15aniversario CENAM
CENTRO NACIONAL DE METROLOGÍA

SIM Senior Policy Makers Dialogue Forum

Chemical Metrology and Its Impact on Industry and Quality of Life

Testimonials and Dialogue regarding the rationale for and return on investment from National programs in Chemical Metrology

5-6 November, 2009

Rio de Janeiro, Brazil

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MÉXICO

Scope of activities of Materials Metrology Directorate

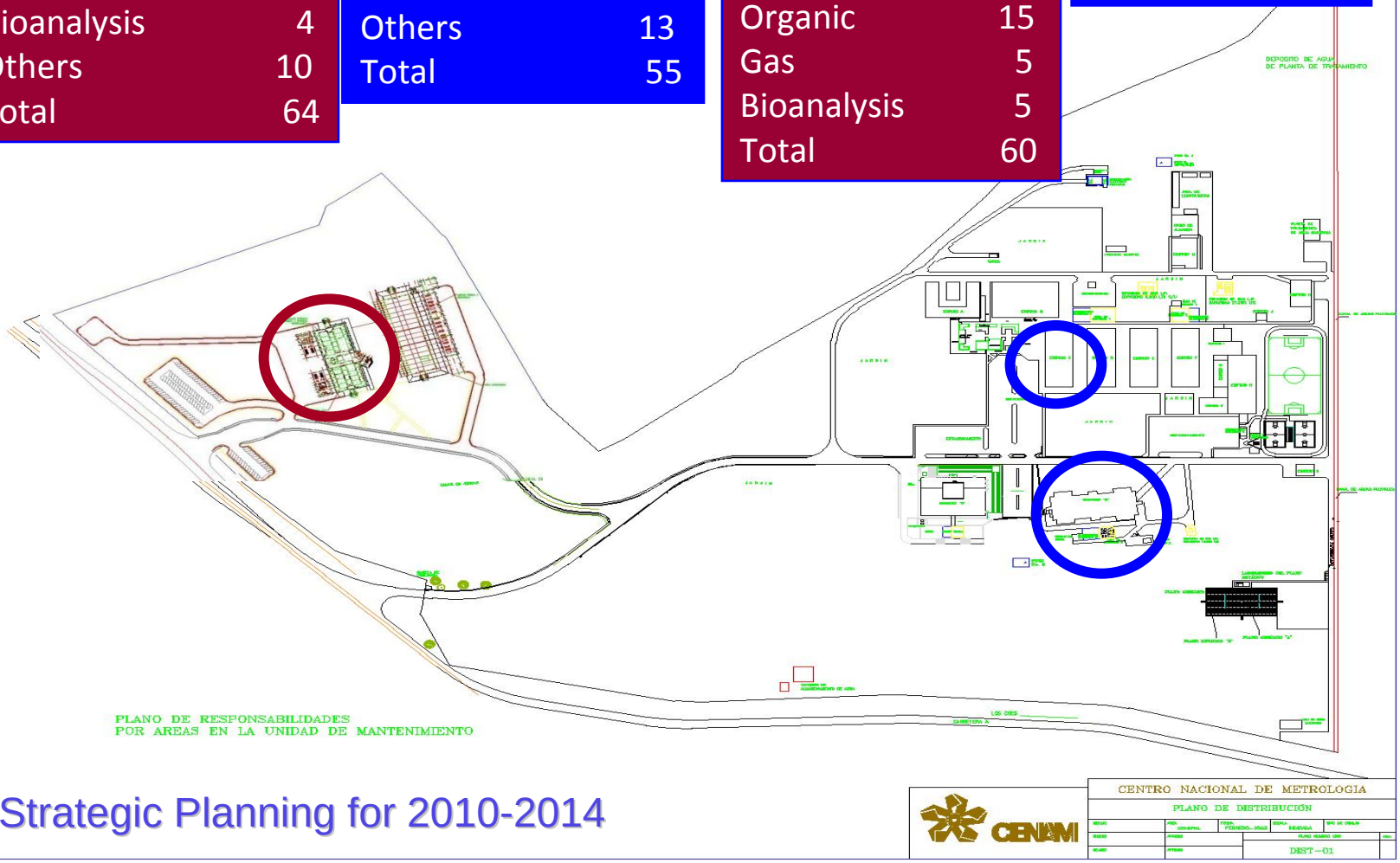
MRTC COORDINATION	CERAMICS	METALS(INORGANIC)	ORGANIC
	XRF RECONSTITUTION	ID-ICP-MS	ID-GC/MS and LC/MS
		COULOMETRY	Electrolytic Conductivity
	MICRO/NANO ANALYSIS	GRAVIMETRY	pH system
MRTC program	XRF for S in fuels		Gas Metrology
		Electro Gravimetry	RT-PCR for GMO
Calibration service	Other reference systems	Other reference systems	Other reference systems
CRM distribution	Engineering materials, particles	Spectrometric solutions Water, Soil	Environmental Clinical , Food pH buffer, EC
Proficiency Testings	**Particle size, Cement, Minerals**	**Water, sediments, food**	**Vehicle & stack Emissions, Food, Soil**

Laboratories 2014	
Materials & Surface/nano	8
Electrochemistry	4
Inorganic	18
Organic	17
Gas	3
Bioanalysis	4
Others	10
Total	64

Laboratories 2009	
Materials & Surface	7
Electrochemistry	4
Inorganic	17
Organic	11
Gas	3
Others	13
Total	55

PERSONNEL 2014	
Direction	4
MRTC	6
Materials & Surface	10
Electrochemistry	5
Inorganic	10
Organic	15
Gas	5
Bioanalysis	5
Total	60

PERSONNEL 2009	
Direction	4
MRTC	5
Ceramics	9
Metals	12
Organics	19
Total	49



Strategic Planning for 2010-2014

Summary of actions (1)

1. CENAM project started in 1991, in which Chemical Metrology Program was included thanks to the recommendation of NIST, and was executed with World Bank credit (Total US$30 MD= US$26 MD for equipment and US$4 MD for training, and with US$30 MD governmental funding for 4 years):
2. Principal political thrust was a decision for NAFTA (1988-1994)
3. Technical background: Initiatives of scientific community (1974-1980)
4. Metrology Law (LFMN): 1988
5. SECOFI (SE) started construction in Queretaro: Initial WB project 1990-1991
6. PTB collaboration with CINVESTAV then with CENAM: 1985-1995
7. Training program in NIST, PTB and other NMIs (1992-1997)
8. Lab design oriented by NIST experts
9. CENAM began services in Proficiency Tests in water analysis in1994 and peer reviewed in 2003 and 2009

Was the investment for 10 years in human resource and in infrastructure development for Chemical Metrology Program in CENAM adequate to meet the need of the industrial and social development of Mexico?

Around 15 % of operational cost is covered by metrological services

CENAM´s Strategic Planning 2010-2014

	Budget for CENAM	Budget for 600	1000	2000	3000	5000
2008	US$ 18.5 MD	US$3.4 MD (18.4 %)	41 %	7 %	29 %	23 %
Service income	US$ 3.33 MD (~ 18 %)	US$0.44MD (~13 %)				100 %
Ideal	?	?				

Metrological services provided by CENAM in Chemical Metrology:

- Calibration services for gas analyzers
- Certified reference materials (CRMs) for chemical measurements
- Proficiency tests
- Specialized analytical services
- Standardization
- Consultancy and training courses
- Technical assessments

CMCs of CENAM (1999-2008) to meet the needs of the society

BIPM/KCDB [August 28, 2009]

Country/ NMI	QM-1 Purity	QM-2 Inorganic. Solutions	QM-3 Organic Solutions	QM-4 Gas	QM-5 Water	QM-6 pH	QM-7 Electrol. Conductivity	QM-8 Metals & Alloys	QM-9 Advan. materials	QM-10 Biolog. Fluid & Mat.	QM-11 Foods	QM-12 Fuels	QM-13 Sedim. Soils, Miner. y Part..	QM-14 Others	QM-15 Surface, engineered nan-materials	Sub-Total MQ	Total Including chemical metrology
Mexico 2008	**53**	**37**	**49**	14	2	7	2	11		4	7		23			209	464

	X	X	X								X	X	X			Trade
	X	X	X								X					Food safety
	X	X	X									X				Energy
	X	X	X			X				X	X					Health
	X	X	X								X			X		C. Protection
	X	X	X	X	X	X	X						X			Environment
	X	X	X	X		X	X	X						X	X	Industry

Top 10 of Mexican & US Trade

Mexico to US

- Crude oil …US$30.3 billion (15.3% of Mexico to U.S. exports, up 31.8% from 2005)
- Car parts & accessories … $21.8 billion (11%, up 5.7%)
- Video equipment (e.g. DVD players) … $14.6 billion (7.4%, up 38.3%)
- Passenger cars … $14.2 billion (7.2%, up 31.2%)
- Other complete & assembled vehicles … $9.6 billion (4.8%, up 20.2%)
- Electrical apparatus & parts … $8.5 billion (4.3%, up 15.1%)
- Telecommunications equipment … $7.0 billion (3.5%, up 41.2%)
- Engines & parts … $5.0 billion (2.5%, up 5.6%)
- Computers … $4.3 billion (2.2%, up 3.7%)
- Miscellaneous household goods (e.g. clocks) … $4.2 billion (2.1%, down 6%)

US to Mexico

- Electrical apparatus & parts … US$10 billion (7.4% of Mexico from U.S. imports, up 13.2% from 2005)
- Vehicle parts & accessories … $9.4 billion (7%, up 14.2%)
- Plastics … $6.6 billion (4.9%, up 12.9%)
- Computer accessories … $6.2 billion (4.6%, down 1%)
- Semi-conductors … $5.6 billion (4.1%, up 0.4%)
- Other petroleum products … $4.8 billion (3.6%, up 9%)
- Finished metal shapes … $4.75 billion (3.5%, up 28.2%)
- Telecommunications equipment … $4.4 billion (3.3%, up 45.7%)
- Industrial supplies … $4.2 billion (3.1%, up 13.3%)
- Industrial machines … $3.9 billion (2.7%, up 5.4%)

Read more: http://internationaltrade.suite101.com/article.cfm/mexicos_top_exports_imports#ixzz0VGMPDNFi

Cases of agricultural products Mexico-US border

FDA URL: http://www.fda.gov/ora/oasis/ora_ref_prod.html (OASIS: Operational and Administration System for Import Support , March 2008)

Pesticides	fresh green beans, **agave syrup**, SHANHAI, GAI LANN, NW YW, sugar pea leaf, BIG BOK CHOY, NW YW BOK, snow peas, fresh papayas, TLAQUEMADA, RED SAUCE, **cactus leaves**, **dried new mexico peppers**, peanuts with hot sauce, **chipotle pepper in adobe sauce**, fresh papaya, **dried ancho pepper**, **sliced jalapeno pepper**, Yucca schidigera powder, 1224 BX GREENBEANS, **HABANERO PEPPERS**, **Ground Red Peppers in Brine Paste** , **PASILLA PEPPERS**, **YELLOW BELL PEPPER**, CORIANDER,FRESH, COSTENA **CHIPOTLES PEPPERS**, RED SALSA, TLAQUEMADA SAUCE, LA SABROZA CHILE DE ARBOL SALSA, BOK CHOY TAIWAN, LONG BEAN, BASIL, **Serrano Peppers**, CUCUMBERS, GREEN BEANS, YU CHOY, SNOW PEAS, SUGAR PEA LEAF, Peanuts w/ Hotsauce , **FRIED FISH (CHARAL) W/ HOT SAUCE**, FRESH LETTUCE IN CARDBOARD BOXES, Dried spearmint (hierba buena), **GREEN ONION MEDIUM**, RED BEET , VALENTINA RED HOT SAUCE, **NOPAL**, GREEN ONION SMALL, CORIANDER (CILANTRO), **GUAJILLO PEPPER**, FRESH CACTUS, YELLOW SQUASH, Red Aztec Spinach, CHINESE KALE, **FRESH CHILACA PEPPER**, EGGPLANT
Aflatoxin	Aflatoxin in Pumpkin seed, peanuts, CHOCOLATE COVERED MAZAPAN
Veterinary Drug	FROZEN SHRIMPS
Histamin	Refrigerated Oilfish

Summary of actions (2)

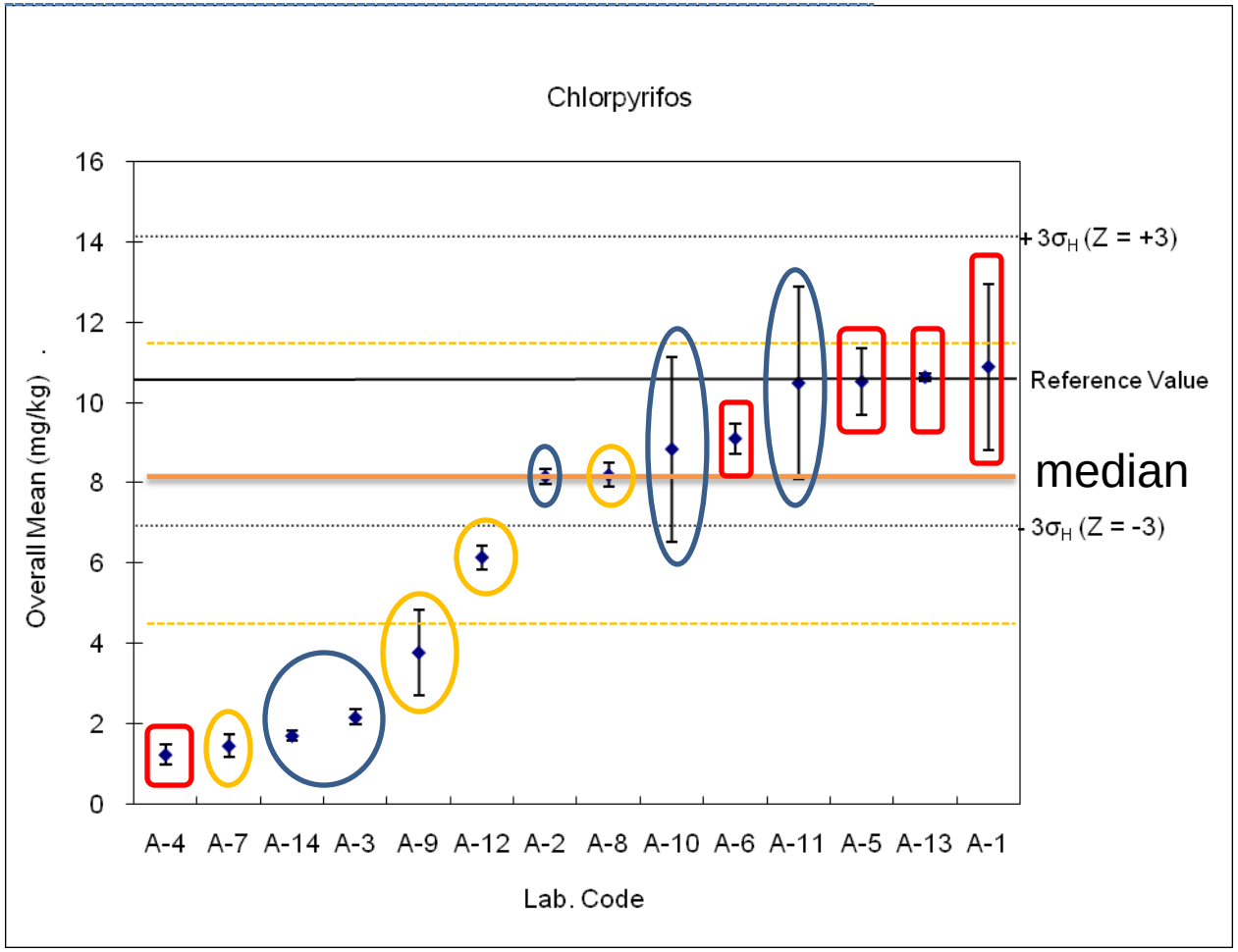
9. CENAM has promoted chemical metrology in APEC region

- Participation in APEC/APLMF Seminars on Traceability and Food Safety (2004-2008)
- Promote comparison studies for food safety in the region, organized by APLAC and APMP/SIM which collaborate in identifying the priority of the region.
- **Implementation of APEC Project for Chemical Metrology Infrastructure (CMI) Development in APEC Region in support of Peru initiative (2008-2009)**

  Study material: Chlorpyrifos and Diazinon in Chinese Cabbage

  Participating economies in the study: Korea (2), Hong Kong China, Japan, Australia (2), Chinese Taipei, Thailand, New Zealand, Malaysia, Mexico (2), Peru (2), Chile, (Suri Lanka), and in the seminar: Indonesia, Brunei, Russian Federation

Comparison results and CMI models



: NMI involves somehow : distributed NMI : no NMI

CENAM´s strategy for developing CMI for CRM

10. Collaborations in other governmental entities and organizations

Looking for collaborations with reference laboratories and accredited laboratories:

Transfer metrological responsibility to RL to convert it to DL (CIPM-MRA)
Develop capability as PT providers and/or RM producers

11. Collaborations in SIM region

OAS Project

Collaboration to support of food quality and safety by Chemical Metrology

Goals: Certify by collaboration CRMs for food quality and safety control

Participating countries:

Argentine, Brazil, Bolivia, Colombia, Chile, Ecuador, Peru, Jamaica, Mexico, Uruguay

Stage I (2007/2008): Lyophilized milk (Colombia & Chile)

Stage II (2008/2009): Synthetic water (Colombia)

Stage III (2009/2010): Meat homogenized (Colombia & Chile)

Stage IV (2010/2011): Grain

Cadmio

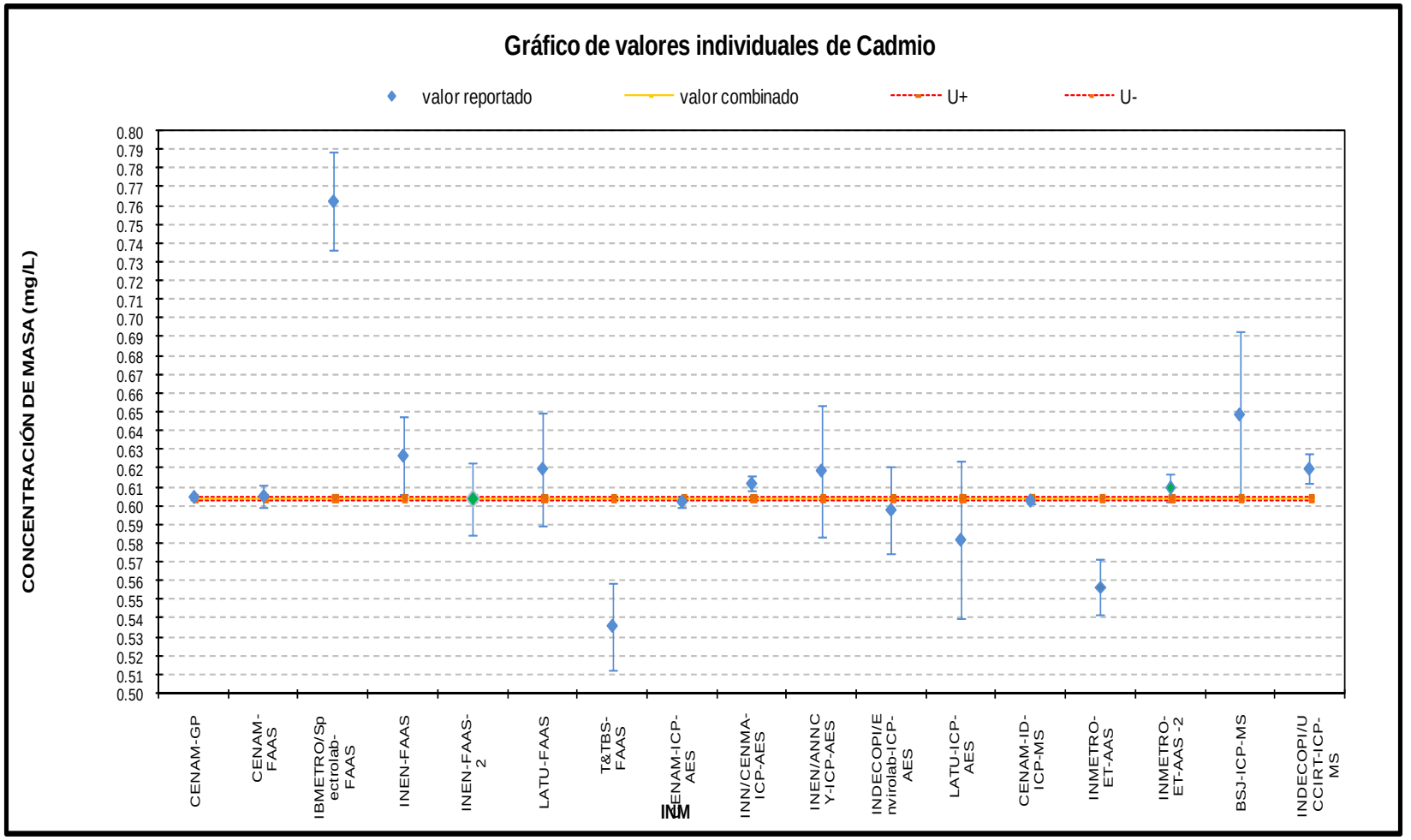


Fig. Comparison between reported values by NMIs and CENAM´s certified value for cadmium.

Summary of actions (6)

12. Sector oriented Projects:**CENAM´s Strategic Planning 2010-2014**

- International trade: Associations and chambers (Cement)
- Food Safety and Nutrition: Responsible Entities (SENASICA)
- Sustainable Energy: CFE, PEMEX, ININ
- Healthcare Decision-Making: COFEPRIS
- Consumer Protection: SE(PROFECO)
- Environmental Protection: INE/SEMARNAT, CONAGUA
- Sustainable Economy: Innovation and MRTC program

Present situation of CRM availability in Mexico

- Demand for CRMs exceeds the installed capacity of CENAM and of the MRTC program in types and numbers
- International availability does not satisfy it, in addition to the difficulty in customs clearance and authorization process, which hinder easy access to CRMs
- There are good initiatives for collaboration among domestic Institutions, which require formal institutional support to materialize
- There exist good infrastructure for conformity assessment and human resources in public Institutions
- There is a good possibility to establish Designated Institute or Depositary of Standards in chemistry with additional investment.
- Lack of PT providers is critical
- Accreditation scheme for CRM providers does not exist
- Use of traceable CRMs in conformity assessment, which are available in the market

Project for facilitation of FT between EU and Mexico: PROTLCUEM (Actividad C2A2-79), June 2009

Recommendations

Project for facilitation of FT between EU and Mexico:
PROTLCUEM (Activity C2A2-79), June 2009

1. Establish formal collaboration with other public Institutions for development of CRMs
2. Enhance MRTC program
3. Collaborate with ema for development of CRM producers accreditation program
4. CENAM should concentrate on production of CRMs not available internationally
5. Mutual acceptance of CRMs by accredited providers with other regions
6. Facilitate mechanisms of importation of CRMs
7. Collaborate with other NMIs
8. Promote the good use of CRMs

Tasks

2010-2014

- Up-date measurement infrastructure
- Participate in standardization/harmonization
- Contribute to innovation/competitiveness of industries
- Development HR in critical areas:
  - More MRTC partners
  - Support food quality and safety initiatives
  - Support environmental quality management
  - Support “pure substance reference” of FEUM for pharmaceutical application
  - Develop capabilities in GMO quantification and nanometrology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