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DEKHEILA MEAT AND POULTRY LABORATORY GAP ANALYSIS

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ASSISTANCE FOR TRADE REFORM

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Dekheila Meat and Poultry Laboratory GAP ANALYSIS

The laboratory was visited on 23/12/2004 with the aim of assessing the present situation of the facility and personnel and setting a plan for upgrading the physical, technical and analytical capabilities in the field of pesticide residue analysis in food. The upgrading plan is designed to achieve non-stop analysis of the following:

1. Pesticide residues in samples of:
 - a. fatty foods (meat, poultry and products)
 - b. fruits and vegetables
 - c. milk and oil seeds
 - d. dry and low fat foods

2. Multiresidue methods that are capable to analyze:
 - a. organochlorine pesticide residues and PCB's
 - b. organophosphorus pesticide residues
 - c. carbamate residues
 - d. other specific methods (i.e. benzimidazoles, methyl bromide...)

Other essential objectives are:

- working capacity of 10,000 samples per year (as a start)
- applying quality control and quality assurance issues
- applying for international accreditation based on ISO 17025
- sustainability of the lab work

Present Status and changes needed

Working Area:

- One of the existing labs. should be specified as the pesticide residue analysis lab. (PRA). Possibly, the lab for analyzing food additives with HPLC.
- The specified lab. should be reorganized to include:
 - Standards room for weighing and preparing standard solutions.
 - Wet lab for extraction, cleanup, partitioning, evaporation, etc.
 - Dry or instrumental lab. for GC's, HPLC's, spectrophotometer, etc.
 - Washing room for glassware washing machine, water distiller, drying oven, etc.
 - Small office for data reporting.

Equipment:

The main list of equipment (HD-QR-101) (No.1) submitted by the lab. members was revised and additions needed are listed in Annex 1. item I.

Chemicals:

The chemical list (HD-QR-100) (No. 2) submitted by the lab staff was revised and additional chemical and solvents needed are listed in Annex 1. items IV and V and in Annex 2. items II and III.

Capillary columns:

The column list (HD-QR-124 c) (No. 3) submitted by the lab staff was revised and additional columns needed are listed in Annex 1. tem III and Annex 2. item I.

Glassware:

The list of glassware (HD-QR-102) (No. 4) submitted by the lab staff was revised and additional glassware needed are listed in Annex 1. item VI.

Standard reference materials (active ingredients):

The list of standard reference materials needed should be prepared according to pesticide residues moving in international trade of food that contribute health risk to consumer and to the available scope of the methods of analysis used.

0.25 g of each certified standard ref. material needed for analysis. All estimates are based on analyzing 5000 samples of vegetables, fruits, dry and low-fat foods and 5000 samples of fatty foods, milk and oilseeds (total 10,000 samples).

Quality needs:

Quality management system:

- Laboratory Quality Manual following ISO 17025
- Standard operating procedures (SOP's)

Quality Assurance /Quality Control Systems:

- Recovery studies
- Reference material (spiked samples)
- Quality control charts
- Spiking procedures
- Trouble shooting chart for poor recoveries
- Reagent and method blanks
- Documenting the results from intralaboratory quality assurance programs
- Adequacy of the analytical methods
- Limits of quantification
- Participating in Interlaboratory Quality Assurance programs (professioncy tests)

Sampling:

The sampling process is not the task of the lab. Instead, it is operated by inspectors from Import/Export Control Departments. However, inspectors should be trained continuously

under supervision of the lab. A manual for sampling should be prepared by the lab, setting the rules for sampling procedures suitable for pesticide residue analysis and internationally accepted.

Subsampling:

Subsampling room is close to the analytical lab where the instruments suitable for grinding and mincing the samples could be installed.

Cooling stores:

Refrigerators for sample storage (+2°C),
Refrigerator standard reference materials (+2°C),
Deep freezers for storing samples (homogenized) (-20°C),

Storage areas for:

Chemicals, solvents and reagents,
Glassware,
Spare parts,
Archives.

Training:

Training programs will be organized in the following areas:

Analysts technical training

- On job technical training (local experts) -6 months,
- Technical training in an accredited pesticide residue analysis lab. (local lab.)-2 months,
- Technical training in an international accredited pesticide residue analysis lab.(FDA lab.) -2 months

Quality Control/Quality Assurance training

- Special training programs will be prepared and organized on some specific issues i.e. uncertainty, validation of results, statistical analysis of data and reporting.

Training on sampling procedures (Inspectors)

- Training programs will be prepared and organized for the inspectors on the procedures of samples collection. Refreshing and updating training should be organized every second year.

Training on subsampling procedures

- Training programs will be prepared and organized on grinding, mincing and preparation of laboratory samples for residue analysis

Training on safety of the workers and environment

- Training program will be prepared on the safety of the workers and the environment in a laboratory of pesticides residue analysis lab.

Proficiency tests:

The lab will participate in international proficiency test programs as well as ring test analysis with local accredited lab.

Personnel:

Five analysts are working in the pesticides residue analysis lab. graduated either from the faculty of engineering (chemistry) or the faculty of science (chemistry). They are well qualified for the work. At least, five more analysts newly graduated from faculties of science (organic, analytical or bio-chemistry) or agriculture (pesticide chemistry) are needed. Ten well trained analysts are the minimum requirement to analyze 10,000 samples per year.

Power supply:

Electric generator and UPS are available but steps should be taken to guarantee a continuous uninterrupted power supply for all analytical instruments and computers.

Water supply and water quality:

Water supply should be at a suitable and continuous flow for washing, rotary evaporators and soxhelets. Water distillatory and deionizer are available but the quality of the resulting water needs to be checked for compliance with analytical needs.

Air conditions and ventilation:

Air conditions are available but it was noticed that the temperature in the lab. was high and not cool enough for operating the analysis. New air conditions should be added to the different areas especially the wet and dry lab's. Air conditions should be working simultaneously 24 hr. to keep the temperature $22^{\circ}\text{C} + \text{or} - 1^{\circ}\text{C}$ all the time with no big fluctuations that can affect the analysis process or the equipment.

The lab. windows should be sealed to prevent dust from reaching the working area. Exhaust fans should be fixed in every place were chemicals and solvent vapors could be found i.e. wet lab., dry lab., standards room and washing room.

Fuming hoods should be fixed in standards room (1) and in the wet lab.(2)

Computer network and information center:

A computer network to be installed in the lab. connected to the sample receiving area to collect the samples information and give the working orders and collect the analysis data to issue the certificate of analysis.

All the data of analysis should be stored on CDs (preferably) with a daily backup.
 Connection to the internet in a separate computer should be available to get the updated international information on the methods of analysis and the maximum residue limitsetc.

Proposing for accreditation:

After completion of the lab quality management system according to ISO 17025, the lab will be qualified for accreditation from A2LA. The lab will be assisted to propose and the team leader will attend the initial assessment visit.

Future sustainability of the work:

Suggestions will be offered to find resources that grantee the continuity and sustainability of the work including investments, materials and incentives for the staff.

Annex 1: List of equipments, chemicals, solvents, GC capillary columns required for analysis of pesticide residues in meat and poultry at GOEIC/DEKHAILA Lab.

S/N	Requirements	Quantity
I- EQUIPMENTS		
1	GC equipped with double NPD (Agilent-6890)	1
2	GC equipped with double ECD (Agilent-6890)	1
3	Nitrogen generator	1
4	Air compressor	1
5	Top load balance	1
6	High speed blender	4
7	Mincer	2
II- ACTIVE INGREDIENTS		
1	0.25g of each pesticide or PCB active ingredient (required to be within scope of analysis)	1
III- GC CAPILLARY COLUMNS (based on 5000 samples / year)		
1	HP-PAS 5 (25 m length, 0.32mm i.d, film thickness 0.52 um	5
2	DB-1701 (30 m length, 0.32mm i.d, film thickness 0.25 um	5
IV- CHEMICALS (based on 5000 samples / year)		
1	Sodium Sulfate	575 kg
2	Florisol	75 kg
3	Sodium Chloride	5 kg
V- SOLVENTS* (based on 5000 samples / year)		
1	Petroleum ether	9000 liters
2	Acetonitril	600 liters
3	Diethyl ether	750 liters
4	Hexane	50 liters
5	Acetone	125 liters
VI- GLASSWARE** (based on 5000 samples / year)		
1	Buchner funnel	20
2	Chromatographic column 22mmX300mm i.d, coarse porosity fritted disc	20
3	Seperatory funnel 125 ml	20

4 Separatory funnel 1000 ml 20

* All solvent have to be pesticide residue grade

**Glassware specified in this list are those especially required for analysis of pesticide residues in meat and poultry, other glassware which are commonly used in chemical laboratories are still requested

Annex 2: List of chemicals, solvents, GC capillary columns required for analysis of pesticide residues in fruits, vegetables and dried herbs at GOEIC/DEKHAILA Lab.

S/N	Requirements	Quantity
I- GC CAPILLARY COLUMNS (based on 5000 samples / year)		
1	HP-PAS 5 (25 m length, 0.32mm i.d, film thickness 0.52 um	5
2	DB-1701 (30 m length, 0.32mm i.d, film thickness 0.25 um	5
II-CHEMICALS (based on 5000 samples/year, half of them will be subjected for clean up)		
1	Sodium Sulfate	500 kg
2	Florisil	75 kg
3	Sodium Chloride	10 kg
III- SOLVENTS*(based on 5000 samples/year, half of them will be subjected for clean up)		
1	Acetone	750 liters
2	Petroleum ether	250 liters
3	Dichloromethane	625 liters
4	Hexane	225 liters
5	Ethyl acetate	100 liters
6	Benzene	5 liters

* All solvent have to be pesticide residue grade

**glassware which are commonly used in chemical laboratories are requested

Months	-1	-2	-3	-4	-5	-6	-7	-8
1-Establishing Dekhela residue lab.								
Providing overall guidance	x							
Developing standard set of equipments and supply	x							
Reviewing and setting out equipments and supplies	x							
Identifying the scope of accreditation	x							
2-Initiating the lab. management system according to the requirement of the ISO 17025								
Updating Organization Chart	x							
Nominating Technical and Quality Managers	x							
Assignment of duties and responsibilities for key functions	x							
Setting the lab. quality policy	x							
Revising the procedures of:								
document control		x						
review of requests, tenders and contracts		x						
sub-contracting of tests		x						
purchasing services and supplies		x						
complaints		x						
control of non-conforming testing work		x						
corrective and preventive actions		x						
control of records			x					
internal audits and management review			x					
personnel competence demonstration			x					
Setting procedures for:								
accommodation and environmental conditions				x				
validation of test methods				x				
estimation of measurement uncertainty				x				
operating and calibration of testing equipment				x				
assuring the quality of test results					x			
3-Preparation of manuals and instructions for sampling, sub-sampling								

and sample preparation processes

- Providing advisory services and training for GOEIC inspectors
- Training the staff on the techniques employed in sampling and sub-sampling processes according to CODEX principles
- Arrangement for translation and printing of manuals and instructions for sampling, sub-sampling and sample preparation processes

			x x x x					
				x x x x				
	x x x x	x x x x						

Months	-1	-2	-3	-4	-5	-6	-7	-8
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4-Human capacity building and training

4.1 Lectures:

- Chemistry of pesticides
- Pesticides regulations and registrations in Egypt
- Maximum Residue Limits (MRLs) of the CODEX ALEMENTARIUS
- World Trade Organization and Sanitary and PhytoSanitary Agreement
- Pesticides regulations and registrations in Egypt
- Pesticide Residue Analysis in fatty and non fatty foods
- Analysis of pesticide residues using GC techniques
- Analysis of pesticide residues using HPLC techniques
- Confirmatory tests
- Validation of pesticide residue analytical methods and related topics
- Estimation of measurement uncertainty
- Quality Assurance and Quality Control in Pesticide Residue Analysis Labs.

					x			
					x			
					x			
					x			
					x			
						x		
						x		
						x		
						x		

4.2 Practical training:

4.2.1 Start analysis of pesticide residues in fatty food:

- running experiments
- validation of test methods
- Inter-lab comparison with Cent. Lab of Residue Analysis
- applying for participation in international PT programs

						x		
						x		
						x		
						x		

4.2.2 Start analysis of pesticide residues in non-fatty food:

- running experiments
- validation of test methods
- inter-lab comparison with Cent. Lab of Residue Analysis

							x	
							x	
							x	

applying for participation in international PT programs								x	
4.3 Training abroad									
3 groups(3,3,4) to be trained in USA laboratories for 2 months each	x x x x x	x x x x x	x x x x	x x x x		x x x x	x x x x		
5-Start analysis of Real Samples and evaluation of the Lab. capabilities for NON-STOP analysis of pesticide residues:									
Receiving real samples and evaluating the Lab. capabilities for non-stop analysis								x	
Issuing test certificates								x	
Continue participating in inter-lab comparison round with the Cent. Residue lab									x
Participation in international proficiency test for fatty and non-fatty foods									x
6-Applying for International Accreditation									
Issuing the final version of the lab. Quality Manual				xxxxxx	xxxxxx	xxxxxx	xxxxxx		
Issuing the final version of the lab. Standard Operating Procedures Manual				xxxxxx	xxxxxx	xxxxxx	xxxxxx		
Contacting International Accreditation Body								x	
Fill in application for International Accreditation Body								x x	
Assign the time of the initial accreditation visit									x
7-Get the Accreditation for GOEIC Pesticide Residue Laboratory in DEKHELA									
Set the corrective actions plan for the non-compliances reported by the accreditation body during the initial assessment visit									x

