

# **ASEAN GMF Testing Network - Developments Update, Needs & Future Actions**



**Presented by Singapore at  
3<sup>rd</sup> EU-ASIA Regional Network Meeting on GMO Analysis  
Singapore, June 7<sup>th</sup> 2011**





1999, 'ASEAN Harmonised Guidelines on the Release of Agricultural Related GMOs'

2001, Indonesia approved the planting of *Bt* cotton ( 1<sup>st</sup> this kind in ASEAN )

2003, S'pore initiated, AMAF endorsed to establish "ASEAN GMFT Network"

2004, 1<sup>st</sup> ASEAN GMFT Network Meeting

2002 - 2010, Philippines approved up to 54 GM crops / varieties.

2011, 8<sup>th</sup> ASEAN GMFT Network Meeting

Timelines on ASEAN GMO related development

1971, world 1<sup>st</sup> GMO developed

1996, beginning of commercialization of GM crops (tomato, cotton, soybean)

2004 onwards, increase the presence of stacked events in GM crops

2009, continue growth in biotech crops, e.g. 93% US soy , 77% global soy productions are GM

2011, we are here

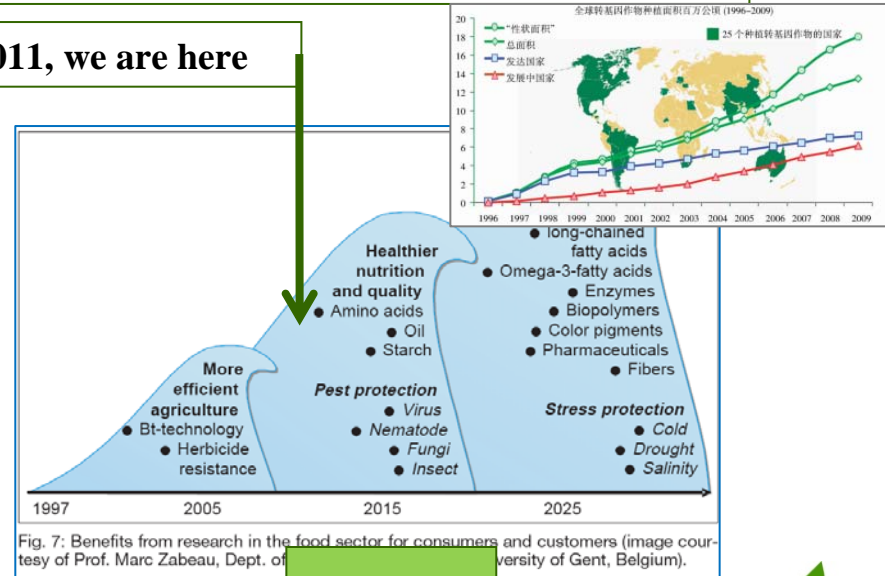


Fig. 7: Benefits from research in the food sector for consumers and customers (image courtesy of Prof. Marc Zabeau, Dept. of Food Safety and Food Quality, Ghent University of Gent, Belgium).

Trend



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## No. of GMO Approved – by Country (as @ Aug 2010)

GM Crop	Canada	USA	Brazil	EU	Australia	China	Japan	South Korea	Philippines	Total (GM Crops)
Canola	15	10	1	6	7	6	11	6	1	17
Cotton	10	14	6	6	13	5	16	12	7	21
Maize	38	28	2	14	16	11	38	32	35	53
Potato	4	4	0	0	3	0	4	4	4	4
Rice	4	2	0	0	1	0	0	0	0	5
Soybean	8	9	4	2	6	3	6	4	4	11
Tomato	2	2	0	0	0	0	1	0	0	6
Wheat	5	1	0	0	0	0	0	0	0	7
Others	10	15	0	6	5	0	4	2	3	20
<b>Total:</b>	<b>96</b>	<b>85</b>	<b>13</b>	<b>34</b>	<b>51</b>	<b>25</b>	<b>80</b>	<b>60</b>	<b>54</b>	144

*Top 5: by approved GMO varieties*

<http://www.cera-gmc.org>

ASEAN member



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## Events in commercial GM crops and in pipelines worldwide - *by region of origin*

Developer country	Commercial in 2008	Commercial pipeline	Regulatory pipeline	Advanced development	Total by 2015
USA & Europe	24	7	10	26	67
<b>Asia</b>	<b>9</b>	<b>0</b>	<b>11</b>	<b>34</b>	<b>54</b>
Latin America	0	0	2	1	3

EU 2009 rpt: The global pipeline of new GM crops



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**1999, adoption of the “ASEAN Harmonised Guidelines on the Release of Agricultural Related GMOs”;**

**June 2003, Singapore proposed to establish “ASEAN GM Food Testing Network”,**

**ASEAN  
GMFTNet**



**August 2003, “ASEAN GM Food Testing Network” established by 25<sup>th</sup> AMAF endorsed Singapore proposal**  
**-Singapore designated as the Coordinating Country of the network**  
**-To share and leverage member states resources and expertise to build up GM food testing capacities**

**ASEAN GMFTNet Scope and Objectives:**

- regional cooperation platform for regulatory and scientific exchanges on issues related to GM food analysis;**
- harmonization / standardization of methodologies for sampling and detection of GM food in ASEAN;**
- enhance collaboration and capacity building activities within and outside ASEAN;**
- Annual meeting**

**May 2004, Singapore hosted “1<sup>st</sup> ASEAN GMFTNet Meeting”**  
**2005-2010, 2<sup>nd</sup> to 7<sup>th</sup> Annual ASEAN GMFTN Meeting**

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## Terms of Reference of the ASEAN GMFT Network

ASEAN  
GMFTNet



*Drafted and proposed by Singapore in 2004,*

*Adopted by ASEAN GMFTNet during its 1<sup>st</sup> mtg in 2004,*

*Reviewed and decided to retain the existing TOR by 7<sup>th</sup> ASEAN GMFTNet mtg in 2010.*

- Update the current status of GMOs regulatory systems and GM testing capabilities, and expertise in ASEAN member countries.
- Collate and publish a compendium of analytical methods (validated and un-validated), related expertise and GM testing laboratories providing services in ASEAN.
- Establish a framework for methods validation and proficiency testing in accordance with internationally accepted performance criteria for validation.
- Establish a depository for reference materials for use as positive and negative samples in quality control and methods validation.
- Establish a molecular register which houses the details of genetic manipulation for approved GMOs.
- Plan and organize training workshops and exchange programmes to address technical needs in ASEAN.

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## AGMFT Network Progress

ASEAN  
GMFTNet



- Annual meetings since 2004 to exchange update member states info
- GMO regulatory systems in place*: **Brunei, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam**
- GMO regulatory systems under development*: **Cambodia, Lao,**
- Eleven laboratories* from 7 member states registered on the Network
- Total of **136** *GMO testing methods* and their information have been kept in the Network database – long term aim is harmonization of the detection methods;  
Validated / accredited methods
- PT and Ref materials

*\*\* progress update in June are not reflected here.*

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# AGMFT Network Progress



Annual Meeting / Year	Host Nation
1 <sup>st</sup> /2004	Singapore
2 <sup>nd</sup> /2005	Singapore
3 <sup>rd</sup> /2006	Thailand
4 <sup>th</sup> /2007	Vietnam
5 <sup>th</sup> /2008	Brunei
6 <sup>th</sup> /2009	Indonesia
7 <sup>th</sup> /2010	Malaysia
8 <sup>th</sup> / 2011	Singapore

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## **AGMFT Network Progress**

**– No. of Regulatory Labs in our network**



<b>ASEAN Member Country</b>	<b>No. of Laboratories</b>
<b>BRUNEI DARUSSALAM</b>	<b>0</b>
<b>CAMBODIA</b>	<b>0</b>
<b>INDONESIA</b>	<b>3</b>
<b>LAO</b>	<b>0</b>
<b>MALAYSIA</b>	<b>1</b>
<b>MYANMAR</b>	<b>1</b>
<b>PHILIPPINES</b>	<b>1</b>
<b>SINGAPORE</b>	<b>1</b>
<b>THAILAND</b>	<b>3</b>
<b>VIETNAM</b>	<b>1</b>

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## AGMFT Network Progress

No. of validated / accredited methods



Country	screening	qualitative	quantitative
Indonesia	4	22	10
Malaysia	3	14	6
Myanmar	4	4	2
Philippines	1	17	7*
Singapore	5	21	10
Thailand	yes	yes	yes
Vietnam	2	5	—

\* They have not been used for regulatory tests.

# AGMFT Network Progress

No. of Ref Materials available



Country	IRMM	AOCS	Others Sources
Indonesia	7	-	-
Malaysia	9	8	3
Myanmar	-	-	-
Philippines	-	-	3
Singapore	6	12	8
Thailand			
Vietnam	8	-	3

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# AGMFT Network Progress

## Quality Assurance (incl PT)



Country	GeMMA	USDA	APLAC
Indonesia	√	—	√
Malaysia	√	√	—
Myanmar	—	—	—
Philippines	—	—	—
Singapore	√	√	—
Thailand	√	√	—
Vietnam	—	—	—

Note: Indonesia, Malaysia, Philippines, Singapore and Thailand participated in EU-ASEAN GMO PT in 2006

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# AGMFT Network Progress



## Training, consultation and knowledge exchanges

ILSI SEA/AVA GMO detection training workshop (2008),  
Philippines DA new GMO testing lab design consultation (2009)  
Brunei, Indonesia laboratory staff training in AVA/VPHL lab  
(2010)

## Broadening collaboration with EU, Asia and South American

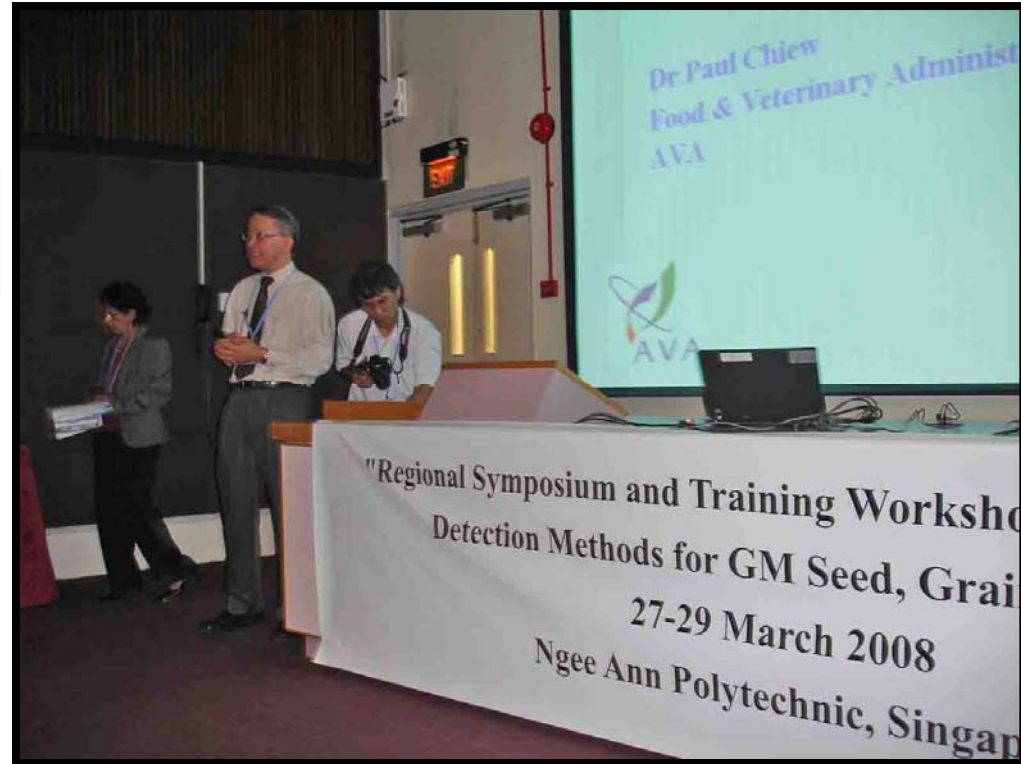
International workshop on harmonisation of GMO detection and  
analysis for Central and South America (2009)  
1<sup>st</sup> EU-Asia regional network meeting on GMO analysis (2009)  
2<sup>nd</sup> EU-Asia regional network meeting on GMO analysis (2010)

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# Regional Symposium & Training Workshop on Sampling and Detection Methods for GM Seed, Grain and Food Mar 27-29, 2008

## Plenary Session



Training & Exchanges



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# Regional Symposium & Training Workshop on Sampling and Detection Methods for GM Seed, Grain and Food Mar 27-29, 2008

## Hands on Session



Lecturing & Data interpretation



Face 2 face Q&A

## Protein method

Training & Exchanges



Pipetting time

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# Regional Symposium & Training Workshop on Sampling and Detection Methods for GM Seed, Grain and Food Mar 27-29, 2008

## Hands on Session



**DNA method**

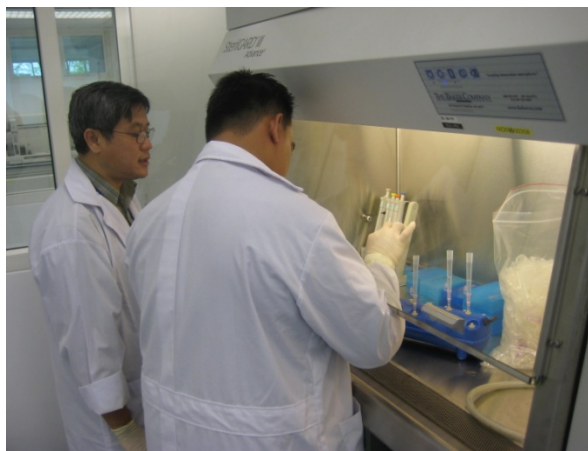
Training &  
Exchanges



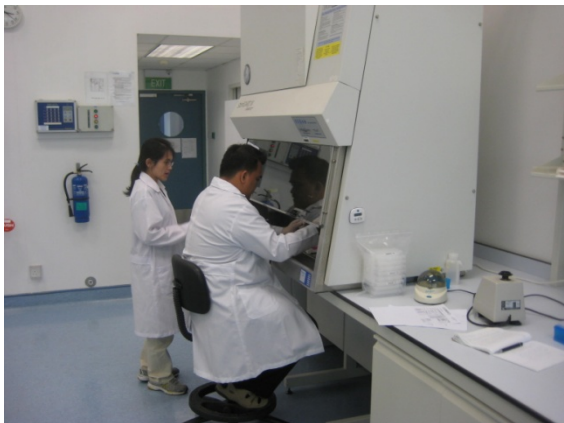
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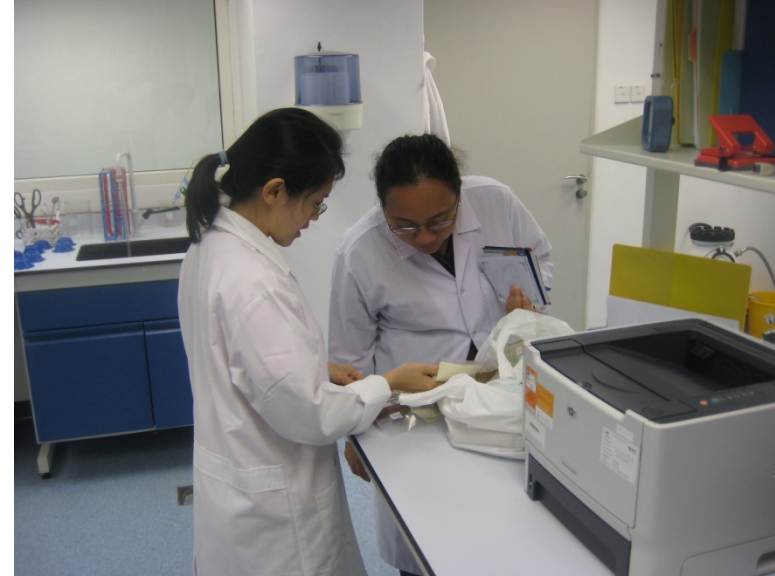
**Mar 22<sup>nd</sup> – Apr 2<sup>nd</sup> 2010, staff from Brunei  
Dept of Agriculture and Agri-food. Trainee  
in AVA GMO testing facility focused on  
Real Time PCR and quantitative detection**



**Training &  
Exchanges**



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**Jul 19<sup>th</sup> – Jul 23<sup>rd</sup> 2010, staff from National Agency of Drug and Food Control (NADFC), Indonesia trained in AVA lab. Part of ASEAN GMFT Net collaboration. Training include QT, and MV.**

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Sample Prep



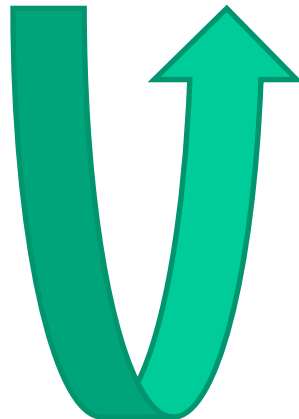
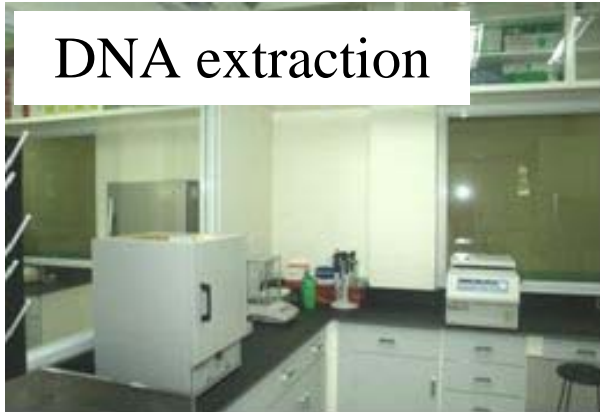
Training & Exchanges



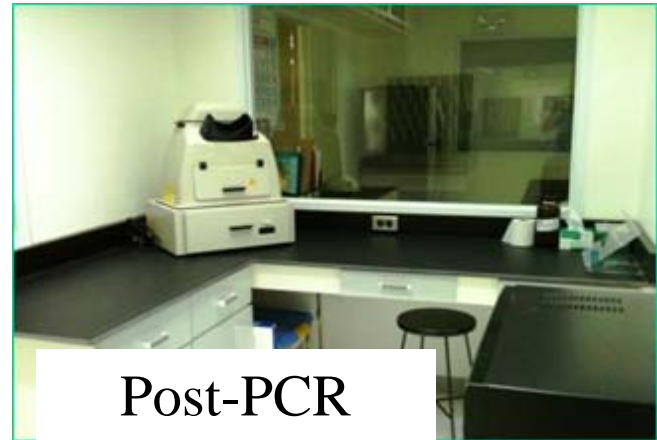
# Philippines DA Post Entry Quarantine Station GMO Detection Lab

-lab design consultation (June 2008)

DNA extraction



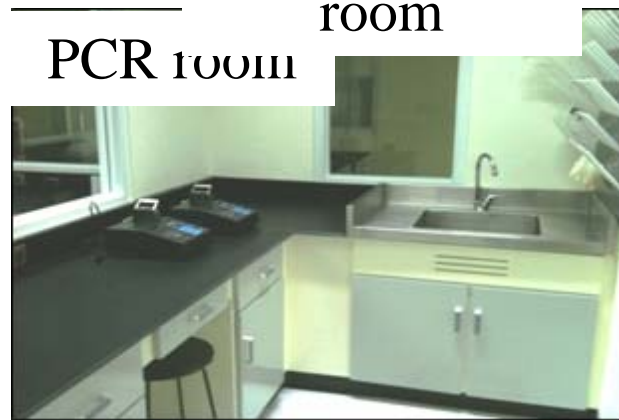
Post-PCR room



Pre-PCR



PCR room



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# 1<sup>st</sup> EU-Asia Regional mtg on GMO detection- Malaysia - June 09



Participants include EC-JRC, China, India, Malaysia, Japan, Singapore, S Korea, & ISAAA

**Broadening  
collaboration**



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# 2<sup>nd</sup> EU-Asia Regional Network Meeting on GMO Analysis - Singapore 9-10 June 2010



Participants:

EC,  
China,  
India,  
Japan,  
S Korea,  
AMSs

Indonesia,  
Lao,  
Malaysia,  
Philippines,  
Singapore,  
Vietnam

IRRI,  
ISAAA

**Broadening  
collaboration**



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**Broadening  
collaboration**



**International workshop on Harmonisation  
of GMO detection & analysis for Central  
and South America -- Dec 09 Brazil**



**Speakers from EC-JRC, Argentina, Brazil,  
Chile, Colombia, Germany, and Singapore**



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# Singapore AVA R&D in GMO detection capacity

Automatic gDNA extraction

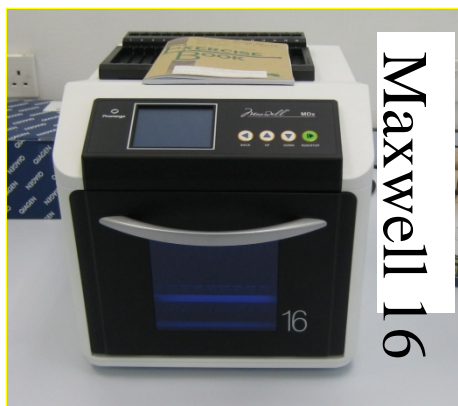
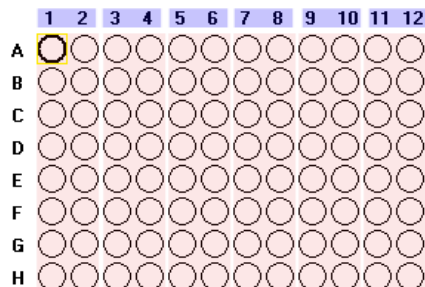


Figure 1.

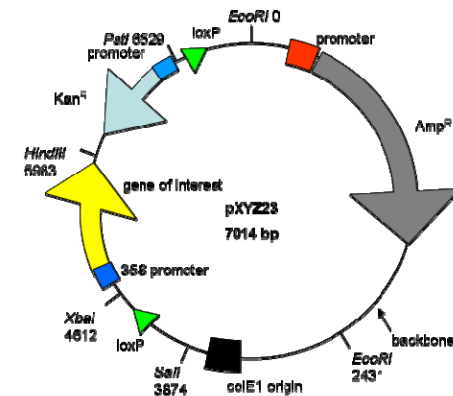


A diagram of a 96-well plate divided into units of 16 samples, or one run.

**Crop based high  
throughput  
GMO screening  
detection (e.g. rice)**

**Collaboration  
with local /  
international  
RIs & industries**

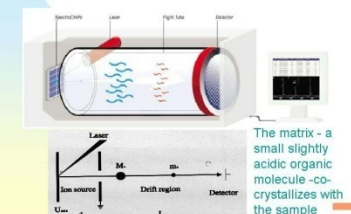
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**Plasmid DNA  
reference materials**



**MALDI-TOF  
Mass Spectrometry - its principle**  
Matrix Assisted Laser Desorption/Ionization - Time-of-Flight



**Protein analytical method  
using MALDI-TOF**



# Needs & Future Actions in GMO Analysis



## 1. Method Validation

### *Special needs:*

Quantitative Detection methods & practical approach of the MU issue.

### *Proposed actions:*

- help from EU & other Asia countries,
- organize a workshop on GMO detection method validation , focus on quantitative detection methods (QT), and cover the practical approach for the MU in GMO QT detection.



# Needs & Future Actions in GMO Analysis



## 2. Reference Materials

### *Special needs in the ASEAN region:*

- (a) availability and affordability of GMO test ref materials for AMCs,
- (b) impurity of matrix based ref materials cause technical difficulty

### *Proposed actions:*

- help from EU and other Asia countries,
- organize a workshop on GMO detection (screening/QL/QT detection) using plasmid DNA – concept and practical issues for using plasmid DNA ref materials *vs* matrix based ref materials.

# Needs & Future Actions in GMO Analysis



## 3. Quality Assurance (incl. proficiency testing)

### *Special needs:*

- (a) ASEAN region does not have an active PT program
- (b) ASEAN GMFT Testing Network also faced technical difficulty to draft “Proposed Guidelines For Method Proficiency Testing In GMO Detection Methods” which is part of our TOR.

### *Proposed actions:*

help from EU and other Asian countries

- (a) To help draft ASEAN GMFTNet “Proposed Guidelines For Method Proficiency Testing in GMO Detection Methods” for;
- (b) To have a PT program that include qualitative detection – more AMSs can participate;

# Needs & Future Actions in GMO Analysis



## 4. Capacity Building

### *Special needs:*

capabilities to detect/ screen, and identify unauthorized GMO crops.

- (a) AMSs have reported detected GMO markers in potato, rice, tomato, wheat, and other crops during recent years;
- (b) Lack of capabilities to conduct further analysis to identify the GMO construct/event for better surveillance detection of unauthorized GMO crops;
- (c) special needs to cater to unauthorized GMO crops that lack common GMO marker(s).

### *Proposed actions:*

help from EU and other Asian countries

- (a) to adapt multiple target screening method using 96-well or 384-well real-time PCR in collaboration with JRC;
- (b) to establish capacity in identifying unauthorized GMO crops, via info exchange, DNA cloning and sequencing (from unauthorized GMO crops), data analysis / mining and other necessary approaches.

# Needs & Future Actions in GMO Analysis



## 5. BioInformatics

- help from EU/JRC and other Asian countries is needed

## 6. Collaboration

EU invited to present their concept proposal at 8<sup>th</sup>  
ASEAN GMFT Network meeting June 9-10, 2011

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**thanks**

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