行政院所屬各機關因公出國人員出國報告書

（出國類別：其他）

參加第二屆中泰農業科技研討會

服務機關： 國立屏東科技大學

出國人員： 周昌弘校長、楊盛行副校長、古源光、黃卓治、許祥純、蔡碧仁、陳和賢、夏良宙、林美貞、李秀菊、鍾玉龍、莊秀琪、辛竹英、翁韶蓮、李錦育

出國地點：泰國曼谷（Bangkok）

出國期間：92 年 12 月 7 至 92 年 12 月 11 日

報告日期：93 年 3 月 9 日

系統識別號:C09205234

公 務 出 國 報 告 提 要

頁數: 76　含附件: 是

報告名稱:

參加第二屆中泰農業科技研討會

主辦機關:

國立屏東科技大學

聯絡人／電話:

曾薇之／7703202-6109

出國人員:

辛竹英　國立屏東科技大學　植物保護系　副教授
翁韶蓮　國立屏東科技大學　水產養殖系　副教授
鍾玉龍　國立屏東科技大學　森林系　副教授
周昌弘　國立屏東科技大學　校長
楊盛行　國立屏東科技大學　生物科技研究所　教授
古源光　國立屏東科技大學　食品科學系　教授
黃卓治　國立屏東科技大學　食品科學系　教授
許祥純　國立屏東科技大學　食品科學系　副教授
林美貞　國立屏東科技大學　畜產系　副教授
陳和賢　國立屏東科技大學　食品科學系　副教授
蔡碧仁　國立屏東科技大學　食品科學系　副教授
李錦育　國立屏東科技大學　水土保持系　教授
夏良宙　國立屏東科技大學　畜產系　副教授
莊秀琪　國立屏東科技大學　獸醫學系　副教授
李秀菊　國立屏東科技大學　技藝訓練中心　助教

出國類別: 其他

出國地區: 泰國

出國期間: 民國 92 年 12 月 07 日 -民國 92 年 12 月 11 日

報告日期: 民國 93 年 02 月 06 日

分類號/目: F0／綜合（農業類）　F0／綜合（農業類）

關鍵詞: 泰國農業大學, 農業科技, 研討會

內容摘要: 本校於八十七年九月與泰國農業大學Kasetsart University（KU）簽訂姊妹校並進行學術交流，迄今兩校互動頻繁，曾進行多項實質交流，如：跨國研習會、交換學者、交換學生及計畫合作，對促進雙方學術交流合作奠下深厚之基礎。爲落實雙方之學術交流，2001年由本校食品科學系率先邀請KU Agro-industry學院的教授，共同舉辦第一屆兩校的學術交流研習會，第二屆中泰學術交流研討會則由泰國農業大學主辦，研討會主題並訂定爲" Global Food Administration: From Production to Processing" ，議程包含兩天之專題演講、討論及兩天之工廠參觀。因考量SARS的防疫，延後議程至2003年12月7日至11日於泰國曼谷舉行，並將交流範圍擴大至農學院相關科系，本校周昌弘校長、楊盛行副校長、食品科學系古源光、黃卓治、許祥純、蔡碧仁、陳和賢，畜產系夏良宙、林美貞、李秀菊，森林系鍾玉龍、獸醫學系莊秀琪，植物保護系辛竹英、水產養殖系翁韶蓮及水土保持系李錦育等十五位教授，於會議中發表研究成果，泰國農業大學方面則有二十一位教授，分別針對生物技術、畜牧產業、農業科技、蔬果加工及穀類及澱粉等五個主要議題發表論文。會後本校不同系別教師則分別至不同

學院參觀，並討論雙方合作事宜；而二天參訪行程中則參觀了Arunyik食用菇農場及QP食品工廠，以了解泰國農業及食品產業之發展。整體而言，本次會議舉辦非常成功，使二校合作關係更加密切，爲持續本校與泰國農業大學的學術交流，本校將於2004年年底配合八十週年校慶，舉辦第三屆中泰學術交流研討會。

摘要

本校於八十七年九月與泰國農業大學 Kasetsart University（KU）簽訂姊妹校並進行學術交流，迄今兩校互動頻繁，曾進行多項實質交流，如：跨國研習會、交換學者、交換學生及計畫合作，對促進雙方學術交流合作奠下深厚之基礎。為落實雙方之學術交流，2001 年由本校食品科學系率先邀請 KU Agro-industry 學院的教授，共同舉辦第一屆兩校的學術交流研習會，第二屆中泰學術交流研討會則由泰國農業大學主辦，研討會主題並訂定為"Global Food Administration: From Production to Processing"，議程包含兩天之專題演講、討論及兩天之工廠參觀。因考量 SARS 的防疫，延後議程至 2003 年 12 月 7 日至 11 日於泰國曼谷舉行，並將交流範圍擴大至農學院相關科系，本校周昌弘校長、楊盛行副校長、食品科學系古源光、黃卓治、許祥純、蔡碧仁、陳和賢，畜產系夏良宙、林美貞、李秀菊，森林系鍾玉龍、獸醫學系莊秀琪，植物保護系辛竹英、水產養殖系翁韶蓮及水土保持系李錦育等十五位教授，於會議中發表研究成果，泰國農業大學方面則有二十一位教授，分別針對生物技術、畜牧產業、農業科技、蔬果加工及穀類及澱粉等五個主要議題發表論文。會後本校不同系別教師則分別至不同學院參觀，並討論雙方合作事宜；而二天參訪行程中則

參觀了 Arunyik 食用菇農場及 QP 食品工廠，以了解泰國農業及食品產業之發展。整體而言，本次會議舉辦非常成功，使二校合作關係更加密切，為持續本校與泰國農業大學的學術交流，本校將於 2004 年年底配合八十週年校慶，舉辦第三屆中泰學術交流研討會。

目次

壹、前言及目的

本校自升格為科技大學以來，即以國際化、專業化及全人化為治校理念與目標，積極推動國際合作之實際交流。除經常舉辦國際性學術研討會外，亦承辦多項推動國際合作研討會，將國際交流經驗與其他學校、機關分享。本校除開創締結新的姊妹校外，亦不斷加強與姊妹校的實質交流，如跨國研習會、交換學者、交換學生及計畫合作等，企盼確切落實國際合作。

泰國農業大學(Kasetsart University, KU)為泰國最古老，且規模最大之農業大學，其學校之發展背景與過程，均與本校相似，目前已發展成以農業為特色之亞洲及世界知名大學。本校於八十七年九月與該校簽訂姊妹校並進行學術交流，迄今兩校互動頻繁，對促進雙方學術交流合作奠下深厚之基礎。這期間曾邀請二位泰國農業大學教授至本校開設泰語與食品行銷課程，另有四批共 29 位交換學生，至本校食品科學系進行為期二個月之短期訓練與研究，本系也有 12 位學生於 2002 年初至泰國農業大學進行一個月的專題研究。在教育部鼎力支持下，2001 年五月一日至六日由本校食品科學系率先邀請泰國農業大學 Agro-industry 學院的教授，共同舉辦第一屆「中泰食品科技交流研討會」，包含兩天之專題演講、討論及兩天之工廠參觀，二校合計十九位教授針對雙方研究特色及成果發表專題報告，會議舉辦成

功，且二校後續之學術交流仍持續進行，爾後此研討會將成為常態性學術會議，由兩校輪流舉辦。

2001 年底為進一步加強雙方教學與研究，本校技術合作處古源光處長於去年底率領三位教授，前往泰國農業大學訪問，同時決定第二屆中泰學術交流研討會將由泰國農業大學主辦，因考量 SARS 的防疫，延後議程至 2003 年 12 月 7 日至 11 日於泰國曼谷舉行，並將交流範圍擴大至農學院相關科系。研討會主題並已訂定為"Global Food Administration: From Production to Processing"，為持續推動本校與泰國農業大學既定之學術合作活動，本校周昌弘校長、楊盛行副校長、食品科學系古源光、黃卓治、許祥純、蔡碧仁、陳和賢，畜產系夏良宙、林美貞、李秀菊，森林系鍾玉龍，獸醫學系莊秀琪，植物保護系辛竹英，水產養殖系翁韶蓮及水土保持系李錦育等十五位教授，於此次會議中發表各人研究成果，達到與泰國農業大學在不同學門全面交流之願景。會議結束後，不同科系的教師，將至與其專長相關之科系參訪，除了解各系之發展方向與研究重點外，亦討論未來雙方可行之合作方案，持續雙方學術交流合作。另在會議結束之後，參觀數家工廠，以了解泰國農業產業之發展現況，提供本國業者前往泰國投資產業之訊息，達到以學術交流促進農業產業投資國際化之目標。

貳、參加會議概要

12 月 7 日 （日）	本訪問團由本校周昌弘校長及楊盛行副校長率領食品科學系古源光、黃卓治、許祥純、蔡碧仁、陳和賢，畜產系夏良宙、林美貞、李秀菊，森林系鍾玉龍、獸醫學系莊秀琪，植物保護系辛竹英、水產養殖系翁韶蓮及水土保持系李錦育等十五位教授，於高雄小港國際機場搭乘中華航空班機，前往泰國曼谷泰國農業大學參加第二屆中泰農業科技研討會。歷經三個小時的飛行，曼谷市的全貌已盡收眼底。泰國農業大學特別派遣主管國際事務的副處長 Dr. Chintana 及 Dr. Somjet 前來接機。
12 月 8 日 （一）	經過一整夜充分休息，泰國農業大學一早即派校車至旅館接送本校與會人員至該校行政大樓報到，開始二天的會議。由於此次會議二校共計有 32 篇論文發表，因此大會將議程分為生物技術、畜產加工、農業科技、蔬果加工及穀類和澱粉等五個主要議題，同時分區進行論文發表。會議首先由泰國農業大學校長 Dr. Viroch 致歡迎詞，肯定屏東科技大學與泰國農業大學之間的各項努力及實質合作，並歡迎本校校長及教授參加本次會議，本校則由周昌弘校長感謝泰國農業大學方面會議安排與熱誠接待，並強調兩校已有之合作關係及持續交流之重要性，同時邀請泰國農業大學於 2004 年底參加本校八十週年校慶活動且出席由本校主辦之第三屆中泰研討會。

12 月 8 日 （一）	隨後由本校周昌弘校長發表「植物相剋於台灣永續農業之應用」專題演講，泰國農業大學則由其學術副校長 Dr. Supamard 進行「永續農業環境管理」之演說，二人豐富的研究成果及精闢的演講，獲得與會來賓之廣大迴響，多人發問熱烈討論，為此次會議揭開了精采序幕。 稍作休息後，會議分為生物技術及畜牧產業二個議題同時於二個會議室舉行，生物技術議程由本校學術副校長楊盛行、食品系古源光、許祥純老師，分別發表「台灣生質能轉換技術」、「紅麴米之生產」及「基因改造大豆之檢測」之研究成果，泰國農業大學則由生技系 Dr. Werasit 進行「調味味酥之製造」成果發表。畜產加工議程則共計有四位泰國農業大學教師及本校畜牧系林美貞老師，發表他們對於牛乳及蛋製品之研究成果。 下午會議主題為農業科技，共有九篇論文發表，本校方面由水土保持系李錦育主任、森林系陳朝圳、鍾玉龍老師、獸醫學系莊秀琪老師、植物保護系辛竹英老師、水產養殖系翁韶蓮老師及畜牧系夏良宙老師發表七篇研究成果，內容包含了「河岸水土保持」、「台灣森林多功能經營」、「衛星監測防洪技術」、「細胞接受者研究」、「農藥殘留調查」、「墾丁海域海藻初級生產力調查」及「台灣畜牧廢棄物處理」，涵蓋本校農學院多系研究方向，也提供泰國農業大學與會人士本校之研究資訊，作為未來合作可行方向之參考。泰國農業大學方面，則有木工系 Dr. Sorgkold 發表「合板製造」及生物技術系 Dr. Mangkorn

12月8日 （一）	提出「鮪魚廢棄物作為草蝦苗飼料」之研究。 同時本校食品系因與泰國農業大學已有四年的合作關係，藉由本日下午時間，由本校楊副校長率領食品系與會教師參訪泰國農業大學農工學院(faculty of Agro-Industry)，該院院長親自歡迎，並與其食品系、生技系、新產品開發等系老師及食品研發中心研究人員，與本校教師共同討論未來合作事宜，除繼續二校交換學生計畫，農工學院並歡迎本校年修教授至泰國農業大學進行短期研究，同時雙方亦可藉由共同指導研究生的模式，進行合作計畫。會後一行人即前往泰國農業大學的食品研發中心（Institute of Food Research and Product Development, IFRPD）參觀，該中心為近二年才竣工啟用之九層樓建築，空間寬敞，除有實習工廠生產各項研發產品，各樓層分別設置品評室、實驗動物舍、泰國廚師訓練教室、精密儀器室及小型實驗室，一樓則規劃為展售室，販售水果酒、蜜餞、乾燥蔬果、擠壓食品等研發產品，從研發、製造到販售，使研究人員參與整體流程，在理論與實際並重前提下，培育食品科技人才，值得國內食品界參考。 晚宴由泰國農業大學校長在行政大樓設宴款待，並有泰國農業大學的各級行政主管作陪，除享受泰式美食佳餚外，更有該校學生演奏傳統泰國音樂，二校與會人員愉快交談，可謂賓主盡歡。

12月9日 （二）	第二天的會議分為「蔬果加工」及「穀類和澱粉」二個議題，在「蔬果加工」的議程中，本校食品系陳和賢及蔡碧仁老師分別發表「綠色乾燥之介紹」及「加熱及貯存對花青素聚合及抗氧化能力之影響」兩篇論文，泰國農業大學則由食品研發中心、食品系及新產品開發系等單位老師發表油炸波蘿蜜片、耐熱巧克力、冷凍蝦之品質等六篇論文。「穀類和澱粉」議程中，本校僅有食品系黃卓治老師發表「樹薯澱粉之品質分析」，而本研究為本校與泰國農業大學合作之計畫之一，在本會議中發表，別具意義，其餘八場演講均由泰國農業大學教師發表其在米食加工及澱粉品質研究之成果，就在發表完「穀類和澱粉」議程中所有報告之後，本次會議論文發表部分即畫上完美句點。 會後主辦單位則安排本校與會教師至相關科系訪問，依照各老師專長分別參觀了獸醫學院、漁業學院、森林學院、農學院及螞蟻博物館。除了對各學院所屬系別有初步了解，並明瞭各系發展方向，更重要的是經由參訪而認識許多泰國農業大學教師，建立起日後學術交流的聯繫管道。在參訪過程中亦發現泰國農業大學對其所收集資源的用心維護，在不同學院分別成立不同博物館，如農學院的螞蟻博物館、漁業學院的海洋生物標本館，提供豐富的研究及教學資源，這種建立各學院特色博物館以保存收集資料的管理模式，值得台灣學術單位作一參考。

12 月 9 日 （二）	為體驗泰國文化及欣賞曼谷市容，下午泰國農業大學特別安排 Dr. Somjet 及 Dr. Warasit 陪同我們前往泰國皇宮及柚木行宮參觀，除參觀了金碧輝煌的泰式建築，也感受到泰國人民對泰國皇室尊敬的態度。 晚上由本校周昌弘校長在 Rama Garden 餐廳以中式晚宴回請泰國農業大學校長及與會教師，因為各與會教師均已完成論文發表，所以用餐心情輕鬆，氣氛融洽愉快，大家一同慶祝研討會圓滿閉幕，也相約 2004 年在屏東科技大學舉行第三屆中泰農業科技研討會。
12 月 10 日 （三）	今天進行工廠參觀訪問，早上七點十五分由 Dr. Somjet 及 Dr. Chintana 陪同，出發前往 ARUNYIK 食用菇農場及 QP 食品工廠參觀。ARUNYIK 食用菇農場以太空包直立式菇架培養多種食用菇，包括：鮑魚菇、杏鮑菇、木耳、香菇、洋菇等，頗具規模。該農場除了種植食用菇外，還自行研發及生產多種菇類加工食品，如菇類冰淇淋、菇類抹醬、菇類脆片等，在講求健康的現今社會，此些產品非常受到消費者的歡迎。參觀完 ARUNYIK 食用菇農場後，再經一個小時的車程，來到 QP 食品工廠參觀，此工廠為一 GMP 與 HACCP 認證工廠，由生產部經理負責接待，首先有 30 分鐘的簡介，再進入廠內參觀。QP 食品工廠生產多種食品，包括：沙拉醬、蔬菜罐頭、肉類罐頭、醋、番茄醬、生菜等，除內銷外，亦行銷至東南亞、日本及台灣，每年為泰國賺進不少外匯。

12月11日 （四）	返國當日早上，Dr. Somjit 非常熱心的帶領本校與會教師至曼谷市區購買紀念品，在曼谷吃過中餐後，一行人即驅車前往曼谷國際機場，在機場還碰見專程前來送機的泰國交換學生，非常感動，雙方互道珍重，也相約在 2004 年年底於本校再聚首，共同參加第三屆中泰學術交流研討會。

參、與會心得與建議

1. 本次研討會共有五個議題，36 篇研究成果發表，因採同時間不同場地進行不同議題，所有論文均可於二天內發表完成，且不致使聽眾感覺安排太緊湊，此種議程安排方式，可作為本校舉行大型研討會之參考。

2. 安排各系老師參訪不同科系，了解雙方發展方向及研究興趣，可提供二校各系學術交流之機會。

3. 本校食品系與泰國農業大學農工學院之交流模式，可與本校其他科系經驗分享，使本校與泰國農業大學之合作關係有更進一步的發展。

4. 感謝教育部提供經費使本校農學院及工學院共計十五位老師參加此次研討會，圓滿完成一次整合各系教師的大型學術活動，並希望藉由此次成功的與會經驗，能鼓勵本校更多教師參與國際學術研討會。

5. 泰國農業大學食品研發中心，規劃完善且兼具研究與實做功能，值得國內食品學界與業界參考。

6. 英文溝通流利是邁向國際化大學的第一步

7. 交換學者的陸續展開與交換學生的持續推動，是落實國際化的第

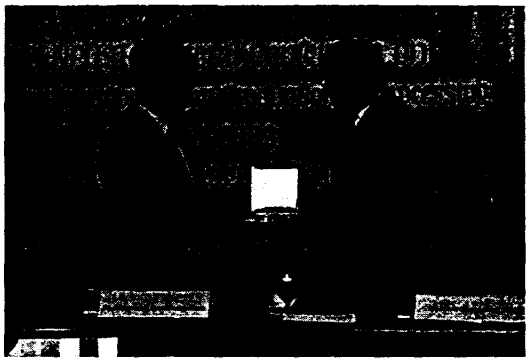
一步。相信藉由實質的學術交流，進一步談研究計劃的合作，應可以收「事半功倍」之效。

8. 希望本校今年八十週年校慶時，可參考此次會議舉行模式，邀請泰國農業大學其他姊妹校參加學術研討會，成立多邊學術交流管道，藉由各校間之學術交流，提升彼此學術水準，並提供學生到姊妹校學習的機會，培育具有國際觀的學生。

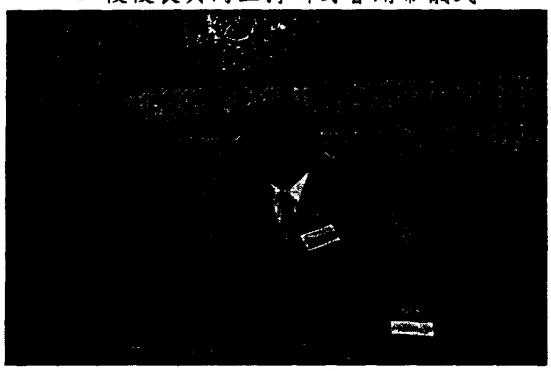
本校與會教授出發前於高雄小港機場合影

與會人士進行報到

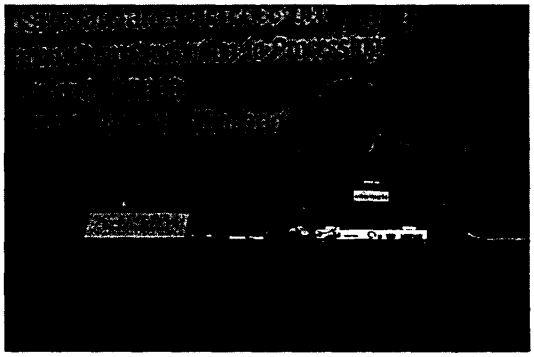
二校校長共同主持研討會開幕儀式



雙方校長互贈紀念品



本校周昌弘校長發表研究成果



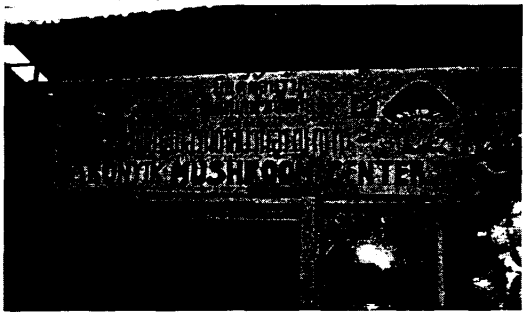
KU 教授 Dr. Werasit 於會中發表研究成果

雙方進行學術合作事宜商討

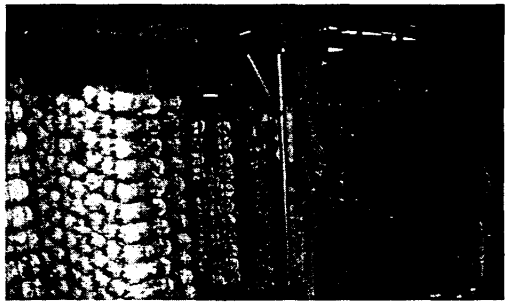
研討會講者與來賓於會場合影

與會人員於晚宴會場合影

本校周昌宏校長設宴回請 KU 與會人員



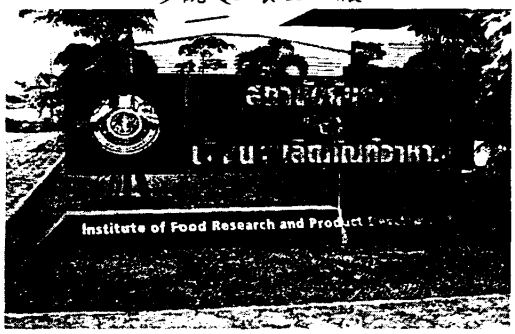
參觀 ARUNYIK 食用菇農場



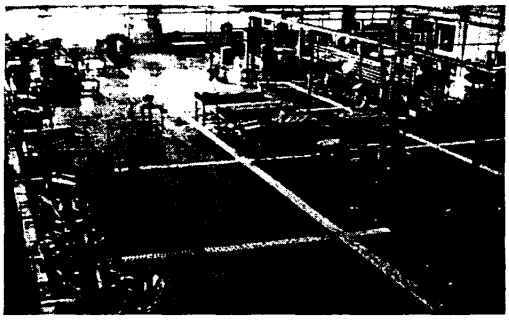
參觀 ARUNYIK 農場之食用菇種植方式

參觀 QP 食品工廠

品嚐 QP 食品廠產品



KU 食品研究中心



KU 食品研究中心實習工廠

伍、附錄

會議論文摘要

60 th Anniversary
Kasetsart University

THE 2ND KU-NPUST BILATERAL CONFERENCE on GLOBAL FOOD ADMINISTRATION: FROM PRODUCTION TO PROCESSING

KASETSART UNIVERSITY

NATIONAL PINGTUNG UNIVERSITY OF SCIENCE AND TECHNOLOGY

ORGANIZED BY
KASETSART UNIVERSITY

2nd KU-NPUST Bilateral Conference on Global Food Administration: From Production to Processing

Golden Jubilee Building
Kasetsart University, Bangkok
December 8-9, 2003

December 8, 2003

Session A: Opening Session & Plenary Keynote

Room: Kamphol Adulavidhaya Conference Room
MC: *Dr. Ravipim Chaveesuk, Division of Agro-Industry Technology Management, KU*

Opening Remarks

09.00 - 09.15 Report on Academic Relationship between National Pingtung University of Science and Technology and Kasetsart University
Dr. Sornprach Tanaisawanyangkura, Vice President of Planning and International Affairs, Kasetsart University

09.15 - 09.45 Welcome Messages
Dr. Viroch Impithuksa, President, Kasetsart University
Dr. Chang-Hung Chou, President, National PingTung University of Science and Technology

Plenary Keynote

09.45 - 10.15 Allelochemicals in Sustainable Agriculture:Taiwanese Experience
Dr. Chang-Hung Chou, President, NPUST

10.15 - 10.45 Environmental Management for Sustainable Agriculture
Dr. Supamard Panichsakpatana, Vice President of Academic Affairs, KU

10.45 – 11.00 Coffee Break

Session B : Biotechnology

Room : Kamphol Adulavidhaya Conference Room
Chairperson : *Vichien Leelawatcharamas, Department of Biotechnology, KU*

11.00 - 11.15 Biomass Conversion Technology in Taiwan
Shang-Shyng Yang,Vice-President of Academic Affairs, NPUST

11.15 - 11.30 Production of Red Mold Rice Using *Monascus purpureus* and a Modified Nagata Type *Koji* Making Equipment
Yuan-Kuang Guu, Director, Center for Developing Countries Studies, NPUST

11.30 - 11.45 Production of Seasoning "Mirin" from Rice by Fermentation
Werasit Kanlayakrit, Department of Biotechnology, KU

11.45 - 12.00 Detection of Round-Up Ready Soybean in Foods by PCR-Based Assay
Shyang-Chwen Sheu, Department of Food Science, NPUST

Session C : Animal Products

Room : 10
Chairperson : *Chintana Oupadissakoon, Department of Product Development, KU*

11.00 - 11.15 Free Thiol Content Analysis in Heated Milk
Somjit Surapat, Department of Food Science and Technology, KU

11.15 - 11.30 Comparisons of Ionic Calcium Concentration and Ethanol Stability in Milks from Cow, Goat and Sheep
Mei-Jen Lin, Department of Animal Science, NPUST

11.30 - 11.45 Reduction of Cholesterol in the Spray Dried-Egg Yolk by Super Critical Carbon Dioxide Extraction
Prasart Footrakul, Department of Biotechnology, KU

11.45 - 12.00 Preparation and Characterization of Eggshell Calcium Chloride
Wanwiboon Garnjanagoonchorn, Department of Food Science and Technology, KU

Session D : Agriculture

Room : 10
Chairperson : *Thammasak Sommartya, Dean, Faculty of Agriculture, KU*

13.30 - 13.45 Integrated Watershed Ecoengineering Techniques for River Bank Protection
Chin-Yu Lee, Head, Department of Soil and Water Conservation, NPUST

13.45 - 14.00 Satellite Technology for Drought Monitoring in Taiwan
Jan-Chang Chen and Chaur-Tzuhn Chen, Dean, College of Agriculture, NPUST

14.00 - 14.15 *Sus scrofa* cDNA for toll-like receptors
Hso-Chi Chaung, Department of Veterinary Medicine, NPUST

14.15 - 14.30 Residues of five pesticides suspected as endocrine disrupting chemicals in water and sediment collected from rice paddy, Taiwan
Chu-Ying Hsin, Department of Plant Protection, NPUST

14.30 - 15.00 Coffee Break

15.00 - 15.15 Study on seaweed community and primary productivity in the Keng-Ting Coral Reef
Saou-Lien Wong, Department of Aquaculture, NPUST

15.15 - 15.30 Potential of Wood Substitution Material for Composite Board; Case Study of Husk
Songklod Jarusombuti, Head, Department of Forest Products, KU

15.30 - 15.45 Multi-Objects Forest Resources Management Progress in Taiwan
Yuh-Lurng Chung, Department of Forestry, NPUST

15.45 - 16.00 Study on Utilization of Tuna Waste as Black Tiger Shrimp Lavae Feed
Mangkorn Rodprapakorn, Department of Biotechnology, KU

16.00 - 16.15 From Livestock Waste to Resource: the Taiwan Experience
Liang-Chou Hsia, Director, Department of Animal Science, ECLWM, NPUST

December 9, 2003

Session E : Fruits, Vegetables, and Etc.

Room : 10
Chairperson : *Tanaboon Sajjaanantakul, Head, Department of Food Science and Technology, KU*
Co-Chairperson: *Anuvat Jangchud, Department of Product Development, KU*

09.00 - 09.15 The Concept of Green Drying
Ho-Hsien Chen, Department of Food Science, NPUST

09.15 - 09.30 Effect of Heating and Storage on the Polymerization and Antioxidant Capacity of Anthocyanin
Pi-Jen Tsai, Department of Food Science, NPUST

09.30 - 09.45 Analysis of Various Natural Ferric Binding Substances in Thai Local Vegetables
Winus Puminat, Institute of Food Research and Product Development, KU

09.45 - 10.00 Packaging of Fried Jack Fruit Chips for Sales Promotion
Sineenart Chariyachotilert, Department of Packaging Technology, KU

10.00 - 10.30 Coffee Break

10.30 - 10.45 A Comparison between Chilli Varieties for Canned Green Chilli Pickle
Kulvadee Trongpanich, Chowladda Teangpook, Udom Karnjanapakornchai, Ngamjit Lowitoon, and Urai Paowsungthong, Institute of Food Research and product Development, KU

10.45 - 11.00 Utilization of W/O Emulsion System in Heat Resistant Chocolate
Siree Chaiseri and Supattra Soontornsattien, Department of Food Science and Technology, KU

11.00 - 11.15 Shelf Life Studies of Dried Shrimp in Laminated Packaging
Chintana Oupadissakoon, Wanniya Sopakdi,Jirawan Yamprayoon and Thongchai Suwonsichon , Department of Product Development, KU

11.15 - 11.30 Use of Peroxyacetic Acids to Enhance Microbial Safety of Frozen Shrimp
Warapa Mahakarnjanakul, Department of Food Science and Technology, KU
Preeya Vibulsresth, Dean, Faculty of Agro-Industry, KU

Session F : Rice Legumes and Starches

Room : 8
Chairperson : *Warunee Varanyanond, Director, Institute of Food Research and Product Development, KU*
Co-Chairperson: *Parichat Hongprabhas, Department of Food Science and Technology, KU*

09.00 - 09.15 Morphological and Physicochemical Characteristics of Native and Sour Rice Flour
Sanguansri Charoenrein and Suputta Potisate, Department of Food Science and Technology, KU

09.15 - 09.30 Thermal and Mechanical Characterization of Starches of Bitter and Sweet Cassava
Tzou-Chi, Huang, Department of Food Science, NPUST

09.30 - 09.45 Effect of Coating Substances on Texture and Retrograded Properties of Frozen Cooked Brown Rice
Onanong Naivikul and Somporn Srisook, Department of Food Science and Technology, KU

09.45 - 10.00 Effects of Ingredients on Mechanical Properties of Mixed Flour Gels
Parichat Hongprabhas, Department of Food Science and Technology, KU

10.00 - 10.30 Coffee Break

10.30 - 10.45 Chemical Compositions and Functional Properties of Thai Waxy Rice Flours and Starches
Namfone Lumdubwong, Division of Physico-Chemical Process Technology, KU

10.45 - 11.00 Potential Markets and Consumer Behavior of Major Exported Thai Rice Products
Ravipim Chaveesuk, Division of Agro-Industry Technology Management, KU
Prisana Suwannaporn, Department of Food Science and Technology, KU

11.00 - 11.15 Utilization of Humectant in Mung Bean Paste
Sukonchuen Sringarm, Department of Food Science and Technology, KU

11.15 - 11.30 Using of Extrusion Process for Preparation of Instant Cereal Beverage Powders based on Corn and Soybean
Chulaluck Charunuch, Pracha Boonyasirikool and Chowladda Tiengpook Institute of Food Research and Product Development, KU

11.30 - 11.45 Effects of Steam Conditioning Temperature on Physical and Chemical Properties of Cassave Pellets
Natchanok Amornthewaphat, Division of Physico-Chemical Processing Technology, KU

Session A: Opening Session & Plenary Keynote

Plenary Keynote

Chang-Hung Chou
Supamard Panichsakpatana

Allelochemicals in Sustainable Agriculture:Taiwanese Experience

Chang-Hung Chou

ABSTRACT

Allelochemicals are metabolites released from plants, microorganisms, insects or other organisms that might be beneficial or detrimental to the growth of receptor organisms. These compounds are involved in the environmental complex of managed or natural ecosystems. Plant allelochemicals, specifically called allelopathy compounds, have been shown to play important roles in the determination of plant diversity, dominance, succession and climax vegetation of natural vegetation and in the plant productivity of agroecosystems. The overuse of synthetic agrochemicals often causes environmental harzards, an imbalance of soil microorganisms, nutrient deficiency, and change of soil physicochemical properties, resulting in a decrease of crop productivity. The incorporation of allelopathic substances into agricultural management may reduce the use of synthetic herbicides, fungicides, and insecticides and lessen environmental deterioration. We have previously demonstrated several cases regarding the role of allelopathy in subtropical agroecosystems and natural vegetation, for example, *Acacia confusa* plants in particular have been recently studied to see the practical application of using the plant parts and their allelopathic compounds as natural herbicide. Furthermore, a case study of pasture-forest intercropping system was demonstrated that could be used as a model for forest management. After the deforestation of coniferous or hardwood forests, a pasture grass, kikuyu grass *(Pennisetum clandestinum)*, was transplanted into the land. Significant suppressior of weed growth by the kikuyu grass was found; however, the growth of coniferous or hardwood plants was not suppressed but stimulated. The aforementioned examples as well as other unique examples from many parts of the world have clearly shown that allelopathy plays a significant role in sustainable agriculture including forests. Therefore, research onto allelochemicals in sustainable agriculture for the twenty-first century should focus on the following points: (1) continuous survey of the potential allelochemicals from natural vegetation or microorganisms, (2) the establishment of practical ways of using allelchemicals in fields, (3) to understand the mechanism of action model of allelochemicals in receptor organisms (4) to understand the role of allelochemicals in biodiversity and ecosystem function, (5) to explore advanced biotechnology for allocation allelochemical genes in plants or microorganisms for biological control, and (6) to challenge the natural product chemists to develop a better methodology for isolating allelochemicals or their degraded compounds from the environment, particularly the soil environment.

Key words: Allelochemicals, allelopathy, sustainable agriculture, phytotoxin, biochemical interactions, agroecosystem, agrochemicals, phenolics, terpenodis, alkaloids, flavonoids.

President, National Pingtung University of Science and Technology, Pingtung 91207, TAIWAN

Session B : Biotechnology

Shang-Shyng YANG
Yuan-Kuang GUU
Werasit Kanlayakrit
Shyang-Chwen SHEU

Biomass Conversion Technology in Taiwan

Shang-Shyng Yang

ABSTRACT

Agricultural wastes contain high moisture content and can be converted to useful agricultural and industrial products by microbes. Starchy and cellulosic agricultural wastes inoculated with yeasts, fungi and actinomycetes and incrementally added nitrogen sources. Produced 15 to 32.4% of protein after 2 to 5 days incubation by solid-state fermentation. For enzyme production, each gram of sweet potato residue yielded 137 to 1056 units of protease. While each gram of corncob produced 18-47, 7-10, 15-34 and 11-24 IU of Avicelase, -glucosidase. CMCase and filter paper activity, respectively. For antibiotic production, each gram of substrate produced 4.7 mg, and 8-12 mg of tetracycline and oxytetracycline with *Streptomyces viridifaciens and S. rimosus*, respectively. Histidine, sodium glutamate, soybean oil and methionine stimulated antibiotic production. Rice bran at C/N ratio of 18.5, each gram of substrate produced 20.6, 5.6, 12.8 and 63.9 g of arachidonic acid, eicosapentaenoic acid, docosahexaeiioic acid and polyunsaturated fatty acids, respectively. Compost or biofertilizer could be produced with the inoculation of appropriate thermo-tolerant microbes which increased the decomposition rate, shortened the maturity period and improved the compost (or biofertilizer) quality. The annual methane flux from paddies, uplands, enteric fermentation, animal waste and municipal waste was 25,678, 721.3, 34,922, 56,277 and 2,075 ton in 2000, respectively. It is estimated that electricity generated from methane is 0.209 MKLOE and from biomass is 1.601 MKLOE in 1998. The value is 18.08% of total renewable energy in Taiwan. From the mentioned statement, it can be concluded that biomass can be converted to compost, biofertilizer, single-cell protein, enzyme, antibiotic, polyunsaturated fatty acid, methane and energy by appropriate microbes in Taiwan.

Key words: Biomass conversion; methane generation; single-cell protein; enzyme; antibiotic; polyunsaturated fatty acid; renewable energy.

Vice-President, Institute of Biotechnology, National Pingtung University of Science and Technology, Pingtung 91207, TAIWAN
Department of Agricultural Chemistry, National Taiwan University, Taipei 10617, TAIWAN

Production of Red Mold Rice Using *Monascus purpureus* and a Modified Nagata Type Koji Making Equipment

Chiu, C. S.[1], Ni, K. H.[2], Pan, T. M.[3] and Guu, Y. K.[1], *

ABSTRACT

Red mold rice has been extensively used in Chinese processed foods for red color enhancement and neutroceutical supplements since thousands years ago. However, traditional method for producing red mold rice takes very long fermentation time and very high labor costs, in addition to a very large space need, and the quality and efficiency are not consistent and satisfactory. In this research, a commercial white koji making equipment with a rotary perforated bed of 5m diameter was modified for the studies of red mold rice production. Monascus purpureus CCRC 31499 was selected for its high production capacities of monacolin K and red pigment. The selected strain was first cultivated in a 120L submerged type fermentor at 34 and 2vvm aeration with 60rpm agitation for 5 days using 20% liquefied rice porridge as carbon source. The high concentration red mold rice broth (> 3.5 g/mL) was harvested and well mixed with cooked rice to an initial inoculum concentration of 2% v/w. The inoculated cooked rice then was directed into the modified koji making equipment, in which the temperature and humidity were kept at 37~38 and 90% RH, respectively. Air was circulated to remove fermentation heat while the rotary bed was slowly agitated. Lag phase in the large scale fermentation was determined as 16 hours, when koji temperature increased rapidly. Water was directed by falls into koji at 36th hour for keeping moisture content of the rice koji at 50% or above. At the final stage of fermentation, temperature was adjusted to 34 for increasing red pigment production. After 7 days, 1200kg high quality red mold rice was harvested each batch. Labor costs, space, and fermentation time were reduced significantly compared with those made by traditional methods.

Key words: Red mold rice; Nagata koji making equipment; Monascus purpureus; monacolin K; GABA.

[1]Department of Food Science, National Pingtung University of Science and Technology, Neipu, Pingtung 91207, TAIWAN
[2]Taiwan Tobacco and Wine Corp., Neipu, Pingtung 91207, TAIWAN
[3]Department of Agricultural Chemistry, National Taiwan University, Taipei, TAIWAN

Production of Seasoning "Mirin" from Rice by Fermentation

Werasit Kanlayakrit and Metinee Maweang

ABSTRACT

Mirin is a traditional alcoholic seasoning in Japan, made from rice and koji by their digestion with enzyme from koji in 35% ethanol. The investigation of *Aspergillus oryzae* strain and Thai rice varieties which are suitable for fungal growth in koji was carried out. *A. oryzae* strain WM-2 could produced enzyme α-amylase at the highest level. "Leung 11" rice variety was the most suitable for koji preparation because of its unaggregation characteristic which was good for the enzyme activity and Mirin fermentation. The suitable ratio of solid:liquid content for Mirin production was studied and compared with commercial Mirin. The 60:40 was the most appropriate ratio of solid:liquid content because it gave rather pale color and suitable residual alcohol concentration (13 % v/v). This ratio was further used for the determination of the ratio of koji and glutinous rice. The result indicated that 1:7 of koji and glutinous rice content gave good quality Mirin comparable to the commercial Mirin. Based on the scaling-up of koji preparation in koji machine, the results showed that the 36 hours cultivation gave the highest enzyme activities of α–amylase and protease which were suitable for Mirin production. Ten kg of rice koji with 1.0 inch thickness in koji bed gave suitable condition for enzyme production (322.0 units/g dry wt. of α–amylase and 150.82 units/g dry wt. of acid protease). The results from the study was used for pilot scale Mirin production (50 kg) and 90 percent of the test panels accepted the quality of Mirin.

Key words: Mirin, solid fermentation, amylase, seasoning, rice

Department of Biotechnology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

Detection of Round-Up Ready® Soybean in Foods by PCR-Based Assay

Shyang-Chwen Sheu & Yu-Ying Kao

ABSTRACT

The objective of this study was to develop a suitable method for detection of Roundup Ready® soybean (RRS) ingredient in foodstuffs. Both buffer extraction and CTAB precipitate methods could isolate high quality DNA of whole soybean. For the different types of commercial products, buffer extraction showed higher recovery of DNA compared to CTAB method. The GM-f/GM-r primer pair that targeted to foreign gene CaMV 35S promoter and the Le-f/Le-r primer complementary to soybean *Le1* sequence was constructed. Application of individual or both primer pairs in PCR or multiplex PCR could identify the presence of RRS and soybean ingredient in soy-derived foods. The detection limit of RRS was 0.1% RRS by multiplex PCR with two pairs of primers. The sequence of PCR product was identical to the original sequence. Using multiplex PCR could correctly and rapidly distinguish RRS content in light processed samples including tofu, bean curd, soybean powder and soybean protein isolate. Highly processed sample, such as seasoned bean curd, simulated meat product and miso, could be identified the RRS ingredient by single primer PCR. Therefore, the developed multiplex PCR method could be applied for the regulation of 5% GMOs content labeling in Taiwan.

Key words: Roundup Ready® soybean (RRS), multiplex PCR, Cauliflower mosaic virus 35S promoter, *Le1*

Department of Food Science, National Pingtung University of Science and Technology, Neipu, Pingtung 91207, TAIWAN

Session C : Animal Products

Somjit Surapat
Mei-Jen LIN
Prasart Foo-trakul
Wunwiboon Garnjanagoonchorn

Free Thiol Content Analysis in Heated Milk

Pornpimol Muangthai[1] and Somjit Surapat[2]

ABSTRACT

Chemical changes, denaturation of whey protein, lysine contents decrease and *hydroxymethylfurfural (HMF)* formation, occur during pasteurization and ultra high temperature (UHT) processes. These changes act as heat indices of milk and milk products. In the detection of an adulteration of reconstituted milk in milk samples, hydroxymethylfurfural is the index used routinely as a reference. In this study, free thiol contents of raw milk, reconstituted milk and mixed milk samples after pasteurization and UHT processes, were determined. The results revealed that free thiol content can differentiate between raw milk and reconstituted milk. The significant correlation between the percentage of reconstituted milk in mixed samples and free thiol is $r^2 = 0.98$. Thus free thiol content could be a new indicator for detection of reconstituted milk in raw milk.

Key words: hydroxymethylfurfural, HMF, thiol content, reconstituted milk.

[1]Department of Chemistry, Faculty of Science, Srinakharinwirot University, Bangkok 10110, THAILAND
[2]Department of Food Science and Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

Comparisons of Ionic Calcium Concentration and Ethanol Stability in Milks from Cow, Goat and Sheep

Mei-Jen Lin[1], Michael, J. Lewis[2] and Alistair, S. Grandison[2]

ABSTRACT

The aim of this study was to compare the values found for ethanol stability and ionic calcium concentration in milk from cow, sheep and sheep and to understand how this might affect their behaviour during processing. The ionic calcium concentration in milk was measured with a Patterson calcium direction flow cells plus a Ciba Coning 250 pH/ion analyser. The ionic calcium in cows' milk was lower than in caprine milk. In contrast, the ethanol stability was higher in cows' milk than in caprine milk. When comparing milks from cows, sheeps and goats, it was found that cows' milk had the lowest ionic calcium concentration but the highest ethanol stability. Caprine milk had the highest ionic calcium concentration but the lowest total calcium concentration and ethanol stability. Cows' milk with the lowest ionic calcium concentration had a weakest curd firming ability, i.e. longer RCT and weaker CF. Both caprine milk and ovine milk produced excessive sediment during canning, but both showed much greater improvement of ethanol stability than cows' milk following canning, due to reductions in their ionic calcium concentrations.

Key words: Ionic calcium concentration, Ethanol stability, milk

[1]Department of Animal Science, National Pingtung University of Science and Technology, Neipu, Pingtung 91207, TAIWAN
[2]School of Food Biosciences, University of Reading, UNITED KINGDOM

Reduction of Cholesterol in the Spray Dried-Egg Yolk by Super Critical Carbon Dioxide Extraction

Prasart Foo-trakul

ABSTRACT

The reduction of cholesterol in the spray dried egg yolk was studied by using supercritical carbondioxide extraction. Cholesterol contents were determined by gas chromatographic method (GC). The cholesterol content in dried egg yolk has mean value of 2321.40 mg cholesterol/100 g test sample. A statistical 3^3 factorial experiment in completely randomized design was performed to study the effect of factors in reduction of cholesterol in the spray dried egg yolk by supercritical carbondioxide extraction. These factors were 3 levels of CO_2 temperature : 40°C, 45°C and 50°C, 3 levels of CO_2 density : 0.70 g/ml, 0.80 g/ml and 0.90 g/ml and 3 levels of extraction time : 30 min, 45 min and 60 min respectively. The residual content of cholesterol in the spray dried egg, after extraction was determined by GC. Duncan's new multiple range test (DMRT) was used to differentiate treatment means. The results indicated that the factors effecting the extraction of cholesterol in the spray dried egg yolk were CO_2 density, CO_2 temperature and extraction time, respectively in order of importance. Response surface methodology (RSM) was used to determine optimum condition of cholesterol extraction. The processing conditions of 50°C temperature, 0.90 g/ml density, 350 bar pressure and 60 min extraction time gave the optimum condition of cholesterol extraction at 64.07%. Supercritical carbondioxide extraction of the spray dried egg yolk and dramatic effect on proximate composition of the end product. The protein content increased 19.53% and phospholipids content increased 18.74%, but total lipid content reduced 17.39%. The solubility value and emulsifying capacity value of the treated spray dried egg yolk were 16.31% and 292.05 ml of oil/g protein, respectively. Consumer acceptability test indicated that the treated spray dried egg yolk can produce emulsifying product of good quality comparable to the fresh egg yolk.

Key words: Supercritical carbondioxide extraction, Spray dried egg yolks, cholesterol

Department of Biotechnology, Faculty of Agro-Industry Kasetsart University, Bangkok 10900, THAILAND

Preparation and Characterization of Eggshell Calcium Chloride

Wunwiboon Garnjanagoonchorn[1] and Alongkot Changpuak[2]

ABSTRACT

The calcium in eggshells was extracted as calcium chloride using 4% (W/V) hydrochloric acid solution for an extraction period of 3 hours with the ratio of eggshell to hydrochloric acid being 1:15 (W/V). After hydrolysis, the residues were removed by centrifugation at 1774 x g for 10 minutes and the solution was heated to 110-115° C until drying occurred in order to obtain a calcium chloride salt at a yield of 87.38% (W/W). The extracted calcium chloride salt existed as a mixture of $CaCl_2$ (anhydrous) and $CaCl_2.2H_2O$. Proximate analysis of calcium chloride salt from the above process showed 0.3% protein, 0.49% water and 94.37% ash with no lipid present. One gram of eggshell calcium chloride dissolves in 400 ml water; this solution showed pH value of 5.27. Impurities found in eggshell calcium chloride are; arsenic, 0.18 ppm ; a heavy metal (calculated as Pb) not over 20 ppm; fluoride ,15.9 ppm; magnesium and alkaline salt, 1.75%; and no lead.

The eggshell $CaCl_2$ was tested as a firming agent in canned rambutan .Both eggshell and commercial $CaCl_2$ give a firm texture to canned rambutan.

Key words: eggshell, calcium chloride, eggshell calcium chloride

[1]Department of Food Science and Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND
[2]Department of Food Science and Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

Session D : Agriculture

Chin-Yu LEE
Chen Jan-CHANG
Hso-Chi CHAUNG
Chu-Ying HSIN
Saou-Lien WONG
Songklod Jarusombuti
Yuh-Lurng CHUNG
Mangkorn Rodprapakorn
Liang-Chou HSIA

Integrated Watershed Ecoengineering Techniques for River Bank Protection

Chin-Yu Lee

ABSTRACT

For past decades, the near-nature ecological engineering method (NNEEM) in Taiwan due to the lack of whole watershed management concept to rivers has caused part of construction effects need to be tested and verified. The topography of natural rivers is formed by boundary flow and erosion. The river boundary may be eroded with the temporal and spatial scale, so the erosion energy and the deposits status shall be assessed while construction lest rivers cannot develop its own function or even bring the contrary effect. The NNEEM relates wide range field, so this study aims to establish a whole consideration on river, and establish several relevant indicators according to watershed scales, which is separated with creature and non-creature and basically classified an d monitored with the topography, flow velocity, flow rate and water quality. Use quantitative indicators to assess the effect of NNEEM to further comply with construction criteria lest building an unsuitable construction on river and causing second damage to river environment.

Considering local river ecosystem, Taiwan has attempted to perform the river control with the NNEEM for recent years. For past few years, we changed the control method and neglected the existing characteristics and ecosystem for river, so caused the non-coordination and make people unlike to approach it. The Taiwan local cases have been discussed in this paper. Therefore, the river characteristics must be fully realized and carefully assessed to choose the best construction method and ecological concept and establish a river management suitable for Taiwan as controlling the river using the near-nature ecological engineering.

Department of Soil and Water Conservation, National Pingtung University of Science and Technology, Neipu, Pingtung 91207, TAIWAN

Satellite Technology for Drought Monitoring in Taiwan

Chaur-Tzuhn Chen[1*], Jan-Chang Chen[2,3], Chi-Ming Yang[3]

ABSTRACT

This research collected the climate data recorded by 355 precipitation stations all over Taiwan between January 1991 and October 2002, and 54 satellite imageries of NOAA for the period of 1995-2001 as well. Normalized difference vegetation index (NDVI), vegetation condition index (VCI), temperature condition index (TCI), and drought index (DI) were calculated from satellite data. The correlation between precipitation and DI was analyzed. Taiwan was divided into 4 areas , north, center, south, and east, the vegetation were recognized as hardwood forest, softwood forest, artificial softwood forest, grass, and mixed forest. The NDVI of winter (November-January) was the minimum, whereas that in summer (May-July) was the maximum. Therefore, NDVI can reflect the drought condition. There is no difference in DIs among various areas in all seasons, but the northern area showed a slightly higher DI in summer. However, DIs of central and eastern areas were higher than those of northern and southern areas in autumn. Eastern area showed the highest discrepancy between autumn and winter. It is obvious that satellite imageries can offer various information of drought condition and help to develop early prevention.

Key words: Satellite imagery, Geography information system, Drought index, Climate data

[1]Department of Forest, National Pingtung University of Science and Technology, Neipu, Pingtung 91207, TAIWAN
[2]Institute of Tropical Agriculture and International Cooperation, National Pingtung University of Science and Technology, Neipu, Pingtung 91207, TAIWAN
[3]Institute of Botany, Academia Sinica, Nankang, Taipei 115, TAIWAN

Sus scrofa cDNA for toll-like receptors

Chaung, H.C., Chen, T.A., Wu, M.L., Chen, S.C., Chung, W.B.

ABSTRACT

Since more agricultural trades between counties in the world, it's getting more important and urgent to develop advanced and effective vaccines to prevent infectious diseases. Host defense relies on a combined action of both antigen-nonspecific innate immunity and antigen-specific immunity. Key features of the innate immune system include (1) the ability to rapidly recognize pathogen and (2) the ability to signal the presence of danger to cells of the adaptive immune system. Cells of the innate system use a variety of pattern recognition receptors to recognize patterns shared between pathogens. In the adaptive immune system, antigen-presenting cells (APC) play important roles for the activation of naïve T cells and the generation of primary T-cell responses. They are responsible to capture, process and present antigens to T cells. Dendritic cells DCs, the unique APCs, are the only ones that are able to induce primary immune responses and thus establish immunological memory. They recognize antigens by specific toll-like receptors (TLRs). TLR3 recognizes dsRNA, a viral product, where as TLR4 recognizes LPS on gram-negative bacterial walls. TLR9 recognizes unmethylated CpG motifs in the microbial genome. Dendritic cells (DCs) and phagocytes produce IL-12 interleukin-12 in a dependent manner of patterns of TLR expression in response to pathogens during infection. Binding with TLR7 and TLR9 ligands, plasmacytoid dendritic cells express TLR7 and TLR9 and consequentially produce a large amount of interferon (IFN-alpha). Therefore, TLR3, TLR7 and TLR9 may play an important role in detecting and combating viral infections. The binding between pathogen-associated molecules to TLR induces the production of cytokines and chemokines, subsequently initiating the adaptive immunity. At least 12 TLRs have been identified in human and mice. However, little is known about porcine DC despite the fact that they represent an important role at modulating resistance to infection in pigs and none of the porcine TLR genes were published yet. Partial cDNA sequences of three TRLs in pig were done in this study. Our aim of this study is to establish swine TLR cDNA database in order to developed agricultural biotechnology in facilitating immunological research on vaccine and adjuvants.

Department of Veterinary Medicine, National Pingtung University of Science and Technology, Neipu, Pingtung 91207, TAIWAN

Residues of five pesticides suspected as endocrine disrupting chemicals in water and sediment collected from rice paddy, Taiwan

Chu-Ying Hsin

ABSTRACT

Samples of water and sediment were collected from the paddy field of Kaoshing District Improvement Station, Guei Lai area and Syngenta Agricultural Field Station. Twenty four samples were collected every month from February to June and July to November in 2001. Residues of butachlor endosulfan and permethrin were analyzed by gas chromatograph. Residues of carbaryl and carbendazim were analyzed by high performance liquid chromatograph. No residue was found in the field of Kaoshing District Improvement Station because no farming was conducted in this year. The residue of butachlor was the most frequently found pesticide in both water and sediment. Five days after application, the butachlor residues in water from Guey Lai area and Syngenta Agricultural Field Station.were 0.9-1.0ppb and 1.26-2.42ppb respectively; The butachlor residues in sediment from Guey Lai area and Syngenta Agricultural Field Station.were 125-128ppb and 963-2,367ppb respectively. The higher residue found in Syngenta Agricultural Field Station may be caused by the smaller experimental field size. Endosulfan and permethrin were found occasionally. The average residue were below 100ppb.

Key words: endocrine disrupting chemical, butachlor, water, sediment, residue

Department of Plant Protection, Natinal Pingtung University of Science Technology, Neipu, Pingtung 91207, TAIWAN

Study on seaweed community and primary productivity in the Keng-Ting Coral Reef

Saou-Lien Wong

ABSTRACT

The long-term temporary and spatial changes in the seaweed community structure and primary productivity were investigated both on the protected and the unprotected reefs in the Kengting National Park and a fringing reef at Wonliton in 2002. Contents of tissue N and P of dominant seaweeds and their relationships to seawater nutrient status were also examined. Estimation of percentage cover, area biomass, species composition and primary productivity of seaweeds were carried out by 3 vertical shoreline transects which are offshore coral reefs at the interval of 5m once 1-2 months. Three line transects are set at 100-150 m intervals on each sampling site. Each transect, used a nylon line, marked in a interval of 5 m and set from the average high tide mark towards the low tide mark and perpendicular to the shore. Primary productivity was determined by the oxygen method modified by Pai. Photosynthetic oxygen released and respiration of dominant fleshy seaweed (e.g. *Codium* edules, *Enteromorpha* spp., *Sargassum* spp., *Gracilaria* spp., *Laurencia* spp., *Boodlea composite*, etc.) and algal turfs will be measured on dock. The P-I curve of those dominant seaweed were conducted to compare among sites as well as various species. Environmental factors including nutrient contents, irradiance, water temperature, and salinity are also determined at the same time. Abundance (% cover) and distribution of seaweeds are calculated. Environmental factors including nutrient contents, irradiance, water temperature, and salinity are also determined at the same time. The contents of algal tissue N and P are determined and the N and P bioassays are also approached to elucidate the role of nutrients on algal blooming. It showed that sites caused varieties among seaweed composition, cover ratio, primary productivity and P-I curve. Besides, it seemed that seaweeds' productivity was limited by nutrients based on tissue nitrogen and phosphate content.

Department of Plant Protection, Natinal Pingtung University of Science Technology, Neipu, Pingtung 91207, TAIWAN

Potential of Wood Substitution Material for Composite Board; Case Study of Husk

Songklod Jarusombuti

ABSTRACT

The present investigation on potential of wood substitution material for composite board case study of Husk by using various ratio of density and glue in composite board fabrication. The objective of this study is aiming to find out the suitable processing method of composite board.

The experimental showed that the properties such as modulus of rupture, modulus of elasticity, tension perpendicular to surface, swelling in water and water absorption increased as the density and ratio of glue increased. When comparing between the properties of composite board and the requirement of standard specification for flat pressed particle board : medium density (TIS. 876-2532) found that composite board made from density 1,000 kg/m^3 and ratio of glue 10% yield the highest values in the properties.

Department of Forest Products, Faculty of Forestry, Kasetsart University, Bangkok 10900, THAILAND

Multi-Objects Forest Resources Management Progress in Taiwan

Yuh-Lurng Chung and Mean-Lun Lu

ABSTRACT

The purpose of this study is to explain the development of the forestry and the history of the forest resource management in Taiwan. The natural resource in Taiwan is very plentiful, people paid more attention to the operation of forestry in the period of Japan. After recovering, the Forestry Administration started making a plan of reforestation in Taiwan including man-made reforestation, seedbed, and the seedlings imported; therefore the forestry in Taiwan was rising gradually. The natural and artificial forests have expanded gradually and cumulatively, in which the natural forest is the main resource of woods in Taiwan. In earlier period, the income of the public enterprise should be depended on felling trees, the timber industry was very flourishing from 1960 to 1970, and it influenced very much the economic efficiency in Taiwan. But recently, the policy of forestry devoted to conserving territory and natural resource. The fell of the natural forest is lessened greatly. The existing artificial forests, such as national forest, public forest, private forest, conservation area of national resource, are developed efficiently and used with many aims. Nowadays, agricultural society in Taiwan was changed to be an industrial society; the traditional policy of forestry management is inconsistent with the demand of present society. It is not allowed to fell the forest as the financial source, so the management policy is changed to be a multi-objects of forestry management. After carrying out the changed policy by government, the forest will be handled continuously including timber production, forestry playground, territory conservation, natural resource conservation, maintenance of the relations and interactions between organisms and their environment. The forestry economy is not only for producing timbers; it should include multi-products in forest directly and indirectly, and should completely produce a result of "multi-objects and multi-functions" in order to achieve a remarkable forestry development in Taiwan.

Department of Forestry, National Pingtung University of Science Technology, Neipu, Pingtung 91207, TAIWAN

Study on Utilization of Tuna Waste as Black Tiger Shrimp Lavae Feed

Mangkorn Rodprapakorn[1], Thornthan Sawangwan[1], Suriya Sassanarakkit[2], Saeree Jareonkitmongkol[3] and Premsuda Saman[2]

ABSTRACT

Tuna waste was used as a fortified amino acid source for black tiger shrimp lavae feed. It was hydrolysed by using *Lactobacillus brevis* LB43 and *L. plantarum* LP64, which grew rapidly in waste mixed with 10 % molasses. The hydrolysate was added to commercial shrimp lavae feed at 12.5, 25.0 and 50.0 % by weight. And effect of hydrolysate addition on black tiger shrimp lavae's growth rate and survival rate was studied for 28 days. The results showed that addition of 12.5 % of hydrolysate increase both lavae growth rate and survival rate, which higher than commercial feed. The specific growth rate and survival rate of shrimp lavae were 0.0358 g / day and 75.0 %, respectively. Furthermore, additon of hydrolysate into commercial shrimp lavae feed did not affect for water quality in the feed pond but decreased number of *Vibrio* spp.

[1]Department of Biotechnology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND
[2]Thailand Institute of Scientific and Technological Research, 196 Phaholyothin, Bangkok 10900, THAILAND
[3]Department of Microbiology, Faculty of Science, Kasetsart University, Bangkok 10900, THAILAND

From Livestock Waste to Resource: the Taiwan Experience

Liang Chou Hsia

ABSTRACT

It is a question to ask whether livestock and poultry are waste producers or important creatures in the chain of ecology system. It is easy to produce animal products without considering waste management. It is also easy to ban animal production without considering ecology balance of the world. Taiwanese experience on how to shift livestock waste to resource is a very good example: 1. how to let animal play an important role on ecology balance, and 2. what the factor is to influence on the development, 3. which kind of the modern technology we should adopt to help us shift animal waste to resource or how to let livestock and poultry production become important creatures in the chain of ecology system. The topic shift animal waste to resource is not equal to ecology balance, but if we can shift animal waste to resource then farmers will have higher motivation to work on waste management; that is, animal production can play more important role on ecology balance. The purpose of this paper is to report Taiwanese experience on shifting livestock waste to resource, what kind of trouble we have met during these periods and what will be in the future on this subject. Animal waste can be considered as a very good resource. If we can use it properly then the animal waste can play an important role in ecology balance system.

Department of Animal Science, National Pingtung University of Science and Technology, Neipu, Pingtung 91207, TAIWAN

Session E : Fruits, Vegetables, and Etc.

Ho-Hsien CHEN
Pi-Jen TSAI
Winus Puminat
Sineenart Chariyachotilert
Kulvadee Trongpanich
Siree Chaiseri
Chintana Oupadissakoon
Warapa Mahakarnchanakul

The Concept to Green Drying

Ho-Hsien Chen

ABSTRACT

An experimental closed type air dryer associated with a photovoltaic system was developed. The transparent drying cabinet was designed with high transmittance glasses to decrease the reflection of direct beam from the sun, and to offer extra direct solar heating to products in drying process. The output of the solar cells could be DC, or converting to AC by an inverter. Parallel wiring with local electrical grid was necessary to switch if without sufficient backup in batteries in peak operational time. In this paper, lemon slices were dried as samples and compared with hot air drying at 60℃. The results indicated that the dried lemon slices by solar drying showed better general acceptance on the analysis of Lab value, color and aroma.

Key words: Photovoltaic system, solar drying, lemon slices.

Department of Food Science, National Pingtung University of Science and Technology, Neipu, Pingtung 91207, TAIWAN

Effect of Heating and Storage on the Polymerization and Antioxidant Capacity of Anthocyanin

Pi-Jen Tsai and Hsiao-Ping Huang

ABSTRACT

Roselle anthocyanin model system (90, pH2) and mulberry wine stored for 1,3,12 months were used to investigate the relation between polymerization of anthocyanin and its antioxidant capacity. Anthocyanin degradation index (DI), color density, anthocyanin patterns (monomeric, copigmented and polymeric) and antioxidant capacity (scavenging activity on DPPH radical ferric reducing ability of plasma FRAP and Trolox equivalent antioxidant capacity, TEAC), were measured. Results showed that, colour density, FRAP activity and monomeric anthocyanins decreased, while DI, polymeric anthocyanins, and DPPH scavenging effect increased after heating or storage. Statistical analysis showed that polymeric or monomeric anthocyanins were positively related to DPPH scavenging ability or the FRAP activity. Further separation by Sephadex G25 indicated that Fraction I (the largest molecules) and III (the smallest molecules) might be the major contributor account for DPPH scavenging effect and FRAP activity respectively.

Key words: Anthocyanin, polymerization, antioxidant capacity

Department of Food Science, National Pingtung University of Technology and Science, Neipu, Pingtung 91207, TAIWAN

Analysis of Various Natural Ferric Binding Substances in Thai Local Vegetables

Winus Puminat

ABSTRACT

Seventy-five samples of Thai local vegetables which popularly consumed as fresh vegetable are chosen from various menu foods. They are selected and classified into direct components in food dish, eg. *Som tum, Kua yum* etc, including consumed as fresh vegetable together with chilli paste such as *Nuam prig.* In report of analysis, the iron absorption - inhibited substances of various local vegetables which affect to bioavailability by binding with ferric ion are 114.46–244.66 mg of phytate 100 g 455.72–1407.23 mg of oxalic acid 100 g 209.60–528.90 mg of phosphate100 g 175.03–453.06 mg of tannin100 g and 1.0852–2.7273 g of crude fiber100 g by statistical interval estimation (minimum – maximun) at 95% confidence level. In part of edible vegetables, they are found that fruit group has crude fiber content more than the others while edible leaf group has high oxalic acid and tannin content. Tannin of creeper, herb and tree which are orderly average 240, 314 and 584 mg/100g have significantly difference by statistic at α=0.01. Comparison on Pearson 's correlations between oxalic acid with phosphate and tannin with phosphate are Rxy = 0.77 and 0.598 respectively at 99% confidence level.

Key words: Thai vegetable, iron bioavailability, risk chemicals, Ferric binding substance, Iron and Local vegetables

Research and Development Department, Institute of Food Research and Product Development, Kasetsart University, Bangkok 10900, THAILAND

Packaging of Fried Jack Fruit Chips for Sales Promotion

Sineenart Chariyachilert, Monvadee Pasupongsakorn and Narisara Wongsakul

ABSTRACT

Fried jackfruit chips has been designated as an " OTOP " (one-tumbong-one product) of Rayong province in the eastern part of Thailand. Its shelf life was usually limited to 3 weeks due to its oil content and rancidity. In this paper various packaging materials and processes were studied to prolong shelf life and promote sales potential. 75 g of chips were filled in flexible pouches made of HDPE (20μ), OPP/CPP (63μ), OPP/MPET/PE/LLDPE (102μ) and some in PP pouches (92μ) were used as control. Packaged chips were stored at outdoor (28 - 32°C) and in an air-conditioned room (23±2° C). They were sampled to measure for moisture content , TBA number , color and sensory evaluation every week until the product was unaccepted. Chips in metallized pouches and air – conditioned storage were the most accepted sample after 8 weeks with an increase of moisture content from 2.16 to 3.08% , TBA number from 16.38 to 28.08 and L-value from + 56.8 to + 60.7 . This was because the very low WVTR (0.07 g/m2-hr) and OTR (63.5 cc/m2-day) values of the metallized pouches. The insertion of an in-package desiccant of silica gel in the metallized pouch could keep the chip moisture content nearly constant (2.16-2.22%) , while the addition of oxygen absorber named Ageless could slightly reduce rancidity by decreasing TBA number to 24.18. The effect of nitrogen gas flushing before heat sealing of a high barrier laminated pouch made of OPP/PE/paper/tie/Al/PE/LLDPE (117μ) with WVTR value of 0.04 g/m2-hr was also examined . The overall quality of chips was still acceptable up to 12 weeks. Even nitrogen gas did not specially maintain the taste or odor of chips; it only served as cushioning for chips and to promote ease of pouch handling. The outer gift pack for a 50 g pouch and the shipping containers made of corrugated board were designed primarily for sales promotion domestically and for export shipment in the future. The corrugated boxes reduced chips breakage during sales and transportation with an attractive appearance.

Key words: fruit chips, food packages, flexible pouch, gas flushing

Department of Packaging Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

A Comparison between Chilli Varieties for Canned Green Chilli Pickle

Kulvadee Trongpanich, Chowladda Teangpook, Udom Karnjanapakornchai, Ngamjit Lowitoon, and Urai Paowsungthong

ABSTRACT

Twenty six green chilli varieties which were planted at Kasetsart University, were comparatively studied for seeking for the varieties that suitable for using as the pickle's raw material. The samples were fermented and afterward were filled in the clean and dried jars and covered with the hot mixture solution of vinegar, salt, sugar and water. The filled jars were then exhausted in live steam and lid closed. After keeping in the room temperature for 3 months, the samples were sensory evaluated by 15 experinced food tasters.

The sensory evaluation was done into two steps. The first step involved dividing the sample into groups by RBD method and each group contained 5 samples. The second step involved the selection of the samples which received the highest total score in each group and they were sensory evaluated together with canned Bell pepper pickle by the 15 food tasters with RBD. In sensory evaluation, the samples were evaluated for the preference in color, shape, odor, flavor, texture, and the overall acceptability by using hedonic scaling method. The tasters were also evaluated the level of the hot taste of the samples. The samples from the second steps were measured for color by using the Data Color International and texture by using Instron model 1140. The results from the sensory evaluation and the texture measurement were statistically analyzed for the differences by using RBD and CRD, respectively.

It was found that the green Bell pepper got the highest preference scores in flavor and texture, because it contained the very mild hot taste with the firm and thick layer of flesh. CA 952 received the higher scores in color, shape and odor than those of the Bell pepper. However, since it contained more hot taste and less firm tissue than the Bell pepper, its total preference score was ranked into the second. However, these two varieties were not significantly different in color, taste, texture, the overall acceptability and the level of hot taste at $p<0.01$, and in shape and odor at $p<0.05$.

Pilot Plant Department, Institute of Food Research and Product Development, Kasetsart University, Bangkok 10900, THAILAND

Utilization of W/O Emulsion System in Heat Resistant Chocolate

Siree Chaiseri and Supattra Soontornsathien

ABSTRACT

Heat resistant chocolate can be prepared by increasing its water content at least 2 %. Addition of this amount of water directly to chocolate increases product viscosity tremendously. In this study, water was added in the form of water-in-oil emulsions using lecithin and polyglycerol polyricinoleate (PGPR) as emulsifiers. Emulsions that had water:cocoa butter ratio of 4:6 with 0.3 % emulsifiers and emulsions that had water:cocoa butter ratio of 5:5 with 0.5 % emulsifiers were used in this study. Using lecithin resulted in larger droplets (10.5-45.5 μm) and lower stability (34.9 and 58.8 %) emulsions. PGPR produced droplets that were smaller (6.3-14.2 μm) and higher stability (87.6 and 93.7 %). However, there was no difference in viscosity and yield value between the samples that used lecithin and those used PGPR up to 7 %. Increase in emulsion level added to chocolate from 0 to 5, 7, 9, and 11 % caused increases in Casson viscosity and Casson Yield value of the products during mixing. All emulsion added samples exhibit heat resistant ability at 40 °C after solidification. Emulsion system that had water:cocoa butter ratio of 50:50 and 0.5 % lecithin or PGPR gave the highest heat resistant samples. Hardness of the sample gradually increased during 14 days of storage at room temperature. As a result, heat resistant chocolate was harder than typical chocolate in the market.

Key words: chocolate, heat resistant, lecithin, PGPR, viscosity, yield value

Department of Food Science and Technology, Faculy of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

Shelf Life Studies of Dried Shrimp in Laminated Packaging

Chintana Oupadissakoon[1], Wanniya Sopagdee[2], Jirawan Yamprayoon [3] and Thongchai Suwonsichon[1]

ABSTRACT

Dried shrimp, a traditional fishery product of Thailand, is a high value product. However, it deteriorates easily and it has a shorter shelf life when dried. Packaging and storage conditions are important factors affecting the quality of dried shrimp. The moisture sorption isotherm of dried shrimp, which shows the relationship between moisture content and water activity, is used to explain the changes of dried shrimp qualities during storage. It is a generally sigmoid curve as found in other foods. The GAB model was applied to predict the moisture sorption isotherm of dried shrimp. The monolayer moisture content of dried shrimp, calculated from GAB model at a_w 0.25 were 7.2-10.3 % (dry solid basis). In this study, good quality dried shrimp produced from the HACCP certified factory were packed in NYLON/LLDPE laminated bags under vacuum conditions (1.60 baht/100 grams) and under atmospheric conditions with an oxygen absorber (3.33 baht/100 grams). Shelf life of dried shrimp in laminated packaging was studied at 0°C, room temperature (30±2°C), 35°C, 45°C, and 55°C. Samples were taken at different times to determine physical, chemical, microbiological, and sensory qualities. The results showed that dried shrimp stored under vacuum conditions and kept at room temperature (30±2°C) had a shelf life of 70 days, while dried shrimp stored under atmospheric conditions with an oxygen absorber had a shelf life of 105 days. Predicted shelf life of dried shrimp stored under vacuum and atmospheric conditions with an oxygen absorber at 0°C were 248 and 359 days, respectively. Dried shrimp packed in the NYLON/LLDPE laminated bags under atmospheric conditions with an oxygen absorber resulted in better quality products at every temperature studied. A test with 250 target consumers, regarding their intention of buying dried shrimp in NYLON/LLDPE laminated bags with an oxygen absorber, showed that 71.20 % of consumers would buy this product. Further test on price acceptability revealed that only 62 % of the 71.20 %, would buy this product after learning that the retail price of dried shrimp would be 3.50 baht per 100 grams.

[1] Department of Product Development, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND
[2] Faculty of Biotechnology, Assumption University, Bangkok 10240, THAILAND
[3] Fish Inspection and Quality Control Division, Department of Fisheries, Ministry of Agriculture and Cooperation, Kasetsart Campus, Bangkok 10900, THAILAND

Effect of Peroxyacetic Acid and its Mixture to Eliminate Significant Foodborne Pathogens in Shrimp Processing

Warapa Mahakarnchanakul[1], Sasikarn Ungnipakul[1] and Preeya Vibulsresth[1]

ABSTRACT

The objectives of this study were to determine the alternative use of other sanitizers to substitute for chlorine based compounds in order to enhance the safety in a seafood process. Effectiveness of two commercial sanitizers, Tsunami 100, containing peroxyacetic acid and Vortexx ES, containing peroxyacetic acid and peroxyoctanoic acids, were compared for their ability to eliminate foodborne pathogens in washing shrimps. The best decontamintation by using either Tsunami 100 or Vortexx ES, at concentration of 70-110 ppm, for reducing *Listeria monocytogenes, Escherichia coli, Vibrio parahaemolyticus* and *Salmonella* Typhimurium contamination on fresh shrimps, was 1 $\log_{10}$CFU/g, at 90 ppm for 10 min. Washing shrimps at low temperature (4 C) did not enhance effectiveness of both sanitizers compared to ambient temperature (27 C). Effectiveness of these two sanitizers in reducing pathogens were not significantly different but depended on type and load of pathogens. A storage study showed that populations of *L. monocytogenes* and S. Typhimurium in shrimps did not decrease during storage at –18 C for 35 days, whereas *E. coli* count decreased and was not observed after 14 days. These findings indicate that the use of two sanitizers was potentially to decontaminate significant pathogens in shrimps processing and can help prevent the disease transmission in our food chain.

[1]Department of Food Science and Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

Session F : Rice Legumes and Starches

Sangunsri Charoenrein
Tzou-Chi (George) HUANG
Onanong Naivikul
Parichat Hongsprabhas
Namfone Lumdubwong
Ravipim Chaveesuk
Sukonchuen Sringam
Chulaluck Charunuch
Natchanok Amornthewaphat

Morphological and Physicochemical Characteristics of Native and Sour Rice Flour

Sanguansri Charoenrein, Pinthip Rumpagaporn and Sunsanee Udomrati

ABSTRACT

Although Thai rice and rice flours have been used as primary ingredients and functional modifiers in many Thai foods, limited information is available regarding gelatinization behaviors of these rice materials. In this study, we have investigated the gelatinization behaviors and swelling powers of five wet milled Thai rice flours, i.e. Gor Kor 6 (GK6), Khao Dok Mali 105 (KDM 105), Gor Kor 7 (GK 7), Luang 11 (L 11), Luang Prathew (LP) and one commercial (CM) rice flour. It was found that swelling power in term of swelling factor of low; KDM 105, medium; GK 7, and high; L 11, LP and CM, amylose content rice flours gradually increased at temperature range of 50 – 80 °C and then dramatically rose at temperature 80 - 90 °C. However, the irruptively increase in swelling power was shown in waxy rice flour; GK 6, at temperature range of 60 – 70 °C. At 90 °C, it swelled 30 times higher than that at 50 ° C as compared to 3 – 15 times in other rice flours. Hydrogen bonds in amylose component contributed to inhibit swelling of starch granules in hot water. Our results showed that in waxy rice and high amylose rice flours, the beginning of swelling coincided with the onset of gelatinization measured by differential scanning calorimetry. However, in low and medium amylose rice flours, the correlation between these two properties was less pronounced. We also found that the waxy and low amylose rice flours had higher enthalpy of gelatinization which probably due to higher degree of crystallite perfection from amylopectin portion. This indicated that these rice flours required more energy to cook than those with medium and high amylose contents. It was also found that the effect of protein content on swelling and gelatinization was less significant than the effect of amylose content as proved by the swelling and gelatinization behaviors of rice starches of the same variety.

Department of Food Science and Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

Thermal and Mechanical Characterization of Starches of Bitter and Sweet Cassava

A. L. Charles[1] and T. C. Huang[2]

ABSTRACT

Native starches, isolated from bitter and sweet cassava varieties from Thailand, were investigated for their basic rheological, pasting and thermal properties. The sweet cassava starches had higher amylose content (14-23%), final viscosities and setback, but exhibited lower peak viscosity and lower gelatinization temperature range. Temperature-time frequency tests revealed that KU50 and Rayong 5, both bitter cassava starches, showed greater frequency independence whereas the sweet starch varieties, Hanatee and YOO2 exhibited frequency dependency after the 2 hr aging process. The bitter cassava starch, KU50, had highest storage modulus, (G') and tan δ values, followed by the sweet cassava variety, YOO2, during heating but on cooling, Hanatee had higher storage modulus values. These disparities among the native cassava starches were interpreted as a function of their varying amylose content and possibly different structural properties. These were considered to be critical factors in their use for food production and industrial commercial activities.

Key words: cassava, starch, viscosity, amylose.

[1]Institute of Tropical Agriculture, National Pingtung University of Science and Technology, Neipu, Pingtung 91207, TAIWAN
[2]Department of Food Science, National Pingtung University of Science and Technology, Neipu, Pingtung 91207, TAIWAN

Effect of Coating Substance on Texture and Retrograded Properties of Frozen Cooked Brown Rice

Onanong Naivikul and Somporn Srisook

ABSTRACT

This project aimed to produce frozen cooked brown rice to meet the consumer preference, but the fluctuant temperature during frozen might effect to textural properties such as increase hardness. From this reason, The seventh and eighth coating substance were developed to decrease changing quality of three cooked brown rice varieties during frozen storage and 8-15 percent degree of coating was used. Three cooked brown rice varieties: Niaw San-pah-tawng, Khaw Dawk Mali105 and Khao Tah Haeng17 (6.32, 15.65 and 22.62 % amylose content) were coated with two formulas of coating substance. Freezing at –30 ^{0}C and storage at –18 ^{0}C, the frozen brown rices were determined the texture properties, retrogradation enthalpy and sensory evaluation after 5 days freeze-thaw until 5 cycles compared with uncoated cooked brown rice. The results showed that the eighth coating substance was the most suitable to coat three cooked brown rice varieties for decrease changing quality during fluctuated frozen storage.

Department of Food Science & Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

Effects of Ingredients on Mechanical Properties of Mixed Flour Gels

Parichat Hongsprabhas

ABSTRACT

This study was based on the concept of biopolymer mixing, where each macromolecule is excluded from the volume occupied by the other(s), leading to the phase separation that can find its use in multi-phase formulated foods. Mungbean starch in water (10-14.5% w/v) was used as the primary network to provide the three-dimensional matrix stabilized mainly by H-bonds and molecular entanglement of hydrated amylose and amylopectin. The mixed network of gelatinized mungbean starch and fillers; namely rice flour, glutinous rice flour and tapioca starch was altered at different cooking temperature, cooking time and levels of filler substituted or added to yield mixed flour gels with different gel strength. It was found that the rheological properties of the mixed gels containing fillers at the level less than, or equal to, one-tenth of total solid was controlled by cooking temperature and cooking time. The rheological characteristics of mixed gels were further altered in the presence of ι-carrageenan at different calcium lactate concentration (0-20 mM). The addition of ι-carrageenan (0.1-1.0%), a negatively charged hydrocolloid, enhanced phase separation. Nevertheless, at appropriate ι-carrageenan, calcium lactate levels, as well as cooking regime, the mixed flour gel characteristics can be designed to be parallel to those of one another regardless of flour or starch sources and/or cooking temperature. Overall, this study suggested the approach in designing the textural properties of multi-phase food products containing starch and flour as main ingredients.

Key words: gel, starch, flour, carrageenan, rheology

Department of Food Science and Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

Chemical Compositions and Functional Properties of Thai Waxy Rice Flours and Starches

Namfone Lumdubwong

ABSTRACT

The objective of this research was to investigate chemical compositions and functional properties of Thai waxy rice flours and starches. Three waxy rice, RD 6, RD10, and San Patong (SPT) were wet-milled, and rice flours were further analyzed. The waxy rice flours contained 6.7-7.4% protein, 0.36-0.38% fat, 0.22-0.30% ash, and 82-84% total starch respectively. The color brightness of RD 10 and SPT flours (L ~ 95.4) was significantly higher than that of RD 6 flour (L ~ 94.8), whereas RD 6 flour was the highest in yellow hue (b = 1.6). SPT flour contained the highest bulk density (0.5 g/cm^3). All the rice flours studied displayed intermediate gelatinization temperatures (68-70°C), which RD 10 had the highest value (T_p = 70.0°C). Swelling powers of the three waxy rice flours were ranged as followed, RD 10 (40.3 g/g), SPT (37.7 g/g), and RD 6 (34.2 g/g). There was neither significantly difference in solubilities, nor the paste clarity of the three flours. When pasting properties of the flours were determined, the order of pasting peak of the waxy rice flours was identical to that of their swelling powers (RD 10,275.6 RVU; SPT, 227.8 RVU; and RD 6, 199.1 RVU). RD 10 flour contained the highest breakdown value (184.2 RVU), but the lowest setback value (-161.62 RVU). On the contrary, RD 6 flour had the lowest breakdown value (114.0 RVU) and the highest setback value (-89.4 RVU). Waxy rice starches were isolated from the flours by alkaline method. The starches contained 0.2-0.5% protein, 0.08-0.15% fat, and 0.1% ash. Amylose contents of the starches were 2.6-4.0%, depending on the rice cultivars and the methods used. SPT starch had the brightness value (L = 96.4), and all the starches displayed the blue tint hue (b~ -0.55). The bulk density of the starches were ordered as followed, SPT (0.36 g/cm^3), RD 10 (0.32 g/cm^3), and RD 6 (0.28g/cm^3). There was no significantly difference in gelatinization temperatures between the three starches. But, the peak gelatinization temperature (Tp) of the starches, except SPT, was approximately 1-2°C lower than those of flours. SP and solubilities of the starches were significantly higher (SP ~ 53.8-58.9 g/g), and lower (solubility ~3.1-5.3%) than those of flours. However, those values were not significantly different among the starches. RD 10 possessed the highest clarity value, $\%T_{650}$ ~ 26.5% of all the starches. The order of the pasting peak of the starches was RD 10 (301.5RVU) > RD 6 (284.3 RVU) > SPT (256.5 RVU). RD 10 starch had the highest breakdown value (185.9 RVU), whereas SPT had the lowest value (153.9 RVU). However, the setback values of the starches followed the same order as those of flours, RD 6 (-115.8 RVU)> SPT (-122.6 RVU)> RD 10 (-143.2 RVU), respectively.

Division of Physico-Chemical Process Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

Potential Markets and Consumer Behavior of Major Exported Thai Rice Products

Ravipim Chaveesuk[1] and Prissana Suwannaporn[2]

ABSTRACT

This research examines potential markets and consumer behavior of core exported Thai rice products including rice noodle and rice snack. Data on consumer eating habit, buying behavior and preference from various targeted regions are collected by means of questionnaires and statistically analyzed. It is observed that Asians consume rice noodle and rice snack products more than people in any other parts of the world. Analysis on rice noodle data reveals that easy to cook rice noodle, fresh rice noodle and dried rice noodle have most potential for new product development. Consumers prefer rice noodle products that possess the following characteristics: medium to very soft texture, medium elasticity, yellow to white in color, medium to mild fermented odor, medium spicy odor, medium hot taste, mild salty taste and prepared by adding hot water for 1-3 minutes or boiling for 1-3 minutes. SEA, South Asia, Japan/Korea, China/Taiwan, and North America are potential markets for easy to cook rice noodle. Common markets for fresh and dried rice noodle are Japan/Korea, China/Taiwan, and Thailand with additional markets in South Asia, and EU excluding UK for fresh noodle and SEA for dried noodle. Investigation on rice snack products indicate that consumers are more interested in buying healthy rice snack, rice bar, salty seasoning rice snack, and garnished rice snack. Common markets for these products are China/Taiwan and South Asia. Additional common markets for salty seasoning and garnished snacks are Thailand and Japan/Korea. Thailand, North America and Australian continent are additional markets for healthy snack while North American, SEA and EU excluding UK are additional markets for rice bar. Study on the factors affecting consumer's buying decision on rice products points out that consumers place more weights on the quality of the products, past experiences, worth of money, and attractive features or flavors.

[1]Division of Agro-Industry Technology Management, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

[2]Department of Food Science and Technology, Faculy of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

Utilization of Humectant in Mung Bean Paste

Sukonchuen Sringam

ABSTRACT

High water activity of sweeten mungbean filling (a_w = 0.85) contributes to short shelflife of Chinese cake. Humectants ; glycerol , sorbitol and glucose , were used to partially replace sucrose in the filling formula . Glycerol had the higher a_w reduction capacity than that of sorbitol and glucose , which were not significantly different. Chinese cake with the fillings at a_w 0.794 , 0.778 and 0.766 , prepared by 40 , 60 and 80 % replacement of sucrose with glycerol , were not accepted by consumer panel of 34 persons. Flavor scores decreased with increasing glycerol concentration. Strong sweetness with bitterness and strong aftertaste were complained. The second set of chinese cakes with the fillings at a_w 0.806 , 0.807 and 0.810 , which obtained from 20 , 80 and 80 % replacement of sucrose with glycerol , sorbitol and glucose , respectively , were accepted. There were no differences from control (100 % sucrose) in appearance , color and flavor. However , glycerol was perfered because of the lowest unit cost. Reduction of the filling a_w from 0.85 to 0.80 could extend the shelflife of Chinese cake from 16 to 23 days.

Department of Food Science and Technology, Faculy of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

Using of Extrusion Process for Preparation of Instant Cereal Beverage Powders based on Corn and Soybean

Chulaluck Charunuch, Pracha Boonyasirikool and Chowladda Tiengpook

ABSTRACT

Preparation of the instant cereal beverage powders based on corn and soybean from extrusion process has been studied. To examine the effect of particle size of corn grit (13, 23 and 33 mesh) and the composition between corn grit and isolated soy protein (84:10, 74:20 and 64:30) on the properties of product and evaluate nutritional value of acceptable product. The results showed that the differences in particle size of corn grit were not significant effect ($p > 0.05$) on the chemical composition (moisture and protein content) and most of the physical properties of product but the differences in the composition between corn grit and isolated soy protein were significant effect ($p \leq 0.05$) on the protein content and the physical properties of product (bulk density, reconstitution index, water absorption index, water solubility index and viscosity). The highest acceptable product consists of particle size of corn grit equaled to 13 mesh and the composition between corn grit and isolated soy protein equaled to 84:10 which reconstituted well, good soluble and moderate viscosity had adequate protein content and appropriate pattern of essential amino acid for good nutritive consuming.

Key words: instant cereal beverage powders,extrusion process,corn,isolated soy protein

Product Development Department, Institute of Food Research and Product Development, Kasetsart University, Bangkok 10900, THAILAND

Effects of Steam Conditioning Temperature on Physical and Chemical Properties of Cassava Pellets

Amornthewaphat, N.

ABSTRACT

The effects of steam conditioning and pelleting on physical and chemical properties of cassava pellets were studied. Cassava chip meal was ground and steam-conditioned at 60 C, 70 C or 80 C before submitted to the pelleting process. Treatments consisted of 1) unprocessed ground cassava chip (control), 2) processed ground cassava chip at 60 C, 3) processed ground cassava chip at 70 C and 4) processed ground cassava chip at 80 C. Pellets were processed within one day with three replications for each treatment. As the conditioning temperature increased, the added moisture content to the cassava mash was in a range of 1-3%. The steam conditioning and pelleting process affected the physical and chemical properties of cassava pellets as follow; Increasing the conditioning temperature significantly increased durability (75.6, 88.3, and 94.1%, $P<0.05$), hardness (3.0, 5.9, and 12.0 kg, $P<0.05$), and length of pellets (2.7, 4.4, and 5.6 cm, $P<0.05$), but significantly decreased dustiness (4.5, 1.6, and 0.7%, $P<0.05$). In addition, the hydrothermal process resulted in lower ($P<0.05$) percentage of ash (6.4, 6.2, 5.5 vs 8.2%)and sand (4.9, 4.7, 4.0 vs 6.6%) in cassava pellets compared to the cassava meal control. However, there was no difference ($P> 0.05$) in the percentage of starch and fiber among the treatments. The pelleting process caused more starch damage that facilitated more enzyme susceptibility. In the contrary, increasing the temperature and the moisture content in the conditioner before pelleting did not affect the percentage of enzyme susceptibility. However, as the temperature increased, pressing the cassava mash through the pellet die had a significant effect ($P< 0.05$) on enzyme susceptibility (11.9, 12.7, and 14.8%). Therefore, the steam-conditioning and pelleting process improved physical and chemical properties of cassava pellets. However, the cost of production would be in the consideration as the conditioning temperature increased.

Key words: cassava pellets, durability, hardness, dust, enzyme susceptibility, steam conditioning, pelleting

Division of Physico-Chemical Process Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok 10900, THAILAND

APPENDIX

Chang-Hung CHOU, Ph.D.

1. **Education Background:**
   B.Sc. (Botany), National Taiwan University, Taipei, TAIWAN 1965
   M.Sc. (Botany), National Taiwan University, Taipei, TAIWAN 1968
   Ph.D. (Plant Ecology), University of California at Santa Barbara, USA 1971

2. **Current Position:**
   President, National Pingtung University of Science and Technology NPUST
   Chairman, ROC National Committee of the International Union of Biological Sciences (IUBS)
   Chairman, National Committee of the Scientific Committee on Problem of Environment (SCOPE)
   Chairman, The Committee of Toxicology of Academia Sinica for International Union of Toxicology (IUTOX)
   Chairman, National Committee of the Pacific Science Association (PSA)
   Chairman, National Committee of the International Council for Science (ICSU)
   Chairman, The National Committee of DIVERSITAS, Academia Sinica, Taiwan for the Scientific Committee for the DIVERSITAS

3. **Professional Experiences:**
   Vice President for Academic Affairs, National Sun Yat-sen University
   Director, Institute of Botany, Academia Sinica
   Director, Life Science Research Promotion Center for the NSC
   Research Fellow, Institute of Botany, Academia Sinica
   Professor, Dept. of Botany, National Taiwan University
   Councilor, Academia Sinica, Taipei
   Vice President, the International Union of Biological Sciences

4. **Major Subjects of Teaching and Research:**
   Plant Ecology, Phytochemical Ecology, Plant Molecular Ecology

5. **Mail address:**
   choumasa@mail.npust.edu.tw

Supamard Panichsakpatana

1. **Education Background:**
   B.S. Kasetsart University
   M.Agr. (Soil Science), Kasetsart University
   D.Agr. (Agri. Chemistry), U.of Tokyo

2. **Current Position:**
   Professor in Dept. of Soil Science, Faculty of Agriculture
   Vice President for Academic Affairs, Kasetsart University

3. **Major Subjects of Teaching and Research:**
   Soil pollution and waste management

4. **Contact:**
   Tel: +66-2-942-8190
   Fax: +66-2-942-8127
   E-mail: agrsmp@ku.ac.th

Shang-Shyng YANG, Ph. D.

1. **Education Background:**
   B.Sc. (Department of Agricultural Chemistry), National Taiwan University, TAIWAN 1967
   M.Sc. (Microbiology), Graduate Institute of Agricultural Chemistry, National Taiwan University, TAIWAN 1970
   Ph.D. (Microbiology), Graduate Institute of Agricultural Chemistry, National Taiwan University, TAIWAN 1975

2. **Current Position:**
   Vice President of Academic Affairs, National Pingtung University of Science and Technology
   Professor and Director, Graduate Institute of Biotechnology,
   National Pingtung University of Science and Technology
   Professor, Department of Agricultural Chemistry, National Taiwan University
   Executive Secretary and National Committee, CODATA/Taiwan
   Publisher and Editor-in-Chief, Journal of the Biomass Energy Society of China
   Steeling Committee, World Conference of Renewable Energy
   National Committee, IGBP/Taiwan
   National Committee, DIVERSIDA/Taiwan
   Head, Division of Environmental Protection, National Programmed of Agricultural Biotechnology
   Executive Editor, Journal of Microbiology, Immunology and Infection
   Editor, Botanical Bulletin of Academia Sinica
   Editor, Taiwanese Journal of Agricultural Chemistry and Food Science
   Editor, Soil and Environment
   Board of Directors, Sugar Enterprise Association

3. **Professional Experiences:**
   Director, Department of Agricultural Chemistry, National Taiwan University
   Director, Agriculture Exhibition Hall, National Taiwan University
   Head, Division of Atmospheric Chemistry, Global Change Research Center,
   National Taiwan University
   Visiting Professor, Department of Industrial Microbiology, INRA Dijon, France
   Visiting Professor, Department of Microbiology and Biochemistry,
   Orange Free State University, South Africa
   Research Fellow, Department of Microbiology and Molecular Genetics,
   Harvard Medical School, USA
   Board of Directors, Taiwan Sugar Company
   Advisor, Environmental Protection Administration, Taiwan
   President, The Chinese Society for Microbiology
   President, The Chinese Agricultural Chemical Society
   President, The Biomass Energy Society of China
   President, Professor Association of National Taiwan University
   Conference Director, The Second International Conference of Biogeochemistry of Trace Elements
   President, The 4th International Symposium on AIDS
   Member of Directors, The Chinese Society of Soil Sciences and Fertilizers

4. **Major Subjects of Teaching:**
   Microbiology, Environmental Microbiology, Environmental Biotechnology, Biotechnology, Advance Microbial Physiology, Bioconversion Technology, Microbial Metabolites

5. **Major Subjects of Research:**
   Application of Solid State Fermentation in Agriculture and Industry, Preparation and Development of Biofertilizer with Thermophilic Microbes, Strain Improvement and Gene Cloning of *Streptomyces,* Flux and Mitigation of Greenhouse Gases Emission from Agricultural Production, Microbial Ecology and Metagenome of Forest Soils and Compost, Carbon Dioxide Fixation with Thermophilic Microalgae Biodeterioration and Prevention of Materials

6. **Mail Address:**
   Tel: 886-8-7740529
   Fax: 886-8-7740530
   E-mail: ssyang@ccms.ntu.edu.tw

Yuan-Kuang GUU, Ph.D.

1. **Education Background:**
   B.Sc. (Chemical Engineering), National Taiwan University, TAIWAN 1977
   M.Sc. (Food Engineering), Graduate Institute of Food Science and Technology, National Taiwan University, TAIWAN 1979
   Ph.D. (Food Engineering), Cornell University, USA 1991

2. **Current Position:**
   Professor, Department of Food Science, NPUST
   Director, Center for Developing Countries Studies, NPUST
   Secretary General, Association of Technological and Vocational Education, TAWIAN

3. **Professional Experiences:**
   Process Engineer, Wei-Chuan Food Industrial Co., Ltd., TAWAIN
   Plant Manager, New Chenyi Enterprise Co., Ltd., TAIWAN
   Lecturer and Associate Professor, NPIA, NPPI

4. **Major Subjects of Teaching and Research:**
   Food Engineering, Biochemical Engineering, Membrane Technology

5. **Mailing address:**
   Department of Food Science
   National Pingtung University of Science and Technology
   1, Hseuh Fu Rd., Nei Pu, Pingtung, 91201, Taiwan
   Tel: 886-6-7740236
   Fax: 886-8-7740378
   E-mail: ykguu@mail.npust.edu.tw

Werasit Kanlayakrit

1. **Education Background:**
   B.S. (Food Science), Kasetsart University
   M.Agr. (Applied Microbiology), Kagoshima University
   Ph.D. (Applied Microbiology), Kyushu University

3. **Current Position:**
   Assistant Professor

3. **Major Subjects of Teaching and Research:**
   Enzyme Technology
   Industrial Fermentation
   Food Safety and Quality Management System (ISO, GMP, HACCP)
   Rice Utilization
   Spirulina Application to Food Industry

4. **Contact:**
   Tel: +66-2-562-5087, 579-5521
   Fax: +66-2-562-5075, 579-4096
   E-mail: werasit.k@ku.ac.th

Shyang-Chwen SHEU, Ph.D.

1. **Education Background:**
   B.Sc. (Horticulture), National Chung-Hsing University, TAIWAN 1986
   M.Sc. (Graduate Institute of Food Science), National Chung-Hsing University, TAIWAN 1988
   Ph.D. (Nutrition and Food Science), Auburn University, USA 1995

2. **Current Position:**
   Associate Professor, Department of Food Science, NPUST

3. **Professional Experiences:**
   Lecturer and Associate Professor, NPIA, NPPI

4. **Major Subjects of Teaching and Research:**
   Food biochemistry, Food biotechnology, Food Enzymology

5. **Mailing address:**
   Department of Food Science
   National Pingtung University of Science and Technology
   1, Hseuh Fu Rd., Nei Pu, Pingtung, 91201, Taiwan
   Tel: 886-6-7740375
   Fax: 886-8-7740378
   E-mail: ssheu@mail.npust.edu.tw

Somjit Surapat

1. **Education Background:**
   B.S. (Food Science and Technology), Kasetsart University
   M.S. (Dairy Science), U. of Reading, UK : Agro. Chem., U of the Philippines at Los Bonos
   Ph.D. (Food Science), Kansas State University

2. **Current Position:**
   Assistant Professor
   Associate Dean for International Affairs

3. **Major Subjects of Teaching and Research:**
   Dairy Products Technology
   Ice Cream Production
   Food Analysis

4. **Contact:**
   Tel: +66-2-562-5025
   Fax: +66-2-562-5021, 942-8864
   E-mail: somjit.s@ku.ac.th

Mei-Jen LIN, Ph.D.

1. **Education Background:**
   B.Sc. (Animal Husbandry), National Taiwan University, TAIWAN 1988
   M.Sc. (Graduate Institute of Animal Husbandry), National Taiwan University, TAIWAN 1990
   Ph.D. (Food Biosciences), University of Reading, UK 2002

2. **Current Position:**
   Associate Professor, Department of Animal Science, NPUST

3. **Professional Experiences:**
   Lecturer, NPIA, NPPI

4. **Major Subjects of Teaching and Research:**
   Dairy Processing, Microbiology of Animal and Animal Products, Chemistry of Animal Products

5. **Contact Details:**
   Tel.: +886 (0)8 7703202 ext. 6203, 6381
   Address: Department of Animal Science, National Pintung University of Science and Technology, No. 1, Sheuh-Fu Road, Nei-Pu, Pingtung, 912, TAIWAN
   E-mail: meijen@mail.npust.edu.tw

Prasart Foo-trakul

1. **Education Background:**
   B.S. (Agronomy), Kasetsart University
   M.S. (Food Science), University of California at Davis
   Ph.D. (Food Engineering), University of Massachusett

2. **Current Position:**
   Assistant Professor

3. **Major Subjects of Teaching and Research:**
   Food Engineering
   Yeast Technology
   Food Processing &Quality Control
   Fruit Juice and Yogurt Development SME

4. **Contact:**
   Tel: +66-2-562-5086
   Fax: +66-2-562-5075, 579-4096
   E-mail: prasart.f@ku.ac.th

Wunwiboon Garnjanagoonchorn

1. **Education Background:**
   B.S. (Food Technology), Chulalongkorn University
   M.S. (Food Technology), Texas A&M University
   Ph.D. (Food Technology), Texas A&M University

2. **Current Position:**
   Assistant Professor

3. **Major Subjects of Teaching and Research:**
   Fishery Products Technology
   Egg Products Technology

4. **Contact:**
   Tel: +66-2-562-5031
   Fax: +66-2-562-5021, 942-8864
   E-mail: wunwiboon.g@ku.ac.th

Chin-Yu LEE, Ph.D.

1. **Education Background:**
   B.Sc. (Forestry), National Chung-Hsing University, TAIWAN 1982
   M.Sc. (Forestry), Graduate Institute of Forestry, National Taiwan University, TAIWAN 1984
   Ph.D. (Forestry), National Taiwan University, TAIWAN 1987

2. **Current Position:**
   Professor, Department of Soil and Water Conservation, NPUST, TAIWAN
   Chairman, Department of Soil and Water Conservation, NPUST, TAIWAN

3. **Professional Experiences:**
   Lecture, Chinese Culture University, TAIWAN
   Associate Professor, NPIA, NPPI, NPUST, TAIWAN
   Visting Scholar, Colorado State University(CSU),USA

4. **Major Subjects of Teaching and Research:**
   Hydrology, Watershed Management, Water Resources Management SABO EcoEngineering

5. **Mail address:**
   cylee@mail.npust.edu.tw

6. **TEL. Number:**
   886-8-7703202 ext. 7171

7. **FAX Number:**
   886-8-7740437

8. **URL:**
   http://wm.npust.edu.tw

Chen Jan-CHANG, M.Sc.

1. **Education Background:**
   B.Sc. (Forest Science, National Pingtung University of Science and Technology, TAIWAN 1985
   M.Sc. (Geographic Information System, Taiwan University Graduate Institute of Forest, TAIWAN 1989

2. **Current Position:**
   Graduate Student, Institute of Tropical Agriculture and International Cooperation, National Pingtung University of Science and Technology, Pingtung, Taiwan.

3. **Professional Experiences:**
   Assistant, Institute of Botany, Academia Sinica, Nankang, Taipei, Taiwan.

4. **Major Subjects of Teaching and Research:**
   Remote Sensing, Geographic Information System, Forest Management

5. **Mail address:**
   zzzjohn@gisfore.npust.edu.tw

Hso-Chi CHAUNG, Ph.D.

1. **Education Background:**
   B.Sc. (Animal Science), National Taiwan University, TAIWAN 1983
   M.Sc. (Physiology), Interdepartment of Physiology, Graduate School of Human Science, Auburn University, Alabama, USA 1990
   Ph.D. (Nutrition & Immunology), Department of Nutrition & Food Science, Graduate School of Human Science, Auburn University, Alabama, USA 1992

2. **Current Position:**
   Associate Professor, Department of Veterinary Medicine, NPUST

3. **Professional Experiences:**
   Post-doctoral fellow, Department of Biomedical Engineering, University of California, San Diego, CA, USA 1997-1998

4. **Major Subjects of Teaching and Research:**
   Physiology, Biochemistry, Molecular Biology, Molecular Immunology

5. **Email address:**
   hcchaung@mail.npust.edu.tw

6. **Telephone number:**
   011-886-8-7740370 L
   011-886-8-7740200 O

Chu-Ying HSIN, Ph.D.

1. **Education Background:**
   B.Sc. (Department of Plant Pathology and Entomology), National Taiwan University, TAIWAN 1970
   M.Sc. (Department of Plant Pathology and Entomology), National Taiwan University, TAIWAN 1973
   (Department of Entomology), Iowa State University, USA 1979
   Ph.D. (Department of Entomology), Iowa State University, USA 1984

2. **Current Position:**
   Associate Professor, Department of Plant Protection, NPUST

3. **Professional Experiences:**
   Senior Specialist and Head, Department of Applied Toxicology, Taiwan Agricultural Chemicals and Toxic Substances Research Institute

4. **Major Subjects of Teaching and Research:**
   Pesticide, Insect Physiology

5. **Mail address:**
   fantasy@mail.npust.edu.tw

Saou-Lien WONG, Ph.D.

1. **Education Background:**
   B.Sc. (Marine Biology), Culture University, TAIWAN 1986
   M.Sc. (Marine Sciences), Marine Sciences Research Center, State University of New York at Stony Brook, USA 1989
   Ph.D. (Marine Biology), National Taiwan Ocean University, TAIWAN 2002

2. **Current Position:**
   Associate Professor, Department of Aquaculture, NPUST

3. **Professional Experiences:**
   Lecturer, NPIA, NPPI 1990-2001

4. **Major Subjects of Teaching and Research:**
   Phycology, Algal Cultivation, Marine Ecology, Oceanography

5. **Mail address:**
   slwong@mail.npust.edu.tw

Songklod Jarusombuti

1. **Education Background:**
   B.S. (Forest Products)
   M.Sc. (Forest Products)

2. **Current Position:**
   Head Department of Forest Products

3. **Major Subjects of Teaching and Research:**
   Forest Products Utilization
   Non-Wood Utilization
   Wood-Based Panel

4. **Contact:**
   Tel: +66-2-942-8109
   Fax: +66-2-942-8371
   E-mail: fforsoj@ku.ac.th

Yuh-Lurng CHUNG, Ph.D.

1. **Education Background:**
   B.Sc. (Forestry), Chinese Culture University, TAIWAN 1982
   M.Sc. (Forestry), Graduate Institute of Forestry, National Taiwan University, TAIWAN 1988
   Ph.D. (Forestry), Graduate Institute of Forestry,National Taiwan University, TAIWAN 1996

2. **Current Position:**
   Associate Professor, Department of Forestry, NPUST
   Head of Department of Forestry, NPUST

3. **Professional Experiences:**
   Assistant and Lecturer , NPPI

4. **Major Subjects of Teaching and Research:**
   Remote Sensing, Forest Mensuration, Surveying, Experimental Design

5. **Mail address:**
   cyl@gisfore.npust.edu.tw

Mangkorn Rodprapakorn

1. **Education Background:**
   B.S. (Biotechnology), Kasetsart University
   M.Sc. (Genetic Resources Technology), Kyushu University
   Ph.D. (Genetic Resources Technology), Kyushu University

2. **Current Position:**
   Assistant Professor

3. **Major Subjects of Teaching and Research:**
   Microbial Genetics
   Utilization of *Actinomycetes*
   Probiotic in Shrimp Cultivation
   Waste Utilization

4. **Contact:**
   Tel: +66-2-562-5088, 579-5521
   Fax: +66-2-562-5075, 579-4096
   E-mail: mangkorn.r@ku.ac.th

Liang-Chou HSIA, Ph.D.

1. **Education Background:**
   B.Sc. (Animal Science Dept.), Pingtung Agriculture Institute, Taiwan, 1966-1969
   M.Sc. (Environment and Nutrition), Aberdeen Univ., U.K., 1973-1974
   Ph.D. (Behaviour and Nutrition), Edinburgh Univ., U.K., 1978-1981

2. **Current Position:**
   Associate Professor, Department of Animal Science, NPUST
   Director, Innovation and Practical Training Center, NPUST
   Director, Animal Farm, NPUST

3. **Professional Experiences:**
   Head, International Cooperation and Farm Extension office, Pig Research Institute Taiwan
   Researcher, Dept. of Production System, Pig Research Institute Taiwan

4. **Major Subjects of Teaching and Research:**
   Animal waste management, Animal nutrition, Animal housing, Animal behavior and welfare

5. **Mail address:**
   lchsia@mail.npust.edu.tw

Ho-Hsien CHEN, Ph.D.

1. **Education Background:**
   B.Sc. (Mechanical Engineering), National Central University, TAIWAN 1991
   M.Sc. (Control Engineering), Automatic Control & Systems Engineering, The University of Sheffield, UK, 1992
   Ph.D. (Control Engineering), Automatic Control & Systems Engineering, The University of Sheffield, UK, 1996

2. **Current Position:**
   Associate Professor, Department of Food Science, NPUST

3. **Professional Experiences:**
   Chartered Electrical Engineer, IEE, UK

4. **Major Subjects of Teaching and Research:**
   Food Machinery, Introduction to food processing automation, Automatic control of food manufacturing processes

5. **Mail address:**
   hhchen@mail.npust.edu.tw

Pi-Jen TSAI, Ph.D.

1. **Education Background:**
   B.S. (Horticulture Science), National Taiwan University, 1979
   M.S. (Horticulture Science), National Taiwan University, 1982
   Ph.D. (Food Science), National Chung Hsing University, 1996

2. **Current Position:**
   Associate Professor, Department of Food Science and Technology
   National Pingtung University of Science and Technology

3. **Professional Experiences:**
   Lecturer, Department of Horticulture Science, NPIA, 1985-1992
   Lecturer, Department of Food Industry, NPIA, 1992-1995
   Associate Professor, Department of Food Science and Technology, NPPI, 1995-1997
   Associate Professor, Department of Food Science and Technology, NPUST, 1997-till now

4. **Major Subjects of Teaching and Research:**
   Fruit and Vegetable processing
   Postharvest of food materials

5. **Mail address:**
   E-mail: pijen@mail.npust.edu.tw

Winus Puminat

1. **Education Background:**
   B.S. (Community Nutrition)
   M.S. (Chemistry)

2. **Current Position:**
   Researcher

3. **Major Subjects of Teaching and Research:**
   Food Chemistry and Natural Product

4. **Contact:**
   Tel: +66-2-942-8633 Ext. 500
   Fax: +66-2-940-6455
   E-mail: ifrwnp@ku.ac.th

Sineenart Chariyachotilert

1. **Education Background:**
   B.S. (Food Technology), Chulalongkorn University
   M.S. (Food Science), Michigan State University

2. **Current Position:**
   Lecturer
   Associate Dean for special Affairs

3. **Major Subjects of Teaching and Research:**
   Food Packaging
   Recycling
   Packaging Materials

4. **Contact:**
   Tel: +66-2-562-5056
   Fax: +66-2-562-5046
   E-mail: sineenart.c@ku.ac.th

Kulvadee Trongpanich

1. **Education Background:**
   B.S. (Food Science), Kasetsart University
   M.S. (Food Science), Michigan State University

2. **Current Position:**
   Expert researcher, P.C. 10

3. **Major Subjects of Teaching and Research:**
   Canning
   Fruit and vegetable processing

4. **Contact:**
   Tel: +66-2-942-8629
   Fax: +66-2-940-6495
   E-mail: ifrkut@ku.ac.th

Siree Chaiseri

1. **Education Background:**
   B.S. (Food Science and Technology), Kasetsart University
   M.S. (Food Science), Pennsylvania State University
   Ph.D. (Food Science), Pennsylvania State University

2. **Current Position:**
   Assistant Professor
   Associate Dean for Planning

3. **Major Subjects of Teaching and Research:**
   Flavor Chemistry of Thai Food and Ingredients
   Confectionery Technology

4. **Contact:**
   Tel: +66-2-562-5040
   Fax: +66-2-562-5021
   E-mail: siree.c@ku.ac.th

Chintana Oupadissakoon

1. **Education Background:**
   B.Sc. (Food Science), Kasetsart University, Thailand
   M.S. (Food Science), University of California at Davis
   Ph.D. (Food Science), North Carolina State University at Releigh

2. **Current Position:**
   Assistant Professor

3. **Major Subjects of Teaching and Research:**
   Sensory Science
   Quality Management System
   Peanut Quality (Aflatoxin)
   Factors Affecting Quality of Foods
   Roasted Chili Paste

4. **Contact:**
   Tel: +66-2-562-5009
   Fax: +66-2-562-5005, 561-3456
   E-mail: chintana.o@ku.ac.th

Warapa Mahakarnchanakul

1. **Education Background:**
   B.S. (General Science), Kasetsart University
   M.S. (Food Science), Kasetsart University
   Ph.D. (Food Science), University of Georgia

2. **Current Position:**
   Lecturer

3. **Major Subjects of Teaching and Research:**
   Microbial Stress Response
   Safety of Minimally Processed Produce
   GMP/ HACCP System

4. **Contact:**
   Tel: +66-2-562-5037
   Fax: +66-2-562-5021, 942-8864
   E-mail: warapa.m@ku.ac.th

Sangunsri Charoenrein

1. **Education Background:**
   B.S. (Food Technology), Chulalongkorn University
   M.S. (Food Science and Technology), University of California, Davis
   Ph.D. (Agricultural and Environmental Chemistry), University of California, Davis

2. **Current Position:**
   Assistant Professor

3. **Major Subjects of Teaching and Research:**
   Starch Technology
   Freezing Technology of Fruit and Vegetables

4. **Contact:**
   Tel: +66-2-562-5027
   Fax: +66-2-562-5021, 942-8864
   E-mail: sangunsri.c@ku.ac.th

Tzou-Chi (George) HUANG, Ph.D.

1. **Education Background:**
   B.S. (Food Chemical Engineering), National Chung Hsing University, 1974
   M.S. (Food Science and Technology), National Taiwan University, 1980
   Ph.D. (Food Science), Rutgers, the State University, 1987

2. **Current Position:**
   Professor, Department of Food Science and Technology, NPUST
   Academic Affiliations

3. **Professional Experiences:**
   Teaching Assistant, Department of Food Science, 1976-1980
   Lecturer, Department of Food Science, 1980-1987
   Associate Professor, Department of Food Science, 1987-1991
   Professor, Department of Food Science and Technology, 1991-till now

4. **Major Subjects of Teaching and Research:**
   Food Biochemistry; Identification of biologically active components in food materials.
   Food Processing; Physicochemical changes during food processing.

5. **Contact Details:**
   Tel: 886-8-7740214
   Fax: 886-8-7740213
   E-mail: tchuang@unix2cc.npust.edu.tw

Onanong Naivikul

1. **Education Background:**
   B.S. (Food Science), Kasetsart University
   M.S. (Food Science), Tuskegee University
   Ph.D. (Cereal Technology), North Dakota State University

2. **Current Position:**
   Assistant Professor

3. **Major Subjects of Teaching and Research:**
   Cereal Products Technology
   Rice Products, Rice Science & Technology
   Wheat Utilization
   Tapioca Utilization
   Legumes Utilization

4. **Contact:**
   Tel: +66-2-562-5023
   Fax: +66-2-562-5021, 942-8864
   E-mail: onanong.n@ku.ac.th

Parichat Hongsprabhas

1. **Education Background:**
   B.Sc. (Food Science and Technology), Kasetsart University, Thailand
   M.Sc. (Food Science and Technology), University of New South Wales
   Ph.D. (Food Science), University of Guelph

2. **Current Position:**
   Assistant Professor

3. **Major Subjects of Teaching and Research:**
   Food Colloids and Biopolymers
   Food Rheology and Microstructure

4. **Contact:**
   Tel: +66-2-562-5044
   Fax: +66-2-562-5021
   E-mail: parichat.h@ku.ac.th

Namfone Lumdubwong

1. **Education Background:**
   B.S. (Food Science and Technology), Kasetsart University
   M.S. (Food Science), Kansas State University
   Ph.D. (Food Science), Kansas State University

2. **Current Position:**
   Lecturer

3. **Major Subjects of Teaching and Research:**
   Cereal and Starch Chemistry and Technology
   Utilization of Starch for Food & Non-food Products
   Relationship between Starch Fine Structure and Functional Properties

4. **Contact:**
   Tel: +66-2-562-5098
   Fax: +66-2-562-5092
   E-mail: namfone.l@ku.ac.th

Ravipim Chaveesuk

1. **Education Background:**
   B.S. (Agro-Industrial Product Development), Kasetsart University
   M.S. (Industrial Engineering), University of Pittsburgh
   M.S. (Food Science and Agricultural Chemistry), McGill University
   Ph.D. (Industrial Engineering), University of Pittsburgh

2. **Current Position:**
   Lecturer

4. **Major Subjects of Teaching and Research:**
   Modelling and Analysis using classical statistics, computational intelligence (neural network and fuzzy logic) and geostatistics
   Capital Investment Analysis
   Design and Analysis of Experiments

4. **Contact:**
   Tel: +66-2-562-5096
   Fax: +66-2-562-5092
   E-mail: ravipim.c@ku.ac.th

Sukonchuen Sringam

1. **Education Background:**
   B.S. (Food Technology), Chulalongkorn University
   M.S. (Food Technology), Texas A&M University
   Ph.D. (Food Technology), Texas A&M University

2. **Current Position:**
   Assistant Professor
   Associate Dean for Academic Affairs

3. **Major Subjects of Teaching and Research:**
   Coconut Milk Processing

4. **Contact:**
   Tel: +66-2-562-5035
   Fax: +66-2-562-5021, 942-8864
   E-mail: sukonchuen.s@ku.ac.th

Chulaluck Charunuch

1. **Education Background:**
   B.Sc. (Chemistry)
   M.S. (Food Technology)

2. **Current Position:**
   Researcher

3. **Major Subjects of Teaching and Research:**
   Food Product Development by Extrusion Process

4. **Contact:**
   P.O.Box 1043 Kasetsart, Bangkok 10903, Thailand
   E-mail: ifrclc@ku.ac.th

Natchanok Amornthewaphat

1. **Education Background:**
   B.S. (Food Science and Technology), Kasetsart University
   M.S. (Food Science and Management), Kansas State University
   Ph.D. (Food Science and Management), Kansas State University

2. **Current Position:**
   Lecturer

3. **Major Subjects of Teaching and Research:**
   Feed processing and starch utilization in poultry and swine.
   Cassava starch utilization in swine

4. **Contact:**
   Tel: +66-2-562-5097
   Fax: +66-2-942-8440
   E-mail: natchanok.a@ku.ac.th

COMMITTEE

Steering Committee

Advisory Board

1. President
2. President of Thai Chamber of Commerce
3. Director of The Food Processing Industry Club, The Federation of Thai Industry
4. Vice President for Academic Affairs
5. Vice President for Research and Intellectual Property

Chairman and committee

6. Vice President for Planning and International Affairs
7. Dean of Faculty of Agro-Industry
8. Dean of Faculty of Agriculture
9. Dean of Faculty of Forestry
10. Director of Institute of Food Research and Product Development
11. Director of Office of Extension and Training
12. Director of Kasesasrt University Research and Development Institute
13. Director of Kasetsart Agricultural and Agro-Industrial Product Improvement Institute
14. Director of Inseechandresatitya Institute for Crop Research and Development
15. Director of Suwanvajokkasikit Animal Research and Development Institute
16. Director of Research and Development Institute for Agriculture Systems under Adverse Conditions
17. Director of Vehicle, Building and Physical Plant Division

Secretary and Assistant Secretary

18. Director of International Affairs Division
19. Head of International Cooperation and Protocol Section, International Affairs Division
20. Head of Administration Section, International Affairs Division
21. Head of Information Section, International Affairs Division

Academic Committee

1. Dean of Faculty of Agro-Industry, Chairman
2. Professor Uthairat Na-nakorn
3. Associate Professor Sornthep Tumwasorn
4. Associate Professor Pongthep Akratanakul
5. Associate Professor Sukhonchuen Sringam
6. Associate Professor Onanong Naivikul
7. Associate Professor Klanarong Sriroth
8. Assistant Professor Somjit Surapat
9. Assistant Professor Werasit Kanlayakrit
10. Assistant Professor Prisana Suwannaporn
11. Assistant Professor Phaisan Wuttijumnong
12. Dr.Montip Chamchong
13. Dr.Sukaherm Sittipod
14. Dr.Damrong Pipatwattanakul
15. Miss Gassinee Trakoontivakorn
16. Mrs.Kulvadee Trongpanich
17. Assistant Professor Siree Chaiseri, Secretary
18. Assistant Professor Wirat Vanichsriratana, Assistant Secretary

Organizing Committee

1. Vice President for Planning and International Affairs, Advisory
2. Director of International Affairs Division, Chairman
3. Assistant to the President for Public Relation
4. Delegate of Office of Extension and Training
5. Delegate of Vehicle, Building and Physical Plant Division
6. Kasetsart Golden Jubilee Building Manager
7. Mrs.Mantana Ruamruk
8. Mrs.Surai Suwunnarut
9. Mrs.Vrangkana Bhundhoombhoad
10. Mrs.Prapis Sangaroon
11. Miss Hathaitus Thongklad
12. Mr.Somsakdi Tabtimthong
13. Mr.Phuthai Buakham
14. Mrs.Sukanya Maneecharoen, Secretary
15. Mrs.Maneerut Somsate
16. Miss Salin Deosurin
17. Mr.Krisana Vimolseth

Agro-Industry Sub-Committee

1. Associate Professor Preeya Vibulsresth
2. Assistant Professor Siree Chaiseri
3. Associate Professor Sukonchuen Sringam
4. Associate Professor Onanong Naivikul
5. Associate Professor Phaisan Wutttijumnong
6. Dr.Sukaserm Sittipod
7. Assistant Professor Wirat Vanichsriratana
8. Dr.Tanaboon Sajjaanantakul
9. Assistant Professor Mangkorn Rodprapakorn
10. Associate Professor Chintana Oupadissakoon
11. Associate Professor Vichien Leelawatcharamas
12. Assistant Professor Somjit Surapat
13. Assistant Professor Chokechai Theerakulkait
14. Assistant Professor Anuvat Jangchud
15. Dr.Ravipim Chaveesuk
16. Assistant Professor Werasit Kanlayakrit
17. Mrs.Sineenart Chariyachotilert
18. Mrs.Somporn Kongchareankeit
19. Miss Pawarin Suraswadi
20. Mrs.Supawadee Saitthiti
21. Mr.Chatchaval Kangkaya
22. Mr.Chavarit Vittayanatpisai
23. Mr.Wasun Eomburi