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Safety and security requirements in chemical laboratories of Iraqi universities

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Abstract
According to recent events surrounding the security and safety concerning the work in chemical laboratories, Universities in Iraq are in need of chemical safety and security facilities, professionals and resource materials, as their involvement in more and advance chemical educations and researches. It seems that the more the universities engage themselves with advanced chemistry research, the more they need the safety and security facilities and skills. Problems concerning improper chemical waste disposal were identified with allegedly not providing enough training to employees and having deficiencies in the laboratories chemical hygiene plan. Discarders should be expert in chemical security and work hard to safeguard the communities.

Keywords: chemical laboratories, safety, security, chemical disposal, Basrah, university

Introduction
During conducting of an experiment in a chemical laboratory, University, Industrial, or even for demonstration, there will be a certain risk assessment from hazardous chemical compounds within reaction or production [1].
Therefore, there are a certain precaution needed to be taken:

1. Is there any requirement for using fume hood?
Is it required to prepare or using of hazardous chemical compounds. If so the lab should supply with fume hood, otherwise no conduction of chemical experiment. On the other hand, if there is no chemical risk for reactants or products, no hood is needed and normal room ventilation is sufficient for demonstration with little precaution that decrease inhalation and conducting the experiment in a short time [2].

2. What safety equipments are required?
Chemical splash is expected so goggle and eyewash, shower as well as gloves and apron are required. They all should be made of resistance materials for chemical stress and heat [3].

3. Hazards associated with chemical or physical reactions?
Certain chemical compounds during proceeding of a chemical experiment might lead to fire, pressure, temperature due to gas generation and incompatibility issues of reactants or products.
In a research project for the extraction of Polycyclic Aromatic Hydrocarbons (PAHs) from an environmental samples, sediments or organisms, a great quantity of heat as steam as well as hazardous fume are generated. Therefore, in order to dump the boiling borosilicate glass could be used and keep users far away from the extracting apparatus during its work and get rid of fumes [4].

4. Waste disposal protocols are required especially for hazardous waste.
This part required a certain procedures including the instruction to collect and disposal of waste. The waste containers should be classified, labeled, transported in addition of chosing a site and treatment procedures.
The waste is incompatible of a certain chemical compounds such as solvents (benzene and hexane) and certain petroleum derivatives (benzo (a) pyrene) the most toxic and carcinogenic hazard waste even in very low concentrations [5].

5. In case of spill accidents during proceeding of experiment.
A certain precautions should be taken immediately: Spill cleanup tools, and for fire, extinguisher should be available very close to the experimental site [6].

Methodology
Data for this paper were extracted from laboratory experiment workers in the Marine Science Centre represented by extraction of main environmental pollutants, polyaromatic hydrocarbons (PAHs), and heavy elements from water, sediments, and biota (fishes, and plants).
Chemicals using in the research laboratories at Marne Science Centre are extremely restricted and limited by certain solvents and uses, moreover the instruction for using these chemicals and their disposal either as a reactants or products are available in the laboratories [7, 8]

Results and Discussion
Required to think about responsibility for safety in the conduct of their work. This will lead to what is aimed at reduction of unnecessary risk [10]
Risk assessment is to justify the educational value. Its purpose is to uncover both obvious and latent hazards and communicate the necessary barriers or controls that prevent harm to the chemical labs users (staff, operators, and students).
Carrying out risk assessment for a chemical experiment requires three steps:
1. Identify the hazards and problem associate with the substances and tasks.

2. Assess the risk to the hazard,
3. Control the risk by implimitation of procedures and precautions.

Directions for drain disposal at the end of any chemical experiment summarized as follows:

1. Acid solutions should be neutralized with caustic soda,
2. Gases should exhausted by hood,
3. Solid waste should collected together and damping far away from the city and ground water.

At the end of each experiment only the aqueous solutions of non-toxic materials and in quite low concentration and have a measurable pH between 6 and 8 can be disposed in normal manner, on the other hand, generation of chemical waste which could be assigned hazardous materials should be disposed by a certain expertise with the University policy and all wastes from all labs should not transferred by individuals but should be collected in designed room and assigned as waste disposal area [11].

Due to increase costs for disposing waste chemicals are seemed to decrease the quantities of reactants as well as change them by safe ones [11]. Moreover, hazardous waste could be controlled if one can account for how much reactant is being used [10, 12].

Problems concerning improper chemical waste disposal were identified with allegedly not providing enough training to employees and having deficiencies in the laboratory's chemical hygiene plan [1]. Discarders should be expert in chemical security and work hard to safeguard the communities [1].

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