CENTRAL ANALYTICAL LABORATORY(CAL) QUALITY CONTROL & QUALITY ASSURANCE

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Introduction

- CAL was established in 1977
- To provide analytical support and services to KISR's applied research programs
- State of the art analytical facility

Introduction

Current Areas of Activities:

- Provides analytical services to KISR's research activities in the field of petroleum, environment, hydrology and food.
- Provides analytical services to government and private organization.
- Provides training on analytical equipments, analytical techniques and their applications; and QC/QA practices.
- Research and development activities including analytical method development.

Introduction

❖ Five analytical Sections:

- Chromatography Section
- Spectroscopy Section
- Physical Chemistry Section
- Trace metals Section
- Wet Chemistry Section

❖ Quality Control & Quality Assurance section

Introduction

❖ Manpower:

- Each analytical section is headed by a qualified and experienced researcher.
- Qualified, trained and experienced analytical staff

❖ Instrumentation:

- Each section is equipped with most modern analytical equipments.

Chromatography Section

Analytical Instruments

- Bench top Gas chromatograph-Mass Spectrometers (GC/MS)

- Tandem Mass Spectrometer interfaced with GC and HPLC and equipped with Electrospray, FAB, Frit-FAB and other ionization sources.

- An LC-MS/MS equipped with Electrospray and APCI ionization sources.

- GCs equipped with FID, ECD, HALL, FPD, TCD and NPD detectors, split/splitless injection and head space systems.

- High Performance Liquid Chromatographs (HPLC) equipped with UV, fluorescence and refractive index detectors; system controller for programmed gradient elution and data module.

- Fluid Management System (FMS).

Chromatography Section

❖ Analysis carried out on various types of samples:

- Dioxin & Furans by High Resolution GC/MS/MS (Joel 800D) .
- Pesticides and PCBs in soil by GC/MS-NCI (Agilent 5973).
- PBDEs by GC/MS (Agilent 5975).
- PAHS in food and water samples by GC/MS & HPLC.
- VOC's by Purge and Trap GC/MS (Agilent 5973).
- Fatty acid & Cholesterol in food preparations by GC.
- Crude oil & petroleum products analysis by GC & GC/MS.
- Vitamins (Fat & Water soluble) in food and feed by HPLC.
- Sugars in food samples by HPLC.
- Anabolic Agent in food, urine and feeds by GC/MS
- Light Petroleum Hydrocarbons Gases by GC/FID.
- Honey adulteration as Hydroxy Methyl Furfural analysis by HPLC.
- Aflatoxins in food and feed by HPLC.
- Food colors in food by HPLC.

Chromatography Section

❖ R & D activities conducted through projects:

- Assessment of pesticides residue levels in foods in Kuwait.
- Assessment of the levels of chlorinated pesticides in breast milk in Kuwait.
- Assessment of the impact of air pollutants emitted from medical waste incinerators on the hospital environment and surrounding areas.
- Microbial and chemical contaminants associated with seafood and its safe consumption in the state of Kuwait.
- Establishment of Kuwait Municipality Central Food Control laboratory and a Risk-based system for Food Sampling and Analysis.

Standard Operating Procedures (SOP)

1. **Samples**

- SOP for sample handling.
- SOPs for preparation of samples for analysis.
- Appropriate labeling.
- Appropriate environmental conditions during transportation, handling and storage.
- Defined sample retention period.
- SOPs for samples disposal.
- Sample record.

Standard Operating Procedures (SOP)

2. Calibration

- SOPs for calibration of equipments including their calibration schedule.
- Calibration by trained staff.
- Use of appropriate calibration standards and certified reference materials.
- Performance check by analyzing check standards and certified reference materials.
- Calibration record.

Standard Operating Procedures (SOP)

3. Testing & Reporting

- SOPs for testing.
- Appropriate method used to perform test.
- Preferably standard methods published by international organizations e.g. ASTM, ISO, USEPA, USFDA etc.
- Non standard methods and Laboratory-developed methods are validated before routine use.
- Performance are checked by analyzing check standards, spiked samples and certified reference materials.
- Reporting of results with appropriate information.
- Testing record .
- Participation in-inter laboratory comparison exercises.

Quality Control & Quality Assurance

Methods Of Quality Control/Quality Assurance on POPs

A set of experiments were run in the laboratory in order to obtain an acceptable reliable data, which include:

- Certified reference materials (CRM).
- Internal standards.
- Spike surrogate and native compounds.
- Repeatability and reproducibility.
- Matrix effect.
- Procedural and field blank.
- Recovery test.
- Participation in inter -laboratory comparison exercises.

List of some publications in the relevant field

1- "Quantitative determination of organochlorine pesticides in sewage sludges using soxtec, soxhlet and pressurized liquid extractions and ion trap mass-spectrometric detection".
M.I.Helaleh, A. Al-Omair, N. Ahmed and B. Gevao
Anal Bioanal Chem (2005) **382**: 1127-1134

2- "Organ phosphorus Pesticide Residues in the total diet of Kuwait".
Talat Saeed, Wajih N. Sawaya, Nisar Ahmad, Sangeetha Rajagopal, and Ali Al-Omair.
The Arabian Journal for Science and Engineering, volume 1A (2005).

3- "Performance in International Analytical Quality Assurance studies on pesticides residues in spiked food samples".
Ali S. Al- Omair**,** Nisar Ahmed, Abdul Aziz Inayatullah and Al- Kandari
Kuwait Journal of Science& Engineering" V 31 number (1) June, 2004

4- "Chlorinated pesticide residues in the total diet of Kuwait".
Talat Saeed, Waji N. Sawaya**,** Nisar Ahmad, Sangeetha Rajagopal, Ali Al-Omair, Fawzia Al-Awadhi
Food Control **12** (2001) 91-98.

List of some publications in the relevant field

5- "Assessment of the levels of chlorinated pesticides in breast milk in Kuwait".
Talat Saeed, Waji N. Sawaya**,** Nisar Ahmad, Sangeetha Rajagopal, Basma Dashti and Samira Al-Awadhi.
Food Additive and Contaminants, 2000, vol, **17**.No.12, 1013-1018.

6- "Dietary intake of Organophosphate Pesticides in Kuwait".
Waji N. Sawaya. Fawzia Al-Awadhi, Talat Saeed, Ali Al-Omair, Adnan Hussain, Nissar Ahmad, Husam Al-Omirah, Sameer Al-Zenki, Sherif Khalafawi, Jamla al-Otaibi, Hanan Al-Amiri.
"Food Chemistry **69** (2000) 331-338".

7- "Dietary intake of Pesticides: State of Kuwait Total Diet Study".
W.N.Sawaya, F. A. Al-Awadhi, T. Saeed, A. Al-Omair,
N. Ahmad, A. Hussain, S. Khalafawi, S. Al-Zenki, H. Al-Amiri, J. Al-Otaibi and J. Al-Saqer.
"Food Additive & Contaminants." 1999,Vol.**16**.No 11.473-480,

8- "Kuwait's Total Diet Study: Dietary Intake of Organ chlorine, Carbamate, Benzimidazole and Phenyl urea Pesticides residues".
Waji N. Sawaya. Fawzia Al-Awadhi, Talat Saeed, Ali Al-Omair,Nissar Ahmad, Adnan Hussain, Sherif Khalafawi, Husam Al-Omirah, Basma Dashti, Hanan Al- Amiri and Jameela Al-Saqer.
"Journal of AOAC International Vol. **82**, No.6.1999".

List of some publications in the relevant field

9- Determination of the Levels of Polycyclic Aromatic Hydrocarbons in Toasted Bread Using Gas Chromatography Mass Spectrometry.

Amal Al-Rashdan, Murad I. H. Helaleh, A. Nisar, A. Ibtisam and Zainab Al-Ballam

Hindawi Publishing Corporation, International Journal of Analytical Chemistry. Volume 2010, Article ID 821216, 8 pages.

Conference Papers:

1- Fast Analysis of Polycyclic Aromatic Hydrocabons, Organo-Chlorinated Pesticides and Polychlorinated Biphenyls in Environmental Marine Samples by Automated PLE and Power Clean-Up System.

Amal Al-Rashdan, Murad I. H. Helaleh, A. Nisar, A. Ibtisam , Z. Al-Ballam

36th International Symposium on Environmental Analytical Chemistry, October 5-9, 2010. Rome, Italy.

2- Determination of the Levels of Polycyclic Aromatic Hydrocarbons (PAHs) in Toasted Bread from Barley, Bran, Corn, Rice, Soya and Flacks Mixed with Sun Flower Seeeds Flours using Gas Chromatography Mass Spectrometry.

Amal Al-Rashdan, Murad I. H. Helaleh, A. Nisar, A. Ibtisam, Z. Al-Ballam

36th International Symposium on Environmental Analytical Chemistry, October 5-9, 2010. Rome, Italy

Thank you