

2013 Joint Research Scheme Program

Project A: Uncovering the dynamic mechanisms in pathogenesis of dengue virus infection

Date: 2013/03/28 (year /month/day)

1. Hosting Center/College

Center of Infectious Disease and Signaling Research

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4. Project Details

Project Description	<p>Dengue fever, caused by infection with dengue virus, is not a new disease, but recently its serious emerging health threats, coupled with possible dire consequences including death, have aroused considerable medical and public health concern worldwide. Today, dengue is recognized as the most important arthropod-borne viral disease in humans in terms of morbidity and mortality. The Bureau of Health sectors or Ministry of Public Health have listed dengue virus as an important priority infectious pathogen. The recent outbreaks in Southeast Asia neighborhoods and Taiwan highlight the potential of dengue virus spread to the every corner of the world, potentially threatening the burdens of economic development in the region. It has estimated that 50 to 100 million new dengue infections occur annually. Among these, there are 200,000 to 500,000 cases of potential life-threatening dengue hemorrhagic fever (DHF)/dengue shock syndrome (DSS), characterized by thrombocytopenia and increased vascular permeability. The death rate associated with the more severe form DHF/DSS is approximately 5%, mainly in children under ages of 15 in dengue endemic countries, while adults are the dominant population in non-endemic country, such as Taiwan.</p>
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Dynamic clinical manifestations in dengue patients have been registered and consequently dengue is one of the most difficult diseases to be diagnosed and treated timely by attending physician. Currently, there are no antiviral modalities or vaccines available to treat and prevent dengue. Supportive care with close monitoring is the standard clinical practice. The mechanisms leading to severe dengue remains poorly understood in spite of several decades of intensive efforts and investigations. Multiple factors have been attributed to the pathological mechanisms, but only a couple of these hypotheses are popular in scientific circle, suggesting that many under-appreciated factors are neglected. Therefore, there are several parameters remaining to be investigated and defined to tease out the contributing factor to the pathogenesis of DHF/DSS.

In this SATU 2013 Joint Research Scheme project, we will focus on some of these underappreciated parameters that may play an essential role in a combination for the pathogenic cause of DHF/DSS. The research components will include the following elements in collaboration with SATU members.

1. Host factors may contribute to the age factors that define the affected population in different regions of the geographic location. We will study and identify a probable biomarker that can address and differentiate why age difference playing a role in dengue endemic and non-endemic regions. The approach will compare samples collecting from different regions by proteomic and biological analysis.
2. Viral strain differences may have an enhancement property in progression of dengue. We will compare the viral isolates from different regions and full-genome sequencing will be applied and compare the local circulating strain for population difference and severity of dengue disease.
3. Role of hematopoietic stem/progenitor cells in dengue virus infection. Bone marrow suppression is a well-known fact in dengue patients, and yet its contribution to the clinical spectrums and pathogenesis of dengue are largely unexplored. It has been demonstrated that the mass of bone marrow reduced significantly before or during onset of fever, but become hypercellularity at the peak of fever, a time at which patients admitted to clinic or hospital. More recently, it has been documented that bone marrow recipient succumbed to dirt

consequence after transplantation of bone marrow from healthy donors whom developed dengue fever after two days of donation. Furthermore, reports indicate that hematopoietic stem/progenitor cells appear to be a favorable target by dengue virus. These results suggest that the components of bone marrow may engage with dengue virus very early and perhaps intimately. In addition, high viremia in blood donated from healthy individual has been reported, indicating a possible dengue virus carrier and viral latency in these healthy individuals. We therefore would like to launch a more detail and comprehensive study on relationships between hematopoietic stem/progenitor cells and dengue virus. Specifically, we will try to identify the phenotype of hematopoietic stem/progenitor cells infectable by dengue virus and to test the hypothesis on viral latency in hematopoietic stem/progenitor cells.

4. Role of coagulatory factor and autoantibody in dengue disease development. Thrombocytopenia and bleeding are the two major clinical measurable parameters. Abnormal coagulation activities have been well-documented in literature, so does the presence of autoantibody to host coagulatory components in acute serum of dengue patient. How exactly the cross-binding nature contributing to the severity of dengue remains poorly understood. We will utilize state of art technology in combination of available reagents to uncover the relationships with samples collected during dengue outbreak season to dissect the fine element or molecule that these two interact and define the functionality pathways of the consequence.

The ability to identify and distinguish the role player in each category will shed new light on the development of better diagnostic tools, antiviral drug development, and pave a new avenue for molecular processes of immune development in the design and generation of modern vaccines.

2013 Joint Research Scheme Program

Project B: Wave dynamics and sediment transport on adverse and following currents in the estuary and tidal inlet

Date:2013/03/27 (year/month/day)

1. Hosting Center/College

International Wave Dynamics Research Center /Tainan Hydraulics Laboratory, National Cheng Kung University

2. Principal Investigator Personal Information

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4. Project Details

Project Description	<p>Morphology of an estuary or a tidal inlet is very dynamic due to complex hydrodynamics including wave-current interactions (e.g., waves, tidal current, river in-outflow) and input/redistribution of sediments (e.g., sediment plume and erosion). For example, freak waves (rouge or giant waves), they have been described as “holes in the sea” or “walls of waters”. These waves have been long known to be notorious hazards to navigation vessels and marine structures. Furthermore, sediment transport is an important factor in the ecosystem, especially as it contains large amounts of nutrients and organic material, serving as a source of food for organisms. In this project, our aim is to study the dynamics between waves and currents, and further examine their effects on the sediment transport using theoretical, numerical and experimental methods.</p> <p>Experimental tests will be conducted in a wave flume (200m*2m*2m) at the Tainan Hydraulics Laboratory (THL), National Cheng Kung University (NCKU). For the first step, wave dynamics on opposing and following currents with horizontal velocity gradient will be applied to explore:</p>
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(1) **Dynamical cascade generation in surface water waves due to the basic mechanism of Benjamin-Feir instability.** Conditions for appearance of direct and inverse cascades will be investigated, as well as conditions for stabilization of the wave system due to cascade termination.

(2) **Laboratory and model studies of giant waves, detailed analysis of the nonlinear wave dynamics responsible for the freak wave appearance.**

It has been found that the occurrence of freak waves is actually more frequent than rare. In areas where there are spatially non-uniform currents, the wave-current interaction could concentrate wave energy in a small area due to reflection and/or refraction. The occurrence of freak wave and its repeatability will be examined in the wave flume test with current.

(3) **Nonlinear surface wave dynamics on adverse and following currents with horizontal-velocity gradient.** Around the blocking point, the wave climate transits rapidly from steepening waves prior to the blocking point (due to the reducing group velocity) to decaying waves beyond the blocking point. The limitations of linear modulation model (e.g., such as linear dispersion relation and fixed blocking point) are limited to completely describe complex phenomenon. We will develop the theory of modulation instability of waves on current, amplification, reflecting and breaking of waves on adverse currents with horizontal velocity gradients in conditions which allow for propagation of the waves across the gradient, and in following currents with the gradients.

Furthermore, the results obtained from above mentioned will be the base for advanced investigation on sediment transport in the estuary and tidal inlet areas. Hereto, we will focus on the mechanisms of initial deposition is the convective sedimentation of hypopycnal plumes, processes affecting vertical sediment flux and interactions between waves and tidal flow that can affect re-suspension and re-distribution of sediment near inlet/river mouth.

2013 Joint Research Scheme Program

Project C: Drifting and rooting of Min-Nan immigrant society: A comparative study in Min-Nan culture of Taiwan, Southern Asia, and South-East Asia countries.

Date: 2013 / 4 / 1 (year/month/day)

1. Hosting Center/College

Min-Nan Culture Studies Center

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4. Project Details

Project Description	<p>Our center sincerely invites professional scholars from every nation who are interested in doing research of Min-Nan culture to join the historical process of rooting of Min-Nan immigrant society within countries from the past to contemporary society, and together hold an international, continuous and cross-domain comparative study. In order to fulfill this goal, the center proposes a collective research project: “Drifting and rooting of Min-Nan immigrant society: A comparative study in Min-Nan culture of Taiwan, Southern Asia, and South-East Asia countries.”</p> <p>“Min-Nan culture” not only refers to the local cultural concepts of Southern Fujian. Due to the geographical and historical factors, traditional Min-Nan people had a characteristic of cross-border floating. They left their hometown, some immigrated to the inland of China, and some went abroad; they settled in many districts, integrating with the culture of each district, and kept the cultural characteristics they already had at the same time.</p>
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SATU Presidents' Forum

of Southeast and South Asia and Taiwan Universities
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For long, “Min-Nan culture” has crossed over nations and borders, spreading from Quanzhou, Zhangzhou, Xiamen, Kinmen, Taiwan to East Asia district, forming a large cultural circle. It contains multi-dimension features such as specific people, language, literature, history, thought, folk custom, religion, society, architecture, art, drama, and music...etc.

Since our center was found in April, 2012, we have held several forum activities like “2012 Min-Nan culture International Academic Conference” (which was held in partnership with Research Center for Humanities and Social Sciences, NCKU) and “Similarity and Difference: The comparison of Multi-dimensional culture development from Min-Yue to Taiwan.” We emphasize not only the breadth of Min-Nan culture but also the aspect of its multi-dimensional culture development. We deeply know that Min-Nan culture is not only so-called the culture of “Min-Nan people” but the culture of migrant society which combines original and local, traveling across the oceans and taking root, and is composed of the features both of land and ocean.

Based on this belief, this year, our center would like to continue cross-field and cross-border collective research, gathering domestic and foreign professional scholars to organize a cross-nations research team, and carry out the comparative comparison study of the spreading, integration, and change of Min-Nan culture under different space-time veins. Furthermore, we would set “Drifting and rooting of Min-Nan migrant society: A comparative study in Min-Nan culture of Taiwan, Southern Asia, and South-East Asia countries” as the primary theme and frame the research methodology as the followings:

1. Invite professional scholars from three to four countries and compose a research team to participate in this project.
2. Decide the typical Min-Nan people's village within countries by every professional scholar, and propose the issues related to this project.
3. Collect the issues / topics of the professional scholars and start to do the collective comparative study.

Present the preliminary results of the research during SATU Forum in 2014.

2013 Joint Research Scheme Program

Project D: Reflections on the Models and Roles of University Incubators ~ The Perspective from The Cultural and Creative Industries

Date: 2013/4/1(year/month/day)

1. Hosting Center/College

Culture and Creativity Incubation and R&D Center, College of Planning and Design, NCKU

The Culture and Creativity Incubation and R&D Center (CCIRDC) was newly established in January 2013 under the College of Planning and Design/NCKU. The College incorporates the established departments of Architecture (est. 1944), Urban Planning (est. 1971), Industrial Design (est. 1973) and Postgraduate Institute of Creative Industries and Design (est. 2006). The CCIRDC started up as a cross-dept. and cross-disciplinary platform with the initial project funding from the Ministry of Culture- The Arts Sector Incubation Scheme and the Ministry of Education- The Top Academic Excellence Program.

About CCIRDC

Missions:

- Cultivate original incubation service model
- Coach creative entrepreneurship and innovation
- Create cross-border exchange for talents and enterprises
- Connect and deepen cross-sector, cross-disciplinary resource integration

Objectives:

- Ensure sustainable cultural and creative industries development in Taiwan
- Enhance creative competence of individual talent and enterprises
- Extend cultural values as essence of industry competitiveness
- Educate students through cross-sector R&D collaborations

Organization Structure:

- Director: Dean of College of Planning and Design/Prof. Feng-Tien Lin/ Urban Planning Dept.
- Chief Executive Officer: Assoc. Prof. Shuenn-Ren Liou/Architecture Dept.
- R&D Division Chief: Assist. Prof. Hsiao-Ling Chung/ Institute of Creative Industries Design.
The Centre currently operates with R&D, Service Promotion, and Admin Supports divisions.
- Project Managers: Two PMs with design and arts background and experiences.
- Project Partnership: With the partnership from the Tainan National University of the Arts, the Centre

is now incubating cultural and creative enterprises from four industries including: Industrial Design, Visual Arts, Craft, and Performing Arts and Exhibition.

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4. Project Details

Project Description	<p>I: Research Rationale and Context</p> <p>As is well known, Taiwan's economic strength is rooted in its industrial base, which began with labor-intensive traditional agricultural and manufacturing industries from the 50s and the expansion into information communication technology industries by the 90s. However while the rapid industrialization has served to increase the strength of Taiwan's SMEs, which has led to the birth of the 'Taiwan Miracle', yet such advantages have weakened in recent years in the globalized context, and Taiwan thus has been seeking for new paths for economic transformation and sustainability.</p> <p>Given the distinct economic contribution of the 'creative industries' recognized by the UK government since 1998, the Taiwanese government has uphold the concept of creative industries and combined it with 'cultural industries' into the 'Cultural and Creative Industries' (CCI), and regarding it as an engine driving a new economy. Subsequently policymakers' concerns with stimulating such an economy through infrastructure building which favors the knowledge transfer and interactions between the academia/universities and the industries/companies. The rationales of encouraging the university incubators (UI) establishments and hence the start-up entrepreneurship fit comfortably with Taiwanese authorities' pursuit of</p>
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the added-value in terms of industry innovation, and such inclination has resulted in the roles and models of UI becoming increasingly inclusive as well as elusive, which bear critical issues for the policy and industry development.

The notion of UI might operate or function differently in Taiwan/Asia due to the following background: The widespread belief that SMEs remains the backbone of Taiwan's Asian Dragon status and economy growth, which heavily influences its government policies and has left the emerging field of CCI with entrenched industrial and social legacies or liabilities. Also the adoption/adaptation of Western style of CCI development strategies has not been without problems due to differing political, economic, cultural and social circumstances.

Against such background, this joint research proposal is based on the premise that most CCI research in Taiwan has focused on its own or the transplanted Western-style of UI practices. Therefore by bringing together researchers from the southeast and south Asian contexts, the project serves as a starting point to share experience and knowledge at a regional level and to work toward an Asia-focused research agenda on the UI practices in the field of CCI.

II. Research Issues and Questions

Given the above, the project explores the following main issues such as:

- 1) How have the existing UI approaches been developed in the member countries, and what's the distinction between their UI practices in cultivating the entrepreneurship in the CCI and other industry sectors?
- 2) How do universities contribute to the education, trainings and identity formation of CCI entrepreneurs? What's the involved higher education strategy or methodology?
- 3) How do universities position themselves and leverage the related stakeholders /resources in the formation and facilitation of the academia-industry collaborations?

III. Aims and Objectives

These questions will be addressed through a group of multi-disciplinary research participants including academic researchers and industry practitioners to advance

UI knowledge and values through oral and written narratives and practices (personal and organizational). Accordingly the contribution of the proposed project is threefold:

- 1) It offers an alternative approach and opportunity to problematize accepted models by examining the methods employed and pursued by the member institutions;
- 2) By interpreting, contesting and sharing their UI practices, the roles of higher education institutes in nurturing CCI entrepreneurs will be further clarified.
- 3) More broadly, the project network aims to serve as a catalyst and stepping stone to initiating and joining participants in more cross- culture collaborations.

By exploring these areas, the project network and its activities will be of interest to scholars, students and practitioners working in and across a range of fields and will intersect with research funding opportunities from the concerned institutions.

IV. Research Methods

- 1) The investigation method of Case Study could be employed and carried out at member universities to ensure the research participants' in-depth knowledge with the natural settings of their own contexts, and to maximize the richness of transferability of the involved knowledge through joint project activities.
- 2) The subject of the case study and ways of ongoing and on-line research communication can be further discussed and determined.
- 3) Diverse research approaches or mixed methodology and methods are also encouraged.

V. Project Output

As the central aim of the joint project network is to gather a multi-disciplinary group together in productive discussions and interactions that will support and encourage individual and collaborative research projects and educational programs, by the end of the funding period, the project is expected to produce:

- 1) Organized/held a 2 day research event at NCKU for project participants;
- 2) Enabled knowledge exchange across disciplinary, institutional, and international boundaries among project participants;
- 3) Established potential research themes and partnerships for further research

- projects by individuals or teams between and among the project participants.
- 4) Established a collaborative networking mechanism or framework to capitalize and expand upon existing research partnerships to ensure knowledge sharing among the SATU members and beyond.

Note:

The 'Cultural and Creative Industries' identified and recognized by the Taiwanese authorities including the following industries that 'originate from creativity or accumulation of culture which through the formation and application of intellectual properties, possess potential capacities to create wealth and job opportunities, enhance the citizens' capacity for arts, and elevate the citizens' living environment':

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|---|---|
| 1. Product Design | 10. Advertising |
| 2. Digital Content | 11. Branding and Fashion Design |
| 3. Craft | 12. Creative Lifestyle |
| 4. Music and Performing Arts | 13. Architectural Design |
| 5. Movies/Film | 14. Visual Communications Design |
| 6. Broadcasting and Television | 15. Pop Music & Culture Content |
| 7. Visual Arts | 16. Other industries as designated by the |
| 8. Cultural Asset Applications &
Performance/Exhibition Facilities | central competent authority. |
| 9. Publishing | |

2013 Joint Research Scheme Program

Project E: Survey and Research on Fujian Yishan in Southeast Asia

Date: 2013/04/02(year /month/day)

1. Hosting Center/College

NCKU Research Center for Humanities and Social Sciences

2. Principal Investigator Personal Information

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4. Project Details

Project Description	<p>Since its establishment in 2009, the National Cheng Kung University Research Center for Humanities and Social Sciences has been devoted to promoting international and multidisciplinary research on culture and history. Program projects that have been organized and supported by the Center include: "Compilation and Research on Materials and Documents Pertinent to the Study of Minnan Culture" (閩南研究文獻的整理與研究), "The Minnan Temple and Trade Network in Southeast Asia: A Comparative Study of Minnan Communities in Vietnam and the Straits Settlements" (東南亞閩南廟宇及貿易網絡：越南與馬六甲海峽閩南族群之比較研究), and "Survey and Research on Fujian Yishan in Southeast Asia" (東南亞福建義山的調查與研究). All of these projects aim to explore important periods in the history and transnational development of the Minnan people and their culture. The proposed research will expand on the last project, "Survey and Research on Fujian Yishan in Southeast Asia," by launching a project featuring international collaboration under the same title, with a view to attaining a more comprehensive picture of the cultural history of Fujianese immigration to Southeast Asia.</p>
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Scholars in the past paid due attention to the Bukit China Cemetery (三保山墓園) in Malacca, and the Fujian Cemetery at the Fuji Temple (福濟寺) in Nagasaki. Their findings have proven helpful to reconstructing the history of early immigrants from Fujian. By contrast, however, the numerous sites of Fujian Yishan in Southeast Asian countries have been insufficiently investigated. Consequently, the blood, sweat and tears shed by many Fujianese immigrants have faded into the oblivion of desolate graveyards. Such important sites as the Fujian Yishan in Hong Kong, the Chinese cemetery in the Thai Binh Province of Vietnam (越南太平省), and the Fujian Yishan in Kuala Lumpur still require in-depth historical investigation.

We hope that the following objectives can be reached through international collaboration:

- (1) to lay out, by means of the GIS technology, the locations of Yishan in countries or regions represented by researchers who are willing to participate in our proposed project;
- (2) to determine, for the graves dating to earlier eras found in Yishan, the burial years and the familial origins and backgrounds of the people interred within;
- (3) to study the management and funeral customs of Yishan in different locations;
- (4) to obtain statistics regarding the places of origin of individuals interred in the same Yishan, and to compare multiple Yishan so as to determine whether there are kinship ties amongst the deceased interred in multiple locations; and, finally,
- (5) to trace and reconstruct the transnational network established by the cultural and trading activities of earlier immigrants.

As for the history of the Fujianese who sought their fortunes overseas and took part in the development of the country or region in which they settled, it is very likely that the above mentioned studies, especially those on earlier immigrants, will yield illuminating results and uncover hitherto neglected histories.

We hereby earnestly invite scholars from universities in Southeast Asia to share

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our concern with Fujian Yishan in their countries or regions, and to participate in this joint endeavor by conducting careful survey on these precious remnants of the last two centuries. Moreover, this will be an international collaborative project that requires all parties to open-mindedly engage in comparative analysis and research utilizing shared data acquired from the hometown (原鄉) of Fujianese immigrants, as well as from the Fujian Yishan of neighboring countries. The National Cheng Kung University Research Center for Humanities and Social Sciences has already initiated the development of a collaborative platform for the project "Survey and Research on Fujian Yishan in Southeast Asia." We are more than willing to share our experience and resources so that, with your support and partnership, the past, present and future of Fujian Yishan can become the focus of serious scholarly concern.

2013 Joint Research Scheme Program

Project F: Product-Oriented Medical Device Innovation

Date:2013/4/2(year/month/day)

1. Hosting Center/College

Medical Device Innovation Center

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4. Project Details

Project Description	<p>The MDIC was founded at the National Cheng Kung University (NCKU) in Tainan in 2011, a Center of Excellence for medical device innovation sponsored by the Ministry of Education. The MDIC has unique innovation environment through interdisciplinary collaborations among physicians, engineers and faculty from Colleges of Medicine, Engineering, and Management at NCKU and NCKU Hospital to brainstorm innovative concepts. The interdisciplinary collaboration fosters to establish an integrated R&D platform for medical devices based on the past research achievements accomplished at NCKU and Hospitals such as orthopedic surgery, plastic surgery, maxillofacial surgery, dental, rehabilitation devices, biomedical imaging instruments and other related medical devices. The detailed information of the MDIC is at http://www.ncku.edu.tw/mdic/. We are looking forward to have the product-oriented joint research for medical device innovation. Please don't hesitate to contact us for the future cooperation.</p>
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2013 Joint Research Scheme Program

Project G: Capitalizing on Foreign Investments through Science and Technology Parks Development and Management: A South Asian Perspective.

Date:2013/04/02(year/month/day)

1. Hosting Center/College

National Cheng Kung University, College of Management

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4. Project Details

Project Description	<p>Governments initiate several programs to stimulate the appetite for foreign and local capital investments for their respective countries. One such initiative is the development of science and technology parks to encourage business and economic growth in some specific industries, such as semiconductor and electronics manufacturing, business process outsourcing, and research and development in biotechnology and energy production. Furthermore, these parks are developed for the purposes of bringing in foreign investments from multinational companies to do business with the host country.</p> <p>The South Asian region is known to be a leader in such an area. India, Singapore, Malaysia, and Taiwan, for example, have invested heavily on their parks, focusing on R&D and supply chain efficiency of their own high-tech industries. This issue is timely, especially that global third party agencies such as Fitch and Moody's have upgraded the investment ratings of the region, most recently that of the Philippines and Indonesia. This presents an opportunity for the region to</p>
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further improve the status quo of the use of these parks for more sustainable business and economic growth.

However, it has been observed that there can be many different business and economic models to support these science parks, depending on the industry. Furthermore, despite these initiatives, the overall productivity and contributions to the economic value-added, among other things, still remains an unresolved issue.

Our research project proposes an examination and analysis of these different models from the different South Asian countries. We propose a research venue to analyze, compare, and contrast existing business models of science and technology parks developments used within the region to gain learnings, exchange ideas, share insights, and formulate new initiatives and possibly new frameworks to address the two aforementioned issues. What do we know, what works and what does not work, what can we learn, and what can we build on are just some of the fundamental questions our research project proposes to address.

2013 Joint Research Scheme Program

Project H : A Study of Catalytic Pyrolysis of Castor Meal and Oleochemicals Production from Castor oil

Date:2013/04/02(year /month/day)

1. Hosting Center/College

Research Center for Energy Technology and Strategy

2. Principal Investigator Personal Information

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4. Project Details

Project Description	<p>Castor is one of the world's top ten oil crops. Castor bean contains rich castor oil. After two stage pressing process (cold pressed and hot pressed), it can get 50% castor oil and 50% castor meal. However, castor meal still has residual oil due to the mechanical limitation. There are two parts in the project. The first part is to extract the residual oil from castor meal by thermal pyrolysis. The second part is to refine the pressed castor oil to high valuable products.</p> <p>In this project, the thermal pyrolysis processes of castor meals will be completely studied. The study parameters include material size, heating temperature, pressure, catalysts and different carrier gas, etc. The Taghchi method is used to find optimal condition for the production of pyrolytic oil. This project will also test a variety of low-cost catalysts to improve the thermal pyrolysis processes</p>
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🌐 : <http://conf.ncku.edu.tw/satu>

and seek to optimize pyrolysis process.

In the refinery of castor oil part, we use alkali pyrolysis to produce sebacic acid and accompanied byproduct 2-octanol. Effects of alkali pyrolytic temperature, reaction time and the concentration of sodium hydroxide on alkali pyrolysis are investigated.