



# GreenBio tech'2010



(An International conference on  
Biotechnology & Environment)

December 18<sup>th</sup>, 2010, Ho Chi Minh City University of Industry

*Conference proceedings of*

*Biotechnology for*

*Green Solutions*

*and*

*Sustainable Environment*

Join organized by:

**Ho Chi Minh City University  
of Industry, Viet Nam**

**Meiho University  
Taiwan**

## Schedule of Event

2010/12/18 (Saturday)

Time	Event	
07:30 – 08:00	Registration	
08:00 – 08:10	Introduction	
08:10 – 08:15	Conference Opening Ceremony	
08:15 – 08:25	Welcome message	
08:25 – 10:05	Keynote Speech - Current Situation of Fruit Industry in Taiwan	Prof. PhD. Zhen-hong, Shü
08:25 – 10:55	The EMMC Cells on the Treatment of Cyanide Wastewater	Assistant Prof. Dr., Ching-Yuan, Chen
10:55 – 11:10	Coffee Break	
11:10 – 12:00	Effects of high pitching rate and nutritional supplementation on yeast fermentation performance in very high gravity brewing	Associate Prof. Dr., Le Van Viet Man
12:00 – 13:00	Lunch Break	
13:00 – 13:50	Synthesis of colloidal silver nanoparticles in chitosan by $\gamma$ -irradiation method and their antimicrobial effect on <i>S. aureus</i> and <i>C. salmonicolor</i>	Associate Prof. Dr., Nguyen Quoc Hien
13:50 – 14:40	Study, determine of <i>Aquilaria crassna</i> plants kind and symbiotic fungi species that is capable of creation aloe wood to be of Phu Quoc national park	Prof. Sci. Dr., Le Huy Ba
14:40 – 15:30	Apply of biotechnology for quality improvement in fruit trees in South Vietnam	Dr. Nguyen Trinh Nhat Hang
15:30 – 15:45	Coffee Break	
15:45 – 16:35	Effect of polyamin and pH medium on somatic embryogenesis of egg plant ( <i>Solanum melongena</i> L.)	Dr. Nguyen Van Vinh

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<b>16:35 – 17:25</b>	Optimization carotenoids production by <i>Rhodotorula glutinis</i> GBDOU using design of Plackett–Burman matrix and Central composite design - response surface methodology	Ms. Bui Dinh Hanh Dung
<b>17:25 – 18:15</b>	Using “System mechanical wounded method” to researching exploration some cloning genotype orientation on aquilaria crassna pierre species the content of aularia oils in phuquoc islands Vietnam	Associate Prof. Dr. Thai Thanh Luom
<b>18:15 – 18:30</b>	<b>Panel Discussion and Closing Ceremony</b>	

**Green Biotechnology'2010 organizing committee**

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1. Ho Chi Minh City University of Industry, Viet Nam.
2. Meiho University, Taiwan.

Co- organizer:

1. Ho Chi Minh University of Technology, Viet Nam.
2. Southern Fruit Research Institute (SOFRI), Viet Nam
3. Research and Development Center for Radiation Technology, Vietnam Atomic Energy Institute

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3. Prof. PhD. Zen-hong Shü (Meiho University, Taiwan)
4. PhD. Ching-Yuan Chen (Meiho University, Taiwan)

Location :

1. Ho Chi Minh City University of Industry, Viet Nam

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## **CURRENT SITUATION OF FRUIT INDUSTRY IN TAIWAN**

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### **ABSTRACT**

The geographic location makes Taiwan a perfect island for growing fruits from tropical, subtropical to temperate. There are more than 30 kinds of fruits, with an area of 220 thousand hectares, total production of 2.7 million tons and production value of about NT\$ 100 billion dollars. The production value of tropical fruits comprises about half of the total production value. Mangos, bananas, pineapples, wax apples, guavas and papayas are the leading tropical fruit species. The present article introduces the current situation of tropical fruit production in Taiwan.

**Keywords:** Tropical Fruit, Production, Taiwan

### **BANANA**

'Pei-Chiao', 'Tai-Chiao No. 1', 'Tai-Chiao No. 2', 'Tai-Chiao No. 3', and 'Formosana' are the major cultivars. The area, total production and production value for bananas in Taiwan were 10,184 hectares, 189,900 metric tons and NT\$3 billion dollars, respectively, in the year 2004. Major production areas are central and southern Taiwan, where southern Taiwan produces spring and summer bananas and central Taiwan fall and winter crops. About 10 % of the production is exported, mainly to Japan.

### **GUAVA**

The size and quality of guava has been greatly improved in these years. 'Century' and 'Pearl' and 'Crystal' are the major cultivars. The area, total production and production value for guavas in Taiwan were 7,486 hectares, 184,738 metric tons and NT\$2.1 billion dollars, respectively, in the year 2004. Production concentrated in southern and central Taiwan with Kaohsiung county 38 % the largest, Tainan county 18 % and Junghwa county 18 % both the second largest. Fruits can be harvest all year round, but fruits with better quality are produced from September to February. There are about 1 % of the total production was exported to Canada, China, and Hong Kong.

### **INDIAN JUJUBE**

The quality and size of Indian jujube has been improved a lot in recent years. The fruit of some cultivars has sizes comparable to small apples. 'Honey' is the leading cultivar. The area, total production and production value for Indian jujubes in Taiwan were 2,083 hectares, 22,916 metric tons and NT\$0.8 billion dollars, respectively, in the year 2004. Production concentrated in Kaohsiung and Pingtung counties.

### **MANGO**

The area, total production and production value for bananas in Taiwan were 19,142 hectares, 182,196 metric tons and NT\$6 billion dollars, respectively, in the year 2004. The yield of a single mango tree is average at about 27 kilograms. Both polyembryonic and monoembryonic mango (*Mangifera indica*) varieties are commercially grown in Taiwan. 'Tsar-swain' and 'Irwin' are the two leading ones comprising about 80 % of the total production area. The fruit characteristics of some of the mango varieties grown in Taiwan are listed in Table 1.

**Table 1.** Fruit characteristics of some of the mango varieties grown in Taiwan percentage of flesh weight/fruit weight.

Variety	Fruit Weight (g)	Fruit Length (cm)	Fruit Width (cm)	Total soluble solids concentration	Acidity (citric acid, %)	TSSC /acidity	% Flesh weight <sup>z</sup> (g)
'Haden'	444 c <sup>y</sup>	107 b	93 ab	18 ab	1.3 b	14	0.93
'Irwin'	386 c	124 ab	88 ab	11 d	1.5 b	7	0.92
'Jin-hwung'	965 a	144 ab	99 a	15 bcd	2.3 ab	6	0.94
'Kent'	506 c	113 ab	95 ab	15 bcd	1.0 b	15	0.92
'Tainong No. 1'	237 c	99 b	69 c	20 a	4.0 a	5	0.85
'Tsar-swain'	154 d	100 b	64 c	17 abc	2.2 ab	8	0.84
'Yulin'	567 bc	117 ab	98 ab	13 cd	0.5 b	26	0.93
'YuWen No. 6'	659 ab	182 a	98 ab	12 d	1.2 b	10	0.93

<sup>z</sup>percentage of flesh weight/fruit weight.

<sup>y</sup>mean separation within columns by Duncan's multiple range test,  $p \geq 0.05$ .

#### PAPAYA

'Tainong No. 2' is the major cultivar. To keep away from aphid transmission of papaya ringspot virus, production under net houses is the major cultivation system. The area, total production and production value for papayas in Taiwan were 2,961 hectares, 133,620 metric tons and NT\$1.5 billion dollars, respectively, in the year 2004. Production concentrated in southern Taiwan. Genetically modified papayas are not yet approved for commercial production.

#### PINEAPPLE

The production pattern has changed from processing-oriented to primarily fresh consumption. In recent years, many fresh consumption cultivars were released, such as 'Tainong No. 13', 'Tainong No. 16', 'Tainong No. 17', 'Tainong No. 18', 'Tainong No. 19'. The area, total production and production value for pineapples in Taiwan were 12,068 hectares, 458,4990 metric tons and NT\$8 billion dollars, respectively, in the year 2004. Production concentrated in southern Taiwan. About 70 % of the fruits are produced from April to September, the rest of the fruits are harvested from October to March next year. Only about 0.2 % of the total production was exported to Canada, China, Japan, Hong Kong and Korea.

#### SUGAR APPLE

The area, total production and production value for sugar apples in Taiwan were 5,931 hectares, 89,189 metric tons and NT\$2.8 billion dollars, respectively, in the year 2004. Production concentrated in Taidong and Tainan counties.

#### STAR FRUIT

The area, total production and production value for star fruits in Taiwan were 1,642 hectares, 26,516 metric tons and NT\$0.5 billion dollars, respectively, in the year 2004.



## WAX APPLE

The area, total production and production value for the wax apple industry in Taiwan were 7,302 hectares, 84,991 metric tons and NT\$6 billion dollars, respectively, in the year 2005. 'Pink' is the leading cultivar, representing 95% of the planted areas in Taiwan. Flowers appear in March in south Taiwan and fruits ripen in May under natural condition. However, 'Pink' blooms and sets fruit almost year-round after flower forcing. As a result, fruits at different growing stages could be found in different orchards, different trees and even on the same tree. Despite its name, this cultivar produces fruits varying from pink to deep red, depending on environmental and cultural conditions. Best prices are obtained with deep red fruits. Fruit color is influenced by many factors, such as light, temperature, position on the tree, growing stage, and leaf:fruit ratio. There are 5 production systems for the wax apple industry in Taiwan, those are regular, simple flower forcing, improved flower forcing, bald cut, bald cut plus shading.

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