

Chemical Hygiene Plan (CHP) in Biology Laboratories

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Without any doubt, biology science discoveries in cellular and molecular level never had been reached to cells components such as DNA, RNA and chromosomes as genetic reservoirs, without using chemical reagents such as solvents, dyes, fixatives, etc.

Chemical materials, directly or indirectly in a wide extent, are used in all biological laboratories affiliated in educational, applied science research sectors, and have very important role in biology science progress.

Unfortunately, it seems that Chemical Hygiene, as a very important concept in laboratory safety management, are neglected in the biological based laboratories, approximately in the entire world, because of biological risk threat dominations.

Chemical hygiene may be defined as consideration all chemical material specifications, risk and safety issues, as are presented in Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS), which have been provided by chemical material manufacturers.

All information present in MSDS is a result from experiences, studies and adverse effect symptoms and manifestations, which gradually have arisen in a long time. It is intended to provide workers and emergency personnel with procedures for handling or working with that substance in a safe manner, and includes information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures [1].

One of the most important occupational safety and health integrity issue in the laboratory safety management is the MSDS awareness, and requires that MSDSs be available to all employees, students, new coming workers, and all for potentially harmful substances handled in the workplace must be well understood, established and run.

In order to promote consistent presentation of information, OSHA recommends that MSDSs follow the 16-Section format [2].

The 16 sections are illustrated in below:

<input type="checkbox"/> Identification Hazard(s)	<input type="checkbox"/> Ecological information
<input type="checkbox"/> Composition/information on ingredients	<input type="checkbox"/> Disposal considerations
<input type="checkbox"/> First-aid measures	<input type="checkbox"/> Transport information
<input type="checkbox"/> Fire-fighting measures	<input type="checkbox"/> Regulatory information
<input type="checkbox"/> Accidental release measures	<input type="checkbox"/> Other information
<input type="checkbox"/> Handling and storage	
<input type="checkbox"/> Exposure controls/personal protection	
<input type="checkbox"/> Physical and chemical properties	
<input type="checkbox"/> Stability and reactivity	
<input type="checkbox"/> Toxicological information	

Chemical Hazard Risk Assessment

In every laboratory, chemical hazard assessment must be achieved under lab safety management protocol, according to laboratory activities scope, along with biological and physical risk assessments.

Toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill, handling procedures are issues that

must be considered, and all necessary supervision and preventative measures are put in safety management.

Ecological Information

Ecological information indicates chemical hazard impacts on environment, plants, aquatic creatures, animals, water resources, etc., are very critical issues which are important in environment protection and biodiversity sustainability.

Toxicological Information

1. Route of entry, including skin contact, skin absorption, eye contact, inhalation and ingestion
2. Effects of acute exposure to product
3. Effects or chronic exposure to product
4. Exposure limits
5. Irritancy of product
6. Sensitization to product
7. Carcinogenicity
8. Reproductive toxicity
9. Teratogenicity
10. Mutagenicity
11. Name of toxicologically synergistic products

First-aid measures

First aid measures by forecasting probable risks and making them prepared to respond to it, also must be put in laboratory safety management.

Quick response to any chemical hazard accident can reduce damages level, so will be very critical in saving up life.

Disposal Considerations

Chemical wastes and chemical hazard waste water are harmful for nature and ecosystem, so chemical waste disposal plan according to the kind of chemical hazard, including harmful chemical such as for radioisotopes, fluorescent dye, must be safely collected and disposed.

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Conclusion

Chemical hygiene plan is a very important issue which must be considered and emphasized in any biology laboratory, from even high school lab class to modern high level research laboratories. Neglected chemical hygiene in laboratory safety management will certainly have danger consequences, poisoning because of chemical hazard contamination with long term consequences, or firing, explosion as immediate, and even lethal accident examples of potential risks in biology laboratories.

All laboratories managers in educational centers, research institutes, trade and industrial units must precisely review their chemical hygiene plan for assuring considering of all risks, planning for training, taking all preventive measures and making comprehensive preparedness for response to any accident.

References

1. http://en.wikipedia.org/wiki/Material_safety_data_sheet.
2. Recommended Format for Material Safety Data Sheets (MSDSs), OSHA.