACOLOGIC ACTIVITIES ASSESSMENT OF WHITE AND PINK NELUMBO NUCIFERA GAERTN FLOWERS

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### Abstract

The phytochemicals of the ethanolic extracts of petals and stamens of lotus flower from several lotus cultivars belonging to the *Nelumbo nucifera* Gaertn (namely 'Lotus white flower' and 'Lotus pink flower') were studied by color reaction test and HPTLC analysis. The Lotus pink flower stamens showed a highest amounts of ethanolic extractives (ca. 18.33±2.14% of dry material weight). The several *N. nucifera* petals and stamens showed similar qualitative phytochemicals. The crude extracts revealed the presence of flavonoids, tannins, and polyphenols. The antioxidant activity was assessed using the 2,2-diphenyl-1-picrylhydrazyl assay. The analyzed Lotus pink flower stamens extract showed a highest antioxidant activity at IC<sub>50</sub> = 0.61 µg/ml and Lotus pink flower petals extract showed a highest tyrosinase inhibitory effect at IC<sub>50</sub> = 2.25 µg/ml. *N. nucifera* flowers could be provide a potential natural source of phytochemicals and could be beneficial to the cosmetic properties.

**Keywords:** *Nelumbo nucifera*, Phytochemicals, Antioxidant, Antityrosinase

## THE APPLICATION OF ACETOBACTER SPECIES IN SWEET GLUTINOUS RICE FERMENTATION FOR BACTERIAL CELLULOSE PRODUCTION

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### Abstract

Bacterial cellulose (BC) is a natural renewable and biodegradable polymer and mostly synthesized from the bacteria genus *Acetobacter*. It has been recently studied for its tremendous potential as an effective biopolymer in various applications due to its uniform structure and morphology superior to those of plant cellulose. In this study, the researchers have observed BC production using sweet glutinous rice as a raw material. In the process, sweet glutinous rice was firstly fermented by loog pang to obtain sugar moiety and alcohol before changing to rice vinegar by fermentation with *Gluconacetobacter xylinum* TISTR 086, or mixed indigenous *Acetobacter* spp., isolated in our lab. Both these two samples gave comparable BC yields. The fermented sweet glutinous rice (FSR) sample exhibited BC yield comparable to the control coconut vinegar medium (2.20 vs 2.00 g/L within 3 days). The remarkable antimicrobial activities of silver nanoparticles impregnated BC products (Ag-BC) were then determined on common pathogens in contaminated wounds; *Streptococcus aureus*, *Escherichia coli* and *Bacillus subtilis* by agar diffusion test. From this study, Ag-BC produced by SFR will be one attractive affordable choice for being biomaterials applied in medical interests, especially skin disinfectant.

**Keywords:** Bacterial cellulose; silver; mixed *Acetobacter*; fermented glutinous rice vinegar

## BIODEGRADATION OF WATER HYACINTH DURING SUPPORTING FOR HYDROPONIC VEGETATION

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### Abstract

Water hyacinth is used in traditional medicine and also used to remove toxic elements from polluted water bodies, but it is considered as a noxious weed and grows very fast and depletes nutrient and oxygen rapidly from water bodies, adversely affecting flora and fauna. In this research, the researchers aimed to apply water hyacinth as the root and stem support for hydroponic plant cultivation and adjust the conditions to reduce natural biodegradation of the plant during vegetation. The results indicated that the soaked parts of the plant materials during vegetation under mostly anaerobic condition at 28-35°C enhanced high degradation process by the fungi *Aspergillus* as well as *Penicillium* mostly habitated on the top surface of the fibers in the air dried areas. No detection of fungi was found in the control sample treated with sodium benzoate (5% w/v) after incubation for 40 days. In the treatment, the deterioration could be slowed down as no fungal detected until 30-40 days when the plant supporting materials were regularly treated with the plant's nutrient solution circulated at 1-1.5 L/min as well as those pretreated with sodium benzoate. All these results suggested that the supporting materials by water hyacinth treated with sodium benzoate and/or simultaneously circulating hydroponic nutrient solution, could replace the sponge, in hydroponic vegetation by ensuring for the hydroponic plant's growth without fungal contamination.

**Keywords:** biodegradation, mold, hydroponic, water hyacinth



**THE ACTIVITY OF INDEGENOUS MICROBIAL CONSORTIUM  
INTERACTING WITH ACETIC ACID BACTERIA STARTER  
AFFECTING VENIGAR PRODUCTION**

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**Abstract**

Consumptions of fermented vinegar made of fresh fruit juices have been increased dramatically due to their freshness, high vitamin content, and low caloric consumption. Unpasteurized fruit juice produced by pressing or squeezing of the fruits also have many diverse microflora which is normally present on the surface of fruits during harvest and postharvest processing and possibly include transport, storage, and processing. In the study, many microorganisms producing acid especially bacteria, fungi, and yeasts demonstrated the high acid production and using fruit juice as a substrate for their growth. Three acid producing bacteria were isolated and characterized for the acid production as well as applied for the fruit vinegar fermentation process.

**Keywords:** Acetic acid bacteria, Vinegar, Banana pulp

## LACTOBACILLI DIVERSITY AS AN POTENTIAL INDICATOR FOR THE KIMCHI QUALITY

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### Abstract

Kimchi, traditional Korean fermented vegetables, is long known for its organoleptic, beneficial and world widely popular. Many researches have been revealed the possible microbial communities during spontaneous kimchi fermentation process are mainly composed of *Lactobacillus*, *Weissella*, *Pediococcus* and *Leuconostoc* spp. In this study, the cultivation-dependent method together molecular techniques, could be applied for indicating Kimchi microbial diversity. It could indicate there were significant lower activities and numbers of heterofermentative lactic acid bacteria in the kimchi samples during the sale having long shelf storage closing to expired sale periods and especially the samples with poor storage in the freezer. The results showed the optimum pH at 4.2-4.6 were maintained while the acidity, which is optimum at 0.6-0.8% of lactic acid, were dropped. At least 60% of the bacteria and 40-50 % of total organic acid were reduced according to lower kimchi quality since lower beneficial and nutrition in kimchi products during the sale on market. Besides, other common bacteria were also increasingly detected during longer kept. Therefore, survival of dominant LAB genera can be a good criterion for indicating the quality of fermented kimchi.

**Keywords:** Organic acid, LAB, kimchi

## **EFFECTS OF A BIOFERTILIZER MADE OF FERMENTED EGGS ON SOIL MICROBIAL COMMUNITY OF RICE PADDY**

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### **Abstract**

Biofertilizers made by fermentation of various agricultural products for diverse many agricultural plants are presently preferred to reduce the hazard of chemicals leading to crop yield losses. They are now becoming good practical substitutes for chemical fertilizers for conditioning the soil fertility and maintain the agro-ecosystem with sustainable productivity and good environmental quality. In this study, we have tested a biofertilizer with the formula of eggs fermented with molasses, called a fermented plant hormone. The results demonstrated that biofertilizer enhanced microbial activity in the paddy soil when applied together with fermented manure. At the soil depth 30-50 cm, heterotrophs as well as autotrophs were also induced (from 5 logunits/ mL to 7-8 logunit/ mL) after the hormone applied at every 7 day for a month. This thus caused pH of the soil changed, as dropped from pH 6.8 to 6.4 within 2 weeks and thus finally increasing to pH 7.3. Most culturable bacteria species were composed of anaerobic and facultative species with cocci as well as bacilli shapes while less yeasts and fungi detected. So this study indicated the tentative effects of biofertilizer on the microbial diversity as another indirect factor inducing the plant growth promoting.

**Keywords:** Microbial diversity, Egg, Plant hormone, Biofertilizer

## CHARACTERISTICS OF ISOLATED SPECIES OF CELLULOLYTIC BACTERIA LOCALIZED IN THE GOAT RUMENS

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### Abstract

In this study, diverse anaerobic cellulolytic bacteria in the goat rumen at Muslim Community, Prachautit 69 Thung Khru, Bangkok, were isolated and characterized for their high cellulase activity. It was found that their population of microbes isolated from in the rumen at different time were highly variable depending the feeding agricultural types, bean leaves and shoots, grass or Acacia mangium shoot. Major bacteria were found to be in genus *Ruminococcus*, *Pseudomonas* spp., and *Bacillus* spp. They had cellulase enzymes that could digest various cellulosic materials at optimum temperature of 40-55°C. These cellulase activity could be enhanced by the mixtures of isolated consortia. These bacteria will be further applied for hydrolyze commercial cellulosic materials.

**Keywords:** Cellulase, Goat rumen, Bacteria

## **SHELF LIFE STABILITY OF FREEZING DRIED LACTOBACILLI ISOLATES FROM FERMENTED DAIRY**

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### **Abstract**

Many methods for drying probiotics have been established in order to retention/stability of probiotic properties. The appropriated methods are depending on microorganism strains and the protective agents to ensure their survival throughout shelf-life and provide adequate numbers of viable probiotic bacteria. Kefir which is one of fermented dairy product with a unique combination of milk and fermented bacteria and yeasts is composed of more than 30 strains of microorganisms especially certain species of Bacilli and Bifidobacteria. In the study, the mixtures of lactobacilli isolates obtained from kefir were prepared into powdered formula after mixing with skim milk solution. It showed to be good protective agent for the freeze-drying process. The results showed that the preservation factors of time and temperature affected the bacterial potency. Total viable CFU counts and high survivability under the shelf life temperature kept at 4 and 10°C were found to be better than those at 25°C. Moreover, their shelf life at 10°C for 10, 20, and 30 days were not significantly different. These studies can indicate the tentative responsiveness factors affecting the risks of lower potency and stability in manufacturing of formulated probiotics in large scale production, the transportation, storage and sales.

**Keywords:** *Lactobacilli*, Stability, Probiotics

## HIGH SALT AND SEQUENTIAL ACIDITY REQUIREMENT IN HOMEMADE PICKLE FERMENTED PRODUCTS AFFECTING ON DIMINISHED INDIGENOUS PATHOGENS

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### Abstract

It is commonly found in the market that undesirable pickle fermentation is usually causing by effective pathogen competing with beneficial microbes such as LAB community. The specific conditions requirement for pickle fermentation has to be done to enhance the growth of unique class of LAB. In the study, we tested the homemade pickle fermentation procedure which are the use of high salts of 10% and limited oxygen compared with common vegetable fermentation using low salt of 2-3% but high acidity. The study showed that the sample of cucumber pickle were done by starting with soaking in 1.0% acetic acid and following heating to 75°C and holding for 15 min could inactivating indigenous pathogen bacteria such as *E. coli*, *Bacilli*, fungal spores microbial as well as most vegetative. It showed the unique initial pH of brined cucumbers around 5.2 after adding 10% (w/w) sodium chloride and thus lowering pH to 3.2-3.6 after adding acetic acid. The increases in numbers of LAB were finally detected in the pickle product. This study, therefore, indicated high salts are first major required factor for specific inducing acidic vegetable fermentation.

**Keywords:** High salt, Pathogen, Pickle fermentation

## **Poster Session II**

# **Innovative Technology and Sustainability Engineering**

## FACILE SYNTHESIS OF CeO<sub>2</sub>/SnO<sub>2</sub> N-N HETEROSTRUCTURE

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### Abstract

Tin oxide and cerium oxide nanocomposites (SnO<sub>2</sub>-CeO<sub>2</sub> NCs) were successfully synthesized via a simple co-precipitation method. The structure and properties of the synthesized materials were characterized using several X-ray and electron-based techniques including XRD, SEM, TEM, SAED, EDS and BET to unravel the structure, morphology, element composition and specific surface area. The results showed that the NCs has the characteristic crystalline structures of SnO<sub>2</sub> and CeO<sub>2</sub>, and high specific surface area (80 m<sup>2</sup>/g). EDS analysis confirm the absence of all element composition and the SEM and TEM analysis observed as particles having the clear spherical morphologies with the average particle size was about 47 nm.

**Keywords:** co-precipitate, nanocomposite, tin oxide, cerium oxide



## **IMPACTS OF CURRENT AND VOLTAGE HARMONICS FOR INDUSTRIAL POWER NETWORK**

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### **Abstract**

Power quality (PQ) has become a more important issue recently due to the use of more sophisticated and sensitive equipment. Medical devices, telecommunication servers and equipment, manufacturing and domestic appliances rely on a good supply of power. This paper presents the review of the power quality in power system. Power quality has always been important for customers, but with increasing applications of electronic loads and controllers sensitive to the power quality, the subject has attracted renewed interest in recent times. Power quality encompasses several aspects: harmonics, over voltage, flicker voltage sags and swells interruptions etc. A major factor contributing to the importance of the quality of power is the deregulation of the power industry. Customers will demand higher levels of power quality to ensure the proper and continued operation of sensitive equipment and processes.

**Keywords:** Power Quality, Power System, Harmonic



## TESTING OF POWER TRANSFORMER USING DISSOLVED GAS ANALYSIS

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### Abstract

This paper investigates the moisture and contamination in transformer oil by using Dissolved Gas Analysis (DGA) method. The method is interpreting the transformer condition. Gas in oil of the DGA method is a sensitive and reliable technique for the detection of incipient fault condition within oil-immersed transformers. The gas in fluid is analysis refers to the DGA method. The DGA technique facilitates the observation of the byproducts of the oil degradation through its environment, the insulating and pressurizing fluid. The three main degradation processes that generate gases are thermal degradation, partial discharge and arcing. The most significant gases generated from oil decomposition such as hydrogen gas, methane, ethane, ethylene and acetylene. In this research has shown the DGA technique for power transformers has become a powerful tool for diagnosing the state and condition, as well as equipment failures, with the advantage that can doing when transformer in use.

**Keywords:** Testing of Transformer, Dissolved Gas Analysis, Moisture, Transformer



## OPTIMAL REACTIVE POWER CONTROL IN POWER SYSTEM WITH PARTICLE SWARM OPTIMIZATION TECHNIQUE

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### Abstract

This paper considers an application of Newton's optimal power flow to the solution of the secondary voltage/reactive power control in power system. This procedure is based on the sensitivity theory applied to the determination of zones for the secondary voltage/ reactive power control and corresponding reduced set of regulating sources, whose reactive outputs represent control variables in the optimal power flow program. PSO is applied to solve the OPF problem for optimal power flow the optimal power flow program output becomes a schedule to be used by operators in the process of OPF-PSO (Optimal Power Flow - Particle swarm optimization) PSO applied to optimal reactive power dispatch is evaluated on an IEEE 30-bus power system. The optimization strategy is general and can be used to solve other power system optimization problems as well.

**Keywords:** Reactive Power, Particle Swarm Optimization, Power System

## **AUTOMATIC MUSHROOM WATERING SYSTEM USING MICROCONTROLLER**

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### **Abstract**

Thailand is an agricultural based country. Agricultural 4.0 with smart operation of farm is therefore a key driver that can boost Thailand's economy. This senior project aims at developing an automatic mushroom watering system using microcontroller. The provision of optimum amount of water for plant growth and water saving are the expected benefits from the study. The proposed watering system consists of 2 main components; a sensor set and a control system. Soil moisture contents are measured by the sensor set and data were passed to Node MCU V2 board to display on LCD monitor. Microcontroller unit is used for actuating the solenoid valves by comparing the soil moisture content with the set value. In case that soil moisture content is lower than 30%, solenoid valve is commanded using microcontroller to supply water. Solenoid valve is controlled to close when the moisture content in soil is higher than 70%. Moisture content and temperature are reported every 2 minutes.

The test results showed that the developed automatic mushroom watering system using microcontroller could control supplying water according to moisture content in the soil with the LCD display screen.

**Keywords:** Automatic Mushroom Watering Systems, Soil Moisture Controller



## **A WEB-BASED BOOKING SYSTEM FOR RAJARUEK PIROM CONFERENCE ROOM**

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### **Abstract**

This research aims to develop a web-based booking system: a case study of Rachapruk pirom conference room. The system is developed by PHP. As well as, MySQL is also employed for managing the database. The database management system is utilized for insert, update, delete and display the data in the booking system. For support the priority user to make decisions about approving the reservation, the system can show the statistic of the booking data by information gathering in the database.

The system was evaluated by the satisfaction survey from 20 users. The research results showed that the web-based booking system for Rachapruk pirom conference room was satisfied in an average level (4.42) which is very satisfying. The work performs properly according to its scope and aims of the research.

**Keywords:** web-based, booking system, conference room

**EFFECT OF AMMONIUM SULPHATE (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> ON  
MICROSTRUCTURE AND MECHANICAL PROPERTIES OF  
SA-213- Gr.T22 AND SA-210-Gr. A STEEL IN THE WATER  
TUBE BOILER**

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**Abstract**

This paper presents the effect of ammonium sulfate (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> leaks into a boiler feed water system on the microstructure, chemistry, metallurgy and mechanical properties of a steel water tube boiler. Tube specimens included water tube and superheated tube of ferritic steel grade SA-213-Gr.T22 and ferritic-pearlitic steel alloy grade SA-210-Gr.A, respectively. Specimens were obtained from different heights within the boiler which correlate with the exposed temperature of the tube during operation. The results from mass spectrometry show that levels of carbon (C) and sulfur (S) did not change significantly over a five day operation period. While operating temperature influenced the microstructure and mechanical properties with a segregation of phase and a change of mechanical properties (hardness and tensile) of the tube, respectfully.

**Keywords:** Water tube boiler, Ammonium sulphate (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>,  
SA-213-Gr.T22, SA-210-Gr.A

## **EYE-GAZE TECHNOLOGY ACCESS TO MEDIA FOR DISABLED STUDENT**

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### **Abstract**

Over the past decade, eye-gaze technology can offer people all over the world accessing software on a computer system. For a person with disabilities, this technology is an augmentative and alternative communication that helps them to communicate more effectively and live fuller. Eye-gaze technology advance has been transferred to the educational area and now the use of interacting with the multimedia materials and resources in the classroom. This research has looked at three design parameters of the interaction-button size, dwell-time click alternative, and placement of the button which suitable for eye tracking interfaces. The evaluation carried out an experiment to compare performance with fifteen students with a disability from Sri-Sangwan School.

The results showed that a combination of big buttons (200x200 pixel) and short dwell-times (2 seconds) are most suited for maximizing accuracy and ease of use. Consequently, eye tracking technology is a great tool to interact in computer-assisted instruction for THAI students with disabled hand control.

**Keywords:** Eye-Gaze Technology, Disabled Student



## **DROWSY ALERT SYSTEM USING DIGITAL IMAGE PROCESSING**

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### **Abstract**

Nowadays, driver drowsy is a significant factor in a large number of vehicle accidents. The purpose of this research is to detect drowsy in drivers to prevent accident and to improve safety on the road. Computer vision and embedded system are used to design and development the system. Furthermore, image processing techniques such as Haar-Like Features and Find Contour technique are used for acquiring details of given eye object and further processing. In addition, Raspberry Pi processor is used for image processing. The system able to monitoring eyes and determines whether the eyes are in an open position or closed state. In such a case when drowsy is detected, a warning signal is issued to alert the driver. If the driver's eye is closed cumulatively more than the standard value (2sec.).

Additionally, to see whether the advantage exists in real usage, this research conducted an experiment with 4 participants tested the accuracy and correctness of drowsy alert. Consequently, the experiment showed that an acceptable accuracy rate 90.62%.

**Keywords:** Drowsy, Eye Detection, Digital Image Processing, Raspberry Pi

## THE DESIGN AND CONSTRUCTION OF FATIGUE TESTING MACHINE

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### Abstract

The structural components in industries are involved more materials. The designers must know the mechanical properties of materials when various loads acting. The component under a reverse of torsion is failed by the fatigue. Determining fatigue life of component before failure is important to ensure safety and reliability. Also, the materials used for producing component must be tested by a fatigue testing machine. The torsional fatigue testing machine is constructed by fatigue producing from the reversed torsion to specimen. The reversed torsion applying to specimen is created from pneumatics and mechanical system. The performance of fatigue testing machine is evaluated from testing specimens with the different torques. The deviation of the testing is not exceed 10%. This research could reduce the cost of the procurement of the fatigue testing machine that uses to study the fatigue behavior of materials.

**Keywords:** torsion, fatigue, design, fatigue testing machine

## PLANNING OF DISTRIBUTION SUBSTATION WITH GIS APPLICATION

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### Abstract

This paper presents the construction process of distribution substation planning which consist of 1) Small area load forecasting 2) Identifying areas to meet power demand 3) Alternative for distribution substations construction (including new distribution substation construction and the transformer size extension of the adjacent distribution substation) . 4) Project evaluation (analyzed in economics including the investment cost of electrical equipment, subtransmission line, energy loss, operation and maintenance) and 5) Reliability indices. All of these are the step of planning in MEA distribution system.

**Keywords:** Energy Loss, Geographic Information System, Distribution Substation

## **ANALYSIS OF STRESS DISTRIBUTION FOR POWDER COMPRESSION MOLDING BY FINITE ELEMENT METHOD**

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### **Abstract**

Ultrasonic mold is designed for ceramic powder compression. CAD and CAE were used in the design to analysis mold strength and natural frequency. Study of stress distribution and compression in upper and lower punch, mold body and wave guide comparison of stresses analyzed by FEA with experiments under maximum compression at 50,000 N to validate the results of both methods and the natural frequency of the mole. The difference between FEA and experimental analysis was 5-7%, acceptable. The result is designed and analysis has cylinder a mold body with an outer diameter of 80 mm and a height of 100 mm the upper punch has a hexagon of 125 mm in length. The six sides are 26 mm high wave guide with a height of 100 mm internal and external diameters are 80 and 110 mm, respectively. The mold is designed can get maximum compression force 1,500 kN. Made with bearing steel AISI 52100 obtainable hardness 65 HRC, the stress concentration occurs at the neck of the upper punch can used ultrasonic at 20-28 kHz.

**Keywords:** stress distribution, power compression mold, finite element method

## **ANALYSIS OF STRESS DISTRIBUTION FOR RUN-FLAT BY FINITE ELEMENT METHOD**

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### **Abstract**

Run-flat for an armored small truck made of AISI 1045 metal with a density of  $7,870 \text{ kg/m}^3$ , one wheel assembly is composed of 2 pieces each piece is semi-circular tighten with metal bolts total weight is approximately 11 kg per wheel. Experiments and finite element analysis were used in the research. Considering the consistency between the two methods, the stresses generated by deformation when subjected to a force comparable to a 7 kN compressive mass, the difference between the experiment and the FEA analysis was 8-10%, acceptable and it can be said that the results with the FEA analysis can be representative of the experiment. Because the ran-flat consists of two pieces is semi-circular. Therefore, the analysis of the stress intensity must be determined at the angle of rotation of the wheel. The stress intensity is highest at the tightening point of both semi-circular.

**Keywords:** stress distribution, run-flat, finite element method

## PHYSICAL AND MECHANICAL BEHAVIOR OF COBALT OXIDE DOPED BNKT LEAD-FREE CERAMICS

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### Abstract

The effects of CoO additive on phase behavior, densification, microstructure and mechanical properties of  $\text{Bi}_{0.5}(\text{Na}_{0.81}\text{K}_{0.19})_{0.5}\text{TiO}_3$  lead-free ceramics were investigated. The samples were synthesized by solid state reaction technique, where powders were calcined at 850 °C for 4 h and ceramics were sintered at 1,050 °C for 4 h. The results show that the X-ray diffraction analysis of the ceramic reveals all samples exhibited a single phase perovskite. The physical and mechanical properties behaviors have significantly changed link with the additive contents.

**Keywords:** Phase formation, Mechanical properties, BNKT

## STUDY OF SYNTHESIS PARAMETERS OF NI-RICH $\text{LiNi}_{0.75}\text{Mn}_{0.15}\text{Co}_{0.10}\text{O}_2$ POWDER BY CO-PRECIPITATION METHOD

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### Abstract

Lithium Nickel Manganese Cobalt Oxide ( $\text{LiNi}_{0.75}\text{Mn}_{0.15}\text{Co}_{0.10}\text{O}_2$ : NMC) is interesting material for lithium battery applications due to high specific energy and low cost. The pure phase and well-ordered layered structure has mostly been synthesized the co-precipitation method. In this study, the Nickel-rich  $\text{LiNi}_{0.75}\text{Mn}_{0.15}\text{Co}_{0.10}\text{O}_2$  positive electrode powder was prepared using the co-precipitation method. The influence of synthesis parameters such as calcination temperature, time and amount of water for rinse a NaOH and  $\text{NH}_4\text{OH}$  were studied. Then, phase formation and structure were studied by X-ray Powder Diffraction (XRD). The morphological changes were also observed by a scanning electron microscope (SEM). Weight loss was measured by thermo gravimetric Analysis (TGA). Finally, the optimum parameter to prepare the highest purity of NMC powder were fast rinse until pH 7.0 with DI water and calcination only single 1 step.

**Keywords:** Lithium, co-precipitation method

## DESIGN AND CONSTRUCTION CAPACITOR VOLTAGE DIVIDER FOR AC HIGH VOLTAGE 50 kV RATED TO TEST THE DIELECTRIC STRENGTH

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### Abstract

This paper presents the design of high Voltage divider 50 kV rated for the measurement to testing of dielectric strength. This research describes Voltage divider for high Voltage alternating current about Voltage ratio 1000:1. The main component is divided into two parts high Voltage polypropylene capacitor series circuit with a total capacitance of 43.321 picofarad. The same type of high Voltage polypropylene capacitance coupled with a total capacitance of 43.277 nanofarad is included in the acrylic insulation pipe. The results show that the designed capacitor Voltages the requirements of IEC 60060-2 (1994) and IEEE Std.4 (1995) standard definition with standard deviation  $\pm 1\%$ . The accuracy in measurement high Voltage measurement techniques are very popular. This is Voltage divider connected to a low Voltage device such as Voltmeter or oscilloscope. For the purpose of solving this problem the design and construction of a qualified Voltage divider can be used to measure the AC voltage in a standardized for dielectric strength testing

**Keywords:** IEC 60060-2 (1994), IEEE Std.4 (1995), high Voltage divider

**A CONCEPTUAL FRAMEWORK FOR THE INNOVATIVE DESIGN  
OF TEMPORARY ACCOMMODATION FOR FLOOD VICTIMS IN  
THA KORPAI COMMUNITY, WARIN CHAMRAB,  
UBON RATCHATHANI PROVINCE, THAILAND**

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**Abstract**

Tha Korpai community in Warin Chamrab, Ubon Ratchathani Province, Thailand, which is adjacent to the Mun River contains 187 houses located at the foot of the Democracy Bridge. The area is affected by floods every year during the rainy season. It is often caused by heavy rains that occur for a long time until flood levels rise. Sometimes it is caused by a tropical cyclone or just Low pressure in the area. In addition, Ubon Ratchathani is the last province where the water masses of the Mun River and the Chi River meet up before flowing together into the Mekong River. There is a large drainage dam from the north of the province to the Mun River that accommodates every rainy season. However, there is still damage to housing, to habitats and organisms. Each rainy season, nearly 70 villagers are displaced on the roadside where they become temporary residents. They reside at the foot of the Democratic Freedom Bridge, waiting for the water level to decrease. After the disaster, the common problem of the victims is a lack of housing that is both safe and comfortable because it is not prepared well in advance. It is not enough to respond to the needs of the victims.

Nowadays, many architects and designers have created innovations to help people cope with natural disasters, both in terms of design and development of effective materials. So, the purpose of this study are the following: (1) To do a case study or some research on the characteristics and patterns of temporary accommodation of the flood victims in Ubon Ratchathani province, (2) To do a case study about the temporary accommodations available in Thailand and abroad, (3) To study the problems and important factors that will create a conceptual framework and innovation for the management of temporary accommodation suitable for the area in Ubon Ratchathani. (4) To study relevant research papers about disasters in Thailand and other countries around the world that were hit by significant natural disasters and to compare them in various aspects such as innovative solution, management, transportation, construction and materials. This includes the assessment of the following: the space requirements for the victims after the disaster, the model of



materials needed and the construction method of the house. This study also aims to explore and collect information about the primary needs of the survivors post- disaster, analyze some data and get to know the main issue at hand, evaluate the things that need to be improved and fixed, and, lastly, to gather information on how to design temporary accommodation for flood victims.

**Keywords:** innovation, conceptual framework, design, temporary accommodation, flood victims, Ubon Ratchathani Province

## ANALYSIS OF STANDARDIZED PRECIPITATION EVAPOTRANSPIRATION INDEX OVER CHIANGRAI AND PHAYAO PROVINCES

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### Abstract

Drought Indices Analysis plays an vital role in flood and drought monitoring and early warning which Thai Meteorological Department main duty and relate responsibility organization especially the basin that is limited use of water resources like Kok and Ing river basins. This study aims to analyze the drought situation utilized Standardized Precipitation Evapotranspiration Index (SPEI) at Chiangrai and Phayao province (Kok and Ing basins). The precipitation and temperature data both observed stations are used for calculation (1951-2018). The result shows that SPEI can point out the situation of Drought in the observed area. This study could be applied to drought monitoring over other basin furthermore.

**Keywords:** SPEI, drought index, northern Thailand

## DESIGN AND CONSTRUCTION OF A MINI MAGNETIC LEVITATION TRAIN

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### Abstract

This article presents the design and construction of a mini magnetic levitation train. The design of the train is based on the theory of 3-phase Linear Induction Motor (LIM). The train consists of two main sections. The first part is the linear induction motor, which is the part that drives the train to move. The second part is the magnetic coils, which is the part that raises the body of the train to float over the rails. Such train can move forward/backward in the same principle as forward/reverse rotation control of 3-phase induction motors. For that reason, this research controls the forward/backward movement of the train with a magnetic contactor set by using the same circuit as the control of the rotation of the 3-phase induction motor. The designed train can lift slightly above the rails and move in short distances along the rails. The test results show input voltage, average time, speed and force of the train.

**Keywords:** levitation train, linear induction motor, magnetic contactor



## DESIGN AND CONSTRUCTION THE RF ION SOURCE FOR COMPACT ACCERELATOR WITH 30 KEV ENERGY

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### Abstract

To construct the low energy accelerator for plant modifications the most important part is the ion source. In the conventional cold cathodes and hot filament ion source methods the filament continuously burns out over time, has a shorter lifespan, requires venting of the ion source to atmosphere. Henceforth the Radio frequency (RF) antenna ion source or “non-thermionic ion source” with 13.6 MHz was used in the accelerator as well as being easy to generate varie the plasma souce and stability. This ion source can produce a particle beam of about ~30 to 40 mA current. The ion particle was extracted by the first zero voltage extraction rod electrode method and focusing the ion beam of 0-30 kV with the second rod electrode and then the third rod electrode has zero voltage. In calculating and designing this system via the Simion8.0 Program, the result showed that the Ar<sup>+</sup> ion beam with 30 keV can be focused with 1 cm diameter beam at the distance of 10 cm of the drift space.

**Keywords:** ion source, low energy, ion beam

## DEVELOPMENT OF A PORTABLE SPOT WELDING

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### Abstract

The research is related to the development of a portable spot welding machine as a tool used for connecting metal together. It is a small size and light weight, and suitably applied for offsite maintenance work. The previous transformer is the main power supply working at short circuit, low voltage, high power causes the large size of the spot welding machine and heavy weight, not suitable for application. According to the study, it was found that the Ultracapacitor (UC), which functions as a transformer since it works at low voltage condition, current and high power, persisting the ratio of higher power-to-weight than comparable transformers. The develop machine would thus be smaller and less weigh compared to the original tool. The UC product of Maxwell Technology effectively works at 2000 F, 2.7 V, 6 series operating, rated current limit at 15 V, 2000 A. It was tested for welding stainless steels with 0.7 and 1.4 mm thickness. It could weld two stainless steel sheets at the thickness 0.7 mm using approximately 1800 J, the power output approximately 31000 W, 2000 A within 0.06 s. Moreover, its work welding stainless steel at 1.4 mm thickness required about 3000 J, 29000 W, and 1900 A within 0.10 s.

Keywords: Ultracapacitor, Spot Welding, Portable

## AN ADSORBENT DEVELOPED FROM BANANA PEELS, WATER HYACINTH, AND KAPOK FOR PHOSPHORUS AND NITROGEN TREATMENT

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### Abstract

Wastewater is one of the major environmental problems which is mostly from industrial and agricultural communities, especially from homes that do not have proper wastewater treatment systems. The wastewater treatment from these sites with the concentration exceeding the required values of wastewater law, 2 milligrams per liter of phosphorus and 20 milliliters of nitrogen, should be reconsidered before leaving to the environment. In this study, the wastewater samples from Saen Saep Canal were tried with three plants composed of banana peels, water hyacinth, and kapok. The plants were baked and ground at 300, 150, and 300°C, consecutively before using as the adsorbents for phosphorus and nitrogen removals. The results revealed that all three plants were not significantly different in phosphorus removals, but only kapok was the most appropriate adsorbent for wastewater treatment having low concentration of nitrogen, not more than 24 ppm. Additionally, these used green adsorbents that have no waste and no polluted to the environment, could be further processed into agricultural fertilizers. Therefore, these low cost cellulosic materials can be one considering for use in community wastewater treatment.

**Keywords:** Banana peels, Water hyacinth, Kapok, Nitrogen, Phosphorus



## LEARNING ACTIVITY PROVISION ACCORDING TO 4H LIFE SKILLS PRINCIPLE USING ONLINE LESSONS VIA GOOGLE SITE FOR EDUCATION INFORMATION SYSTEM MANAGEMENT COURSE

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### Abstract

This research aimed to 1) compare academic achievements within Education Information System Management course, and 2) study satisfaction of learning activity provision according to 4H Life Skills Principle using online lessons via Google Site. Samples of this research were 30 of the 3<sup>rd</sup> year students who enrolled in Education Information System Management course in the 2<sup>nd</sup> semester of academic year 2017, Computer Education Program, Faculty of Education, Nakhon Si Thammarat Rajabhat University. The instruments used in the research were 1) learning activity according to 4H Life Skills using online lessons via Google Site, and 2) learner's satisfaction questionnaire toward the provision of learning activity according to 4H Life Skills using online lessons via Google Site. Statistics used to analyze data were Mean, Standard Deviation (S.D.) and t-test dependent for hypothesis testing. The result had shown that 1) after receiving the provision of learning activity according to 4H Life Skills principle, academic achievement was significantly higher comparing to before the provision at .05 level. 2) There were high level of overall learners' satisfaction toward the development of online lessons via Google Site.

**Keywords:** 4H Life Skills, Google Site, Education Information System Management Course



## DEVELOPMENT OF PROGRAMMED INSTRUCTION LABORATORY FOR APPLICATION IN TELECOMMUNICATION ENGINEERING

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### Abstract

This paper aims to develop the programmed instruction laboratory, to evaluate the quality of programmed instruction laboratory by experts, and to find the efficiency of programmed instruction laboratory. The selected topic used in this research is fundamental to antenna, the design of dipole antenna, and analysis of dipole antenna that related to the three equipment on the antenna engineering subject. The research procedures are the following: 1) to analyze the three topics on telecommunication engineering, 2) to develop the programmed instruction laboratory, 3) to create research tools, 4) to evaluate the quality of programmed instruction laboratory by experts, 5) to apply sampling group, and 6) to collect and analyze the data. The sample group used to test for the efficiency of programmed instruction laboratory was 15 workers in antenna engineering, Bangkok, who were required for telecommunication application in their engineering works. From the results, the research could indicate high standard of the process efficiency ( $E_1$ ) and output efficiency ( $E_2$ ) at higher than the criteria of 80/80. The programmed instruction laboratory for the application in telecommunication engineering would be effective in supporting both theoretical and practical applications in engineering laboratory.

**Keyword:** programmed instruction laboratory, telecommunication engineering, antenna engineering

## DEVELOPMENT OF RESONANCE CIRCUIT CALCULATION PROGRAM

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### Abstract

This paper presents the resonance circuit program by using GUI (Graphic User Interface) of MatLab®. The program consists of three parts: the resonance frequency calculation, circuit impedance, and circuit current. The program developed could calculate resonance frequency, a circuit impedance, circuit current values and inductance capacitance, voltage resistance, the resonance frequency, impedance, electricity and the resulting graph are exactly theoretical. The research results indicated the simulated response comparison agrees well with theory and the evaluation of tools by 5 experts at high level. The Graphical User Interface of MatLab® tools will be further applied and developed for teaching telecommunication engineering with efficiency.

**Keywords:** Development, Resonance circuit, Program

## THE EFFECT OF LEUCITE CERAMICS ON MECHANICAL PROPERTIES OF SILICONE COATING

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### Abstract

Silicone based coating was considered a high performance coatings used to preserve or protect a variety of different materials. However, its mechanical property was a weakness for using in several applications. In this research study, leucite ceramic particles were added to silicone coating in order to improve some mechanical properties. Leucite ceramic particles were synthesized by in-house sol-gel process. The morphology and size of our synthesized leucite particles were analyzed by SEM, EDX, and XRD, respectively. It was revealed that the concentration and size of leucite ceramic particles played the important role on several properties of silicone coating.

**Keywords:** leucite, sol-gel, mechanical property, silicone coating

## INFLUENCE OF CERAMIC ADDITIVES ON MECHANICAL PROPERTIES OF EPOXY COATING

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### Abstract

Leucite ceramic particles were added to epoxy coating in order to improve some mechanical properties. Leucite ceramic particles were synthesized by in-house sol-gel process. The morphology and size of our synthesized leucite particles were analyzed by SEM, EDX, and XRD, respectively. It was revealed that the concentration and size of leucite ceramic particles played the important role on several properties of epoxy coating.

**Keywords:** leucite, sol-gel, mechanical property, epoxy coating

## THE EFFECT OF SINTERING TEMPERATURE ON PHYSICAL PROPERTY OF LEUCITE CERAMICS

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### Abstract

Leucite has been widely used as a constituent of dental ceramics to modify the coefficient of thermal expansion. This is most important where the ceramic is to be fused or baked onto metal. However, its physical property was unpredictable since it was sensitive to several parameters such as sintering temperature and concentration of raw materials. In this research study, leucite ceramic particles were synthesized by in-house sol-gel process. The morphology and size of our synthesized leucite particles were analyzed by SEM, EDX, and XRD, respectively. It was revealed that the sintering temperature played the important role on several properties of leucite ceramic particles.

**Keywords:** leucite, sol-gel, physical property, sintering

## THE EFFECT OF SINTERING TEMPERATURE ON PHYSICAL PROPERTY OF LEUCITE CERAMICS

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### Abstract

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**Keywords:** leucite, sol-gel, physical property, sintering

## THE EFFECT OF MAGNETIC FIELDS ON ALIGNMENT DIRECTION OF IRON FILLER IN THE EPOXY

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### Abstract

Epoxy is one type of materials for adhesive. It was improved the strength by adding the filler such as iron, alumina or silica. Generally, the epoxy adhesive was mixed with iron for application in the metal adhesive. However, the mechanical properties were importance of adhesive. Because, it was one factor for lifetime limit. The iron/epoxy was casted in the magnetic field which was parallel and perpendicular direction with surface of samples. The alignment of iron particles was induced with magnetic fields. The mechanical properties behavior of samples were investigated hardness and impact test. It was found that the alignment of iron particles in the epoxy were influence hardness and impact properties.

**Keywords:** alignment direction, iron, epoxy, hardness, impact strength

## THE INFLUENCE OF BAMBOO CHARCOAL TO MECHANICAL PROPERTIES OF EPOXY COATING

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### Abstract

The epoxy was one of the materials for wear and corrosion protection due to good chemical resistance and high mechanical properties. However, the increasing of mechanical properties of coating can be improved with reinforcement filler. The bamboo charcoal filler was mixed with epoxy powder. After that, bamboo charcoal/ epoxy composites were carbon steel substrate by painting process. The bamboo charcoal/ epoxy composites coatings were investigated about the microstructure of coating, hardness by optical microscope, hardness tester, respectively. It was found that the hardness was increased due to the strength of bamboo charcoal powder.

**Keywords:** bamboo charcoal, epoxy, coating, mechanical properties, hardness

## EFFECT OF TIME AND POWDER PARAMETER OF SPUTTERING ON DEPOSITION RATE OF $\text{La}_{0.8}\text{Sr}_{0.2}\text{MnO}_3$ THIN FILMS FOR SOLID OXIDE FUEL CELLS

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### Abstract

The  $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$  (LSM) thin film, a part of solid oxide fuel cells (SOFCs), was deposited on substrate with sputtering method. The sputtering time and sputtering powder parameter were adjusted for optimum conditions for the high deposition rate. The thickness coating and crystal structure of the LSM thin films were investigated using scanning electron microscope and x-ray diffraction, respectively. It was found that the deposition rate efficiency was depended on the sputtering time and sputtering powder. The optimum parameters were 4,500 s sputtering time and 50 Watt sputtering power due to highest thickness of  $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$  crystal structure of thin films.

**Keywords:** LSM; Sputtering; Solid Oxide Fuel Cells; Deposition Rate Efficiency; Thin Films

## THE EFFECT OF SPRAY DISTANCE ON PHASE TRANSITION OF CHROMIUM OXIDE COATINGS BY FLAME SPRAY PROCESS

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### Abstract

Chromium oxide ( $\text{Cr}_2\text{O}_3$ ) is best resistance to wear and corrosion. It was deposited on the iron steel for the wear and corrosion protection by thermal spray process. Generally, the parameter of spray coating was have very variant. The spray distance was one in the parameter of spray coating that it was affect to the cooling temperature. The microstructure and phase transition of the  $\text{Cr}_2\text{O}_3$  was investigated with optical microscope and X-ray diffraction. From the results, it was found that the phase transition of  $\text{Cr}_2\text{O}_3$  the was difference up to the cooling temperature.

**Keywords:** Chromium oxide, thermal spray, spray distance, phase transition

## DEVELOPMENT OF READING ACTIVITIES FOR KINDERGARTEN 2 STUDENTS WITH AN APPLICATION

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### Abstract

This research aimed to 1) study reading behaviors of the early childhood children before, during, and after the experiment with an application and 2) to compare the early childhood children's development of reading behavior before, during, and after the experiment with the reading application. Samples in the study was conducted for 30 persons. 2 kindergarteners who were studying in the second semester of academic year 2017 in Muang Ratchaburi Kindergarten, Ratchaburi province, sampled by purposive sampling. The study consisted of 8 week data collection for 3 days per a week, 20 minutes per a day, 24 sessions in total. The instruments of this research were reading promotion application and early childhood reading behavior observation form developed by the researcher with reliability ( $\alpha$ ) = 0.94 and reliability of observation (RAI) = 0.92. The data was analyzed using average score and standard deviation and then plotted as line graphs to compare the development of reading activities for kindergarten 2 students with an application in each aspect every week.

The result has shown that 1) reading behavior of the kindergarten 2 students who were experienced with reading promotion application before, during, and after the experiment had significantly higher scores at  $p = .01$ . Increasing of the before experiment scores were measured from observation. During week 1, 2, 3, 4, 5, 6, 7 and 8 the average scores were 9, 14.5, 18.6, 18.6, 25.1, 27.6, 30.4, 33.5 and 35.6 respectively. 2) There was a significant change in the kindergarten 2 students reading behavior before and after the experiment with reading promotion application at  $p = .05$ , 74.64 percent of the kindergarteners had higher reading development score accordingly.

**Keywords:** reading experience promotion, Kindergarten 2 Students, application

## **ANALYSIS OF THE DENSITY DISTRIBUTION OF CERAMIC ARMOR PLATES BY FINITE ELEMENT METHOD**

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### **Abstract**

Ceramic armor plate of hexagon designed by ceramic powder compression. The end of upper punch is dome style and ceramic armor plate has a concave to increase the angle of attack with the bullet as a result, the efficiency of bullet resistance increased. The armor has a hexagonal face with a width of 26 mm per side. For clearly of density distribution, armor plates are made up to a thickness up to 40 mm. Study the density distribution of flat face armor plates and concave armor plates with different angle of attack. The angle of attack of the armor plate is proportional to the depth of the concave groove. The angle of attack increases as a result, the depth of concave groove is increased under compression of 1,000 kN. The density is very high at the top of the dome or the center of the armor plate with concave groove. The armor plate with a concave shape is more dense than a flat face profile.

**Keywords:** density distribution, ceramic armor plate, power compression mold, angle of attack

## DESIGN AND WEIGHT OPTIMIZATION OF RUN - FLAT WHEEL FOR THE ARMORED SMALL TRUCK BY FINITE ELEMENT METHOD

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### Abstract

Run-flat for an armored small truck newly designed shapes and materials are different from the conventional. CAD used in the design and finite element method was used for strength analysis. Based on the stress important variables affecting the design are width of run-flat, height of cross section and locking of the ring, especially at the joints. The new material is UHMWPE composite. The research process hardness testing, toughness, tensile strength, compressive and shear force. As a result, the weight of conventional run-flat of 11 kg decreased to 70% under the same conditions.

**Keywords:** run-flat, armored small truck, UHMWPE composite, finite element method

## **Poster Session III**

# **Textiles and Clothing Sustainability**

## **DYE EXTRACTION FROM COFFEE SLUDGE AND APPLICATION ON HEMP FABRIC DYEING USING ULTRASONIC TECHNIQUE**

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### **Abstract**

This research was concerned with dye extraction from coffee sludge and application of hemp fabric dyeing by the use of ultrasonic technique. Hemp fabric was pretreated using cationizing agent (STARCAT PD) under different conditions. The best suitable condition for pretreatment with cationizing agent was at 60 °C for 30 minutes and 10 % owf. concentration. Hemp fabric was dyed using the water extract obtained from coffee sludge under different parameters i.e. temperature, time and dye concentration. The results show that the optimize condition of temperature and time of dyeing were 60 °C for 60 minutes. The suitable result was achieved when using post-mordanting process after dyeing. Hemp dyed in the solution extracting from the coffee sludge showed light brown shade. The sample mordanted with alum, copper sulfate, and stannous chloride resulted in light brown, green and yellowish – brown shade, respectively. With ferrous sulfate, the colour dark green. The colour fastness to washing, water, perspiration, and rubbing of hemp fabric treated with and without metal mordants was evaluated and the results showed fairly to good, whereas colour fastness to light was at a fair level.

**Keywords:** natural dye; coffee sludge; hemp fabric, dyeing, ultrasonic technique



## A STUDY OF WICKABILITY OF QUICK DRY INNER WEAR

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### Abstract

Quick dry inner wear products become increasingly popular in the tropical regions with a hot and rainy climate. This study evaluated the quick dry property of three brands (Brand A: online brand; Brand B: general market and Brand C: youth market) inner wear for women available in the market via studying their wicking rates. It was found that Brand C products had satisfactory wicking ability as they claimed, whereas Brand A showed no quick dry property.

**Keywords:** wickability; quick dry; inner wear



## AN ANALYSIS OF RELATIVE HAND VALUE OF QUICK DRY INNER WEAR

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### Abstract

Hand feel properties are importance factor of quick dry inner wears. This study aims to evaluate the hand feel properties of women's quick dry inner wears in the market (Three brands were selected with different market position: Brand A: online brand; Brand B: general market and Brand C: youth market) by studying the relative hand value. The relative hand value was measured according to the standard of AATCC-202. Results analysis showed that Brand B was the optimal product in terms of resilience and smoothness, whereas the softness property for Brand C performed better.

**Keywords:** analysis of relative; hand value; quick dry; inner wear

## **DETERMINE THE THERMAL CONDUCTIVITY AND Q-MAX PROPERTIES OF QUICK DRY INNER WEAR**

**Wenyi Wang<sup>1</sup>, Hin-heng<sup>1</sup>, Lois Yim<sup>1</sup>, Chi-wai Kan<sup>1\*</sup>, Usa Thangtham<sup>2</sup>, Nattadon Rungruangkitkrai<sup>3</sup>, and Rattanaphol Mongkhorrattanasit<sup>2\*</sup>**

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### **Abstract**

Thermal property is an importance factor of quick dry inner wears. This study aims to evaluate the thermal property of womens' quick dry inner wears in the market using three brands of different market position (Brand A: online brand; Brand B: general market and Brand C: youth market) by studying the thermal conductivity and Q-Max value (warm/cool feeling). The thermal conductivity and Q-Max values were measured according to the standard of KES-F7. Thermal conductivity analysis showed that Brand B was the optimal product, while Q-Max results indicated that both Brand B and Brand A had the best product in terms of quick dry property.

*Key Words:* thermal conductivity; Q-Max properties; quick dry; inner wear

## AN EXPERIMENTAL STUDY OF WATER VAPOUR TRANSMISSION OF QUICK DRY INNER WEAR

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### Abstract

Water vapour transmission is an importance factor determining the quick dry property of inner wears. This study aims to evaluate the quick dry properties of womens' quick dry inner wears in the market (three brands were selected: Brand A: online brand; Brand B: youth market and Brand C: general market) by simulating of water vapour (sweat) transmission from skin surface to outer fabric surface. It was found that Brand C product was the optimal choice in terms of water vapour transmission.

**Keywords:** water vapour transmission; quick dry; inner wear



## AIR PERMEABILITY PROPERTY STUDY OF QUICK DRY INNER WEAR

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### Abstract

Air permeability is an importance factor determining the quick dry property of inner wears. This study aims to evaluate the air permeability of women's quick dry inner wears in the market (Three brands were selected due to their different market position: Brand A: online brand; Brand B: youth market and Brand C: general market) by using the automatic air permeability tester. It was found that Brand B product was the optimal choice in terms of air permeability.

**Keywords:** air Permeability; quick dry; inner wear

## EVALUATION ON THE PROPERTIES OF ULTRAVIOLET RADIATION AND AIR PERMEABILITY OF COTTON T-SHIRTS

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### Abstract

Cotton T-shirts from on-line shop and physical shop were selected for discussion. The final results showed that the quality of physical shop cotton T-shirt were better than online shop's counterpart. The average UPF of physical shop's T-shirt was 12.11 which is higher than that of on-line shop. This means that physical shop T-shirt may perform better than on-line shop counterpart in terms of blocking the sun-rays out and reducing the UVR exposure. The average air permeability of on-line shop was higher than that of physical shop, which means physical shop T-shirt had better air permeability property.

**Keywords:** ultraviolet radiation; air permeability; cotton; T-shirts

## EVALUATION ON THE DURABILITY OF ON-LINE AND PHYSICAL SHOP COTTON T-SHIRTS

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### Abstract

Cotton T-shirts were obtained from on-line shop and physical shop for comparison and discussion on their durability. The final results showed that the quality of physical shop cotton T-shirt was better than on-line shop counterpart. The average warp and weft dimensional changes of on-line shop T-shirt were higher than that of physical shop, whereas physical shop's T-shirt had lower twist level than that of on-line shop after repeated washing. This indicates that physical shop T-shirt performed better in dimensional change and skewness change.

**Keywords:** durability; on-line shop; physical shop; cotton; T-shirts

## COMPARATIVE STUDY OF MOISTURE MANAGEMENT AND THERMAL CONDUCTIVITY PROPERTIES OF COTTON T-SHIRTS BETWEEN ON-LINE AND OFF-LINE SHOPS

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### Abstract

Cotton T-shirts from on-line and off-line shop were selected for this study and their moisture management and thermal conductivity properties were compared. The final results showed that both off-line shop and on-line shop cotton T-shirts had moisture management properties. However, off-line shop's cotton T-shirt was better than on-line shop's counterpart, indicating the wear comfort of off-line shop T-shirt was better. Meanwhile, the thermal conductive property of on-line shop T-shirt performed worse than on-line shop. This indicates that off-line shop's T-shirt is more suitable for daily usage during summer.

*Key Words:* moisture management; thermal conductivity; on-line shop; cotton; T-shirts

## EFFECT OF PLASMA PRE-TREATMENT ON THE DYEABILITY OF SILK FABRIC WITH METAL-COMPLEX DYE

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### Abstract

Plasma modification is one of the most efficient ways for the surface treatment of polymers, since plasma treatment could selectively modify the chemical and the physical properties of the surface of the polymers by not affecting the original bulk characteristics of the polymers. A plasma treatment provides manifold possibilities to refine a polymer surface, enabled by the adjustment of parameters like gas flows, power, pressure and treatment time. Plasma treatment of polymer surfaces causes not only a modification during the plasma exposure, but also leaves active sites at the surfaces which are subject to post-reaction. It has been proved that the hydrophobic characteristic of silk can be promoted with the aid of plasma treatment. This study was a study in exploring the application of plasma technology in the surface modification of silk fiber. After plasma treatment, the silk fiber can be dyed effectively with metal-complex dye.

*Key Words:* plasma; pre-treatment; dyeability; silk fabric; metal-complex dye

## EVALUATION OF THERMAL CONDUCTIVITY PROPERTY OF SOCKS

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### Abstract

Socks fabrics seem a minor clothing in apparel categories but are indispensable item for daily activities for users. The function of socks is either for heat insulation of body temperature in cold weather or heat releasing to keep thermal neutral for foot in hot weather. Socks with good quality are conducive to prevent foot disease or smelly odor from foot. The wearing comfort of socks can be affected by the fabric properties of thermal transfer. The present study aims to investigate the relationship between the fabric parameters and thermal conductivity property of knitted socks fabric. The physical test on commercial socks fabric was carried out in standard condition atmosphere. It was found that the thermal conductivity of fabric was positively proportional to yarn count and thickness.

**Keywords:** thermal conductivity; socks; fabric

## A STUDY OF THE AIR PERMEABILITY OF SOCKS

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### Abstract

Socks are the clothing preserving the foot in thermal neutrality and preventing foot from blister generating. The development of socks has been diversified like the type, materials, and function, etc. Socks with good quality are conducive to prevent foot disease or smelly odor from foot. The wearing comfort of socks can be affected by the fabric properties of air permeability. The present study aims to investigate the relationship between the fabric parameters and air permeability of knitted socks fabric. The ventilation of socks fabric was measured by the KES-F8 automatic air permeability tester. It was found that the air permeability of fabric was negatively proportional to the content of cotton, yarn count and thickness, before washing. Meanwhile, washing was found to increase the air permeability.

**Keywords:** air permeability; socks; fabric

## AN ANALYSIS OF WATER VAPOUR TRANSMISSION ABILITY OF SOCKS

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### Abstract

The present study investigated effects of fabric parameters on the water vapor transmission of socks fabric, which was measured by the cup method. It was found that the water vapor transmission of fabric was negatively proportional to the content of cotton and yarn count, before washing. Meanwhile, washing was found to increase the water vapour transmission.

**Keywords:** water vapour transmission; socks; fabric



## AN EXPERIMENTAL STUDY OF MOISTURE MANAGEMENT PROPERTY OF SOCKS

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### Abstract

The wearing comfort of socks can be affected by the fabric properties of liquid moisture management. The present study aims to investigate the relationship between the fabric parameters and moisture management of sock fabrics. The moisture management of socks fabric was measured by the moisture management tester according to AATCC 195-2012. It was found that the cotton sock fabrics were waterproof before washing. This may be due to hydrophobic treatment. The cotton material seems not to be suitable for moisture transfer.

**Keywords:** moisture management; wearing comfort, socks; fabric

## AN INVESTIGATION OF ABRASION RESISTANCE OF SOCKS

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### Abstract

During wear, socks are subjected to different degree of abrasion which may shorten the life time of the products. This study is aimed to investigate the ability of sock fabrics to resist deterioration or wearing out in use. It was found that the increasing the cotton content of socks leads to an increase in the weight loss of socks, whereas nylon shows excellent performance in abrasion resistance. Washing seems no significant effect on the abrasion resistance.

**Keywords:** abrasion resistance; socks; fabric

## **EFFECT OF PLASMA PRETREATMENT OF DYEABILITY OF SILK WITH ACID DYE**

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### **Abstract**

Plasma technology provides an effective way to modify the surface of polymeric materials and thus improve the physicochemical properties of this material. This study was a preliminary study in exploring the application of plasma technology in the surface modification of silk fiber. Experimental results revealed that the dyeability of silk fabric with acid dye was improved after plasma treatment.

**Keywords:** plasma pretreatment; dyeability; silk; acid dye

## WICKABILITY OF GAUZE PRODUCTS FOR INFANT

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### Abstract

Gauze is an excellent material for infant apparel which can be made in various forms and by a variety of methods, and thus has attracted great attention in the baby care market. This study aims to identify the wicking property of the gauze fabric in baby care products, and to analyse the relationships between the wicking ability and fabric structure of baby soft gauze products. The experimental results revealed that a significant difference occurred for the gauze in the wicking ability. Cotton gauzes were found to show a higher wicking rate than bamboo counterparts because of the higher hydrophilic property of cotton material. The fiber content and structure of fabric were the major parameters that affect the wicking ability.

**Keywords:** wickability, gauze products; infant

## A STUDY OF AIR PERMEABILITY OF GAUZE PRODUCTS FOR INFANT

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### Abstract

Air permeability is a significant factor for textile materials, which can be used to evaluate the breathability of fabrics, especially for the infant fabric products. This study aims to investigate the air permeability property of gauze products for infant. The experimental results revealed that a significant difference occurred for the gauze in the air permeability. The bamboo gauzes were found to show higher air permeability than cotton counterparts due to high interstice spaces.

**Keywords:** air permeability, gauze products; infant

## AN EVALUATION OF HAND FEEL OF GAUZE PRODUCTS FOR INFANT

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### Abstract

Hand feel is an important properties of textile materials. The hand feel can be instrumentally measured as relative hand value which can describe the hand feel of a human touches a piece of fabric. This study aims to investigate the relative hand property of gauze products for infant. The experimental results revealed that a significant difference occurred for the gauze in the relative hand value. The cotton gauzes were found to show higher hand value than bamboo counterparts.

**Keywords:** hand feel, gauze products; infant

## ENZYMATIC IMPROVEMENT OF PINEAPPLE FIBER QUALITY

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### Abstract

This research aimed to compare the improvement of pineapple fiber quality using the pectinase from selected bacterial strain (*Bacillus subtilis* subsp. *inaquosorum* P4-1) with 3 commercially available pectinase in Thailand: Pectinex Ultra Tropical, Pectinex Ultra SP-L and Scourzyme L. The pineapple leaves were first fed into the fiber extraction machine to obtain pineapple fiber as raw material in this experiment. The results showed that among the commercial pectinase used in this study, Pectinex Ultra SP-L produced pineapple fiber with the best quality at ratio of enzyme: fiber = 1:10 (30 g fiber) in combination with 0.75% tergitol surfactant after 1 day of soaking period in a 1 L glass beaker. The same condition was then applied for the improvement of pineapple fiber quality using pectinase from selected bacterial *B. subtilis* P4-1. The resulting fiber showed no significant different with that from the commercial pectinase after the sensory test. In order to expand the experimental size, 10 kg of pineapple fiber were soaked in a 250 L water bath containing pectinase from selected bacterial *B. subtilis* P4-1 under the same condition as earlier. The quality of the resulting fiber was shown to be improved as similar as that from the smaller size experiment.

**Keywords:** enzymatic; pineapple fiber; quality; bacterial strain

## NATURAL INDIGO DYEING USING GLUCOSE AS REDUCING AGENT IN ALKALINE CONDITION FOR COTTON YARN

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### Abstract

Natural indigo dyeing of cotton yarn was studied using glucose-alkaline reducing agent. Parameters of this dyeing condition which were type and concentration of alkaline (sodium hydroxide, potassium hydroxide and sodium carbonate), reduced temperature and time, were investigated for optimum dyeing condition. The performances of the dyeing process were evaluated by measuring the reduction potential and pH of indigo solution after dyeing and the color yield (K/S) and the *L*, *a*, *b* color system of dyed cotton yarn. The optimum reduced temperature for natural indigo with glucose as reducing agent in condition of NaOH and KOH was around at 60-70 °C, but was 70-80 °C for Na<sub>2</sub>CO<sub>3</sub>. In case of the optimum dyeing time for NaOH and KOH, it was 10-30 min, but was 15-30 min for Na<sub>2</sub>CO<sub>3</sub> due to weak base of Na<sub>2</sub>CO<sub>3</sub>. Concerning to K/S and color of dyed cotton yarn, they were not significantly different for both NaOH and KOH condition using glucose reducing agent. However KOH gave more environmentally friendly process and gave reduction potential for rapid dyeing than NaOH. As a result, it can be noted that for the reduction of indigo by glucose reducing agent, a concentration of 20 g/L of KOH, 10 g/L of glucose reducing agent, 2 g/L of dried natural indigo, a reduction temperature of 65 °C for 20 min are the optimum conditions to obtain the best dyeing performance for cotton yarn to apply in the denim woven fabric industry.

**Keywords:** natural indigo; glucose; reduction agent; alkaline condition; cotton yarn

## THE COMPARISON OF MALEIC ACID, ITACONIC ACID AND BUTANE TETRACARBOXYLIC ACID AS ANTI-CREASE AGENT FOR COTTON FABRICS

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### Abstract

In this work, the potential to use compounds having carboxylic acids as anti-crease agents for cotton fibers was studied. Maleic acid (MA), itaconic acid (ITA), and 1,2,3,4-butanetetracarboxylic acid (BTCA) were compared by applying them on cotton fabrics with the esterification catalyst, sodium hypophosphate ( $\text{NaH}_2\text{PO}_2$ , SHP). The combination of carboxyl compounds and SHP performed as a non-formaldehyde cross-linking agents between two cellulose chains. 6%BTCA/6%SHP curing on cotton at 170°C for 2 min was used as a reference. The concentrations of MA, ITA and SHP were varied and the best results for crease recovery were obtained from 8%MA/4%SHP and 8%ITA/8%SHP after curing at 160°C for 2 min. Crease recovery degrees increased in order of ITA, MA and BTCA. The formation of ester linkages between the carboxyl groups of the anti-crease agent with the hydroxyl groups of cellulose was confirmed by FTIR. The breaking strength and tearing strength of the treated cotton fabrics decreased as compared with the untreated counterparts. The treatment of the combination of MA, ITA, BTCA and SHP also affected the whiteness of cotton fabrics.

**Keywords:** maleic acid; itaconic acid; butane tetracarboxylic acid; anti-crease; cotton fabric

## EFFECT OF YARN COUNT AND FABRIC DENSITY VARIATION ON MECHANICAL PROPERTIES OF SILK FABRICS

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### Abstract

Various studies have indicated relationship between physical and mechanical properties of fabrics; however, very few focused on silk fabrics. Thailand has great reputation in producing silk fabrics. This study collected 20 machined-woven silk fabrics from silk manufactures with variation of end use type. Physical properties (weight, thickness, warp and weft yarn density and yarn count) and mechanical properties (bending stiffness and drape) of silk fabric samples were measured and analyzed. Correlation and ANOVA between fabric weight groups were analyzed to investigate the relationship among properties. The results show weight, thickness, warp and weft yarn density, and weft yarn count in relation to drape. The samples were classified into four groups by fabric weight. There were significant effect on thickness, weft yarn count, and drape between fabric weight groups. The detail results are discussed and further recommendations for end use types are presented.

**Keywords:** mechanical properties; silk fabric; yarn count



## DEMAND FACTORS OF NATURAL DYES OF SMEs/ OTOP AND START-UP ENTREPRENEURS FOR TEXTILE PRODUCT DEVELOPMENT

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### Abstract

This qualitative research aimed to study demand factors of using natural dyes for SMEs/OTOP and Start-Up entrepreneurs. The data were collected from survey, i.e. demand, development guidelines and problems of using natural dyes including problems from natural dye material sourcing. The subjects of this research were SMEs/OTOP and Start-Up entrepreneurs that used natural dyes. The research tool was an interview. The interview data were analyzed by using program in order to obtain the important topic for development and improvement of natural dye properties to reach user's requirements. Moreover, the feature benefits of natural dye applications were concerned. The interview results indicated that the demands factors, i.e. limited factors of natural dye using, required properties of natural dyes and also development guidelines of dyes for entrepreneurs

**Keywords:** SMEs; OTOP; Start-Up; Entrepreneur; Natural dye

## **THERMAL INSULATION PROPERTY OF NONWOVEN FROM BLENDED BORASSUS FRUIT FIBER/ POLYESTER**

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### **Abstract**

This research aims to reflect the utilization of Borassus fruit fiber from agricultural waste. The objectives are to produce nonwoven fabric which made of borassus fruit fiber and polyester fiber and applications for insulated materials. Borassus fruit fiber is blended with polyester of which 60-90 % is borassus fruit fiber and 10-40% is polyester. Then the blended fiber is formed and go through needle punching process to produce 3 dimensional nonwoven fabrics that typically results from this process; a thickness of 3 mm, 20 mm and 30 mm and weight of 300 g/m<sup>2</sup>, 250 g/m<sup>2</sup> and 600 g/m<sup>2</sup>, respectively. Nonwoven fabric could be widely used in various applications and found nonwoven fabric (thickness 3 mm, 20 mm and 30 mm.) showed thermal resistance range of 0.0422 to 0.0491 m<sup>2</sup>.K/W, 0.1899 to 0.2016 m<sup>2</sup>.K/W and 0.4470 to 0.5491 m<sup>2</sup>.K/W, respectively. The results showed that Nonwoven fabrics contributed to good thermal insulating properties and performed slightly close to the widely used polyester fibers.

**Keywords:** thermal insulation property; nonwoven; borassus fruit fiber; polyester



## THE STUDY AND DEVELOPMENT OF TOOLS FOR TRANSPORTING CHILDREN AT THE AGE OF 1-3 YEARS

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### **Abstract**

The study and development of tools for transporting children at the age of 1-3 years has a purpose of making children transportation more diversified and more flexible for various scenarios. For this study, we have researched on many topics including the behaviors and the ways a user would deal with child transportation. To increase the choices for the users, we have to change the ways we use to approach our solutions, the materials used in the tools and the production of the products themselves. The selected group for this study is 70 peoples who have a child ranging from the age of 1-3 years and use child transportation tools on a daily basis at Seacon Square Department Store. The survey indicates that most people who took the survey are between 31-40 years and want the product to be easy to use, portable and beneficial for their everyday lives. As a result, we have handed over some questionnaires and analyzed the data into average percentage.

To develop a tool for transporting children aged between 1-3 years, we let our users participate in exchanging thoughts between one and another to be the pathway for analyzing and later fixing the problems. The result from the questionnaires show that those selected groups of people are satisfied with the product because of its flexibility and the materials used in the products are suitable for those groups of children. Furthermore, the product is truly convertable and functional as it could be used both indoors and outdoors.

**Keywords:** development; transporting; children



## A STUDY AND DEVELOPMENT OF THE TAI-LUE'S WOVEN FOR TEXTILE PRODUCT WITH EMBROIDERY TECHNIQUES

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### **Abstract**

The study and development of tools for transporting children at the age of 1-3 years has a purpose of making children transportation more diversified and more flexible for various scenarios. For this study, we have researched on many topics including the behaviors and the ways a user would deal with child transportation. To increase the choices for the users, we have to change the ways we use to approach our solutions, the materials used in the tools and the production of the products themselves. The selected group for this study is 70 peoples who have a child ranging from the age of 1-3 years and use child transportation tools on a daily basis at Seacon Square Department Store. The survey indicates that most people who took the survey are between 31-40 years and want the product to be easy to use, portable and beneficial for their everyday lives. As a result, we have handed over some questionnaires and analyzed the data into average percentage.

To develop a tool for transporting children aged between 1-3 years, we let our users participate in exchanging thoughts between one and another to be the pathway for analyzing and later fixing the problems. The result from the questionnaires show that those selected groups of people are satisfied with the product because of its flexibility and the materials used in the products are suitable for those groups of children. Furthermore, the product is truly convertable and functional as it could be used both indoors and outdoors.

**Keywords:** TAI-LUE's woven; textile product; embroidery

## A COSTUME DESIGN OF LADIES' PARTY STYLE INSPIRED BY THE SHADOW PUPPET FROM NAKHON SRI THAMMARAT

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### **Abstract**

Shadow play, Nang Talung is one famous southern theater culture, developed especially from Nakhon Si Thammarat. Its special characteristic is the presentation shown through the shadow of a torch on a unique puppet character made of cow skin leaning on the back of a fabricated scene. In this study, the researchers aimed to design and present the model designs of ladies' party suits inspired by the shadow casting and characters of the puppets especially through character story. Three qualifications were characterized that were silhouettes, characters of technique and color of the character on the shadow playing, and the identity of traditional Thai grille motif patterns composed of Pra Jam Yam pattern, Kajang Tra Aoy, and Phum Khaobob pattern. Then 5 new models of the lady's party suits were synthesized and developed to have their up-to-date features with today's fashion trends of Balmain Fall / Winter 2017-2018's. From the questionnaire survey of 100 random inquired customers at Platinum Mall, one of five new models of the party suits, Pattern B was attractive with high to 60% while others, patterns A, C, D, and E, displayed lower than 15% (13, 11, 10, and 6%, respectively).

**Keywords:** shadow puppet; ladies' party style; Thai grille motif pattern

## DESIGN PARTY WOVEN WEAR INSPIRED BY PA KAO MAH FROM NONG PHOK DISTRICT, ROI ET PROVINCE, THAILAND

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### **Abstract**

The purpose of the fashion thesis for designing party women wear inspired Pa Kao Mah fabric from Nong Phok district, Roi Et province, Thailand. The Pa Kao Mah fabric became the main material making the whole fashion collection, by the way, the fabric was developed using golden yarns mix with cotton, as well as, the fabric was applied the innovation of water repellency for encouragement the Pa Kao Mah fabric to worldwide.

The tools of making this fashion collection divided into 2 selections. Firstly, the analysis of the Pa Kao Mah such as the construction of weaving Pa Kao Mah fabric, colors, materials, etc. Secondly, the analysis of the structure of Christian Dior by separate into 3 choices such as silhouettes, colors, pattern.

At the result, the structure of Pa Kao Mah fabric with golden yarns and combined the innovation of water repellency, it made Pa Kao Mah fabric new, modern, and fresh. As well as, the silhouettes of the collection was developed from the new look collection's Christian Dior in 1950.

**Keywords:** party woven wear; Pa Kao Mah; fashion design; fabric

## **Poster Session IV**

# **Financial markets, and economic growth**

## THE INFLUENCE OF HEDONISM ON FASHION IMPULSE BUYING BEHAVIOR AMONG TEENAGERS IN THAILAND

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### Abstract

In recent research, Thailand retail market is expected to grow at a compound annual growth rate (CAGR) of more than 6 percent from 2016 until 2020. The economic growth of Thailand shows the predicted growth in fashion retail sector reaching \$ 9.19 billion by 2020, growing at a CAGR of more than 3 percent. An increasing demand for clothing among teenagers in Thailand has become interested to explore. Moreover, there is an influence of hedonic motivation to their impulse buying. The purpose of this research is to study the influence of hedonism on fashion impulse buying behavior among teenagers in Thailand. The research tool used in is a mix-methodologies approach involves an analysis and observation. It used analysis of a chi-square test with the sample of 100 teenagers. The chi-square results show of  $p < 0.01$  indicates a strongly significant of the hedonism with regard to fashion impulse buying behavior among teenagers in Thailand. In-depth interview finds the respondents are agree to buy fashion due to gain adventure, stimulation, and excitement. The respondents also said go shopping to cope and reduce stress, to elevate their mood, to follow fashion trend, to find the perfect gift for others, and shop when there are discounts. This finding and its dimensions have an impact on impulse buying, which will affect CAGR and finally economic growth

**Keywords:** Hedonic, Impulse Buying, Fashion, Teenagers, Thailand.

## **COST EFFECTIVENESS IN MEASURES FOR CONTROL OF H5N1 AVIAN INFLUENZA DISEASE IN THAILAND**

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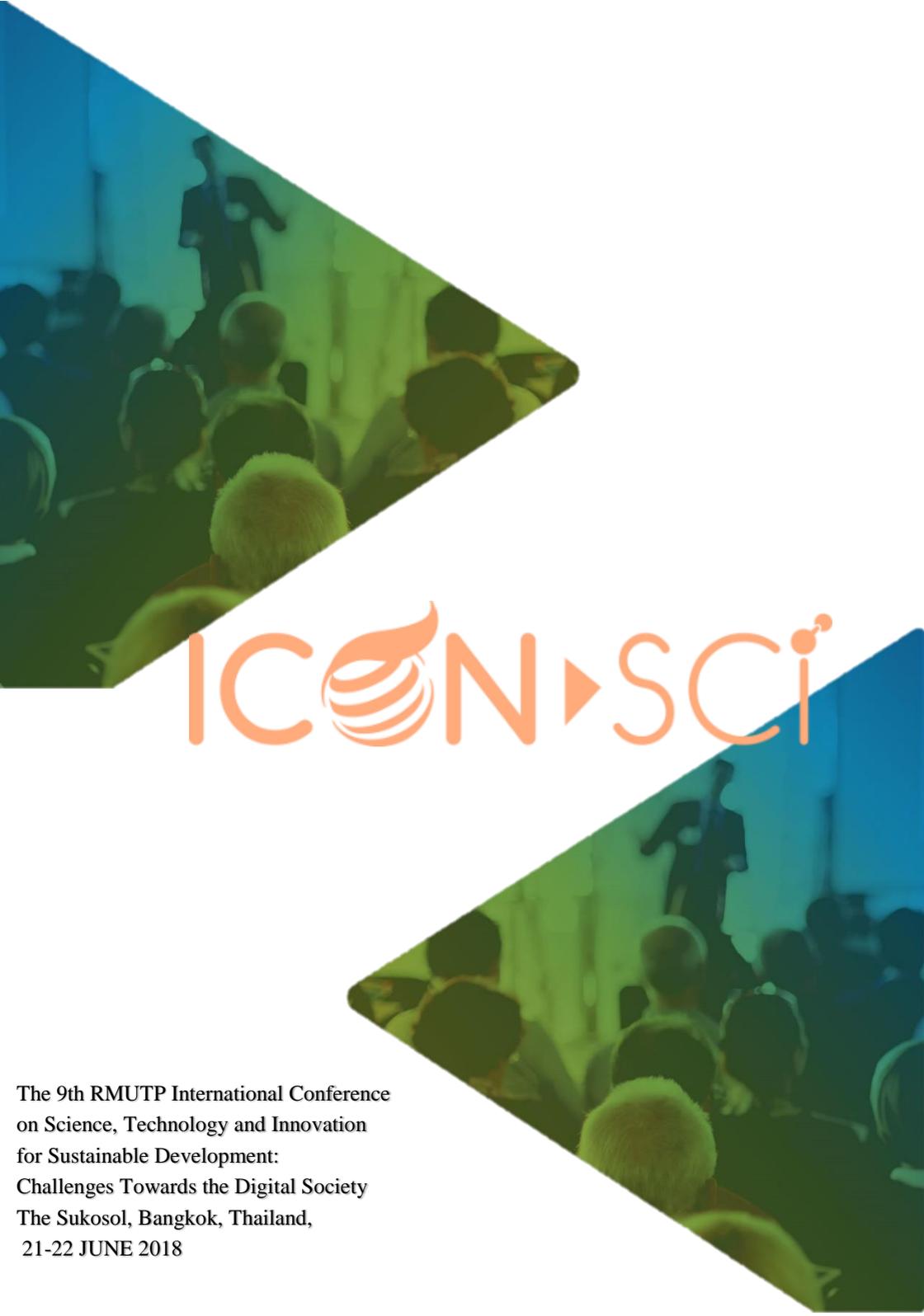
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### **Abstract**

H5N1 Avian Influenza (bird flu, AI) is one of emerging infectious disease, which normally passes through wild aquatic poultries such as broilers, layer chicken, meat-type duck, and layer duck, causes highly-negative impact on the world economy. In 2007 of Thailand, the virus brought massive losses into economic poultry industry in Suphanburi and Lopburi provinces. Its infectious emerging and epidemic patterns conveyed serious concerns due to the difficulty in prevention of this flu disease. In the study, the practical control and monitoring measures for the disease were developed to predict and introduce tentatively good practices for control of this disease based on the previous prevention of the world wide spread associated emerging diseases. A case study for this disease in Suphanburi province in 2017 was selectively compared with its previous 10 year databases. The Cost and Benefit approach was applied to estimate the cost and effectiveness of the measures for control of this bird flu. In addition, the analysis based on the livestock office data as well as costs related to the process and activities for controlling the disease were determined. The results showed that these required measures were dependent on numerous factors related to the animal behaviors, the pathway of disease spreading, weather, and personal practices. Therefore, the effective measures factors obtained from the study of emerging Avian Influenza disease in Thailand could be monitored and should be done to help in-time eradicate the disease and bring back the economic values and long term investment value.

**Keywords:** Avian influenza, Cost effectiveness, Effectiveness

The background of the cover features a photograph of a conference or presentation. A speaker is visible on a stage in the upper left, addressing an audience. The image is overlaid with a green-to-blue gradient and is partially obscured by two large, overlapping triangular shapes: a green one on the left and a blue one on the right. The main title 'ICON-SCI' is centered in orange text.

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