



Scientific and Applied Activities for the Chemistry Department, College of Science, Al-Nahrain University to Enhance Security and Safety in 2017

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Abstract

Chemistry laboratories present more hazards than are typically found in other science laboratories. The Department of Chemistry at the College of Science at Al-Nahrain University aims to establish and develop the concepts of occupational safety and its embodiment through an applied reality aimed at making the work environment safe considering the development of scientific aspects and deepening the safety culture. 2017 was a year of achievements that can be summarized through major trends including the development of laboratory infrastructure, education of safety aspects, scientific support for Iraqi universities, community service in addition to the scientific research activity to teach the department on various safety topics.



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Introduction

The laboratory is a building used to carry out a scientific and practical work. The laboratory is in the process of teaching or research and contains a dedicated and separate site as an office, a hardware room and a material preparation within the competence of the laboratory, which can be chemical, physical, biological or medical¹. Laboratory work requires the application of approved safety procedures according to the nature of the laboratory, as well as rehabilitation courses for laboratory and student personnel, especially in the educational laboratories².

Academic laboratories similar to industrial laboratories require that they conform to basic safety principles to reduce injuries and accidents³. The development of the Department of Chemistry to promote the safety aspects included specific and important directions, including:

Development of Laboratory Infrastructure

The laboratory must contain sufficient space and design according to the nature of the laboratory and equip the laboratories with appropriate furniture in addition to the availability of appropriate ventilation



systems, lighting, heat control devices and dust disposal devices⁴.

All personnel involved in the laboratory activity are responsible for safety as part of the administrative and ethical responsibility. All laboratory staff must meet the legal requirements of health, safety and the environment⁵.

In order to upgrade the infrastructure, research laboratories have been rehabilitated in accordance with the requirements of the good laboratory and according to the basic security and safety needs. A laboratory qualification was conducted under the supervision of the trained Chemistry department staff in the American Chemical Society programs. Pictures 1, 2 and 3 shows the new benches and new instruments instilled in research laboratories.

Education of Safety and Scientific Support for Iraqi Universities

Laboratory staff or students working in the laboratory must be qualified in terms of safety and receive appropriate training from the first day of work. There must be additional training takes place whenever there is an advanced laboratory work or in terms of the dealing with hazardous chemicals or use complicated devices. It is the responsibility of the institution responsible for the laboratory to improve the safety culture and documenting these programs and these exercises as part of general requirements³. The most important events carried out by the Chemistry department can be summarized as follows:

- Teaching the Occupational safety lesson for second grade students in chemistry for the eighth year with a syllabus prepared by the Chemistry department and supported by the American CRDF Foundation experts.
- Supporting the sectors of society by promoting a culture of safety for some of the members of the state departments within the quality sector by a workshop on occupational safety named (fires. Causes and methods of prevention and treatment).
- Active participation in numerous researches at the Second Coordination Conference on Safety.
- An induction seminar for the college of science associates on Mines.
- Establishment of a comprehensive security and safety course entitled "Safety and ethics" for teaching staff and students in Iraqi universities.



Picture 2: New instruments (Electrophoresis) instilled in the laboratory



Picture 1: New benches instilled in the laboratory



Picture 3: New instruments (Atomic Absorption) instilled in the laboratory



Picture 4: Fire extinguishers supplying



Picture 5: Firefighting practices

Safety and Security Scientific Research Activity

The Chemistry department has published a number of specialized researches on security and safety in international journals and educating students the basic concepts of these researches beneficiaries in practical applications. Researches published during the year 2017 are listed below:

- Rehabilitation of gas discharge systems for chemical storage⁶.
- Chemical laboratory assessment and determine the qualification requirements⁷.
- Maintenance and testing of fume cupboard.
- Precautions that must be taken in consideration when putting chemicals in the furnace.
- Using the wrong way of putting ionic liquid sample in tube furnace.
- Evaluating a chemical/ biological laboratory to promote safety measures.
- Environmental problem from the combustion of sulphur in Mishraq field.

Fire Systems and Training

Fires happen when you least expect them, often during the night. They also spread very quickly, damaging property, injuring and killing people. But the real killer is smoke. If you're asleep when a fire starts and you don't have a smoke alarm to wake you, you are unlikely to survive. Smoke suffocates quickly – you could be dead before the flames reach you⁸. Sensors and firefighting systems are very important and need to be available in laboratories. As the Department labs do not have fire sensors and automatic firefighting systems, the department plans to create such systems when the funds are available. However, the department provided sufficient types

of fire extinguishers(see picture 4) as well as the training of the members and students of the department to use them as shown in picture 5.

Results and Privileges

The chemistry department at Nahrain University is superior to the rest of Iraqi universities by teaching the Occupational safety lesson for second grade students in chemistry for the eighth year with a syllabus prepared by the Chemistry department and supported by the American CRDF Foundation experts and the teachers have many participations in the activities of safety such as training courses, conferences and scientific publications in international journals.

Conclusion

Illustrated by the actions of the chemistry department within various activities to strengthen the laboratory infrastructure and promote the dissemination of the culture of safety through conferences, lectures and symposiums supported by practical procedures and practices to increase expertise in procedural processes reflect the department's concern Chemical safety and security, to improve the working environment in laboratories, to ensure the safety of workers and students and to maintain the infrastructure of the educational institution.

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Conflicts of Interests

The authors declare no conflict of interest.

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