Quick Guide to Risk Assessment for Hazardous Chemicals

The following outline provides a summary of the steps that laboratory workers should use to assess the risks of handling toxic chemicals.

1. **Identify chemicals to be used and circumstances of use**. Identify the chemicals involved in the proposed experiment and determine the amounts that will be used. Is the experiment to be done once, or will the chemicals be handled repeatedly? Will the experiment be conducted in the open laboratory, in an enclosed apparatus, or in a fume hood? Is it possible that new or unknown substances will be generated in the experiment? Are any of the workers involved in the experiment pregnant or likely to become pregnant?
2. **Consult sources of information**. Consult an up-to-date MSDS for each chemical involved in the proposed experiment. Depending on the worker's level of experience and the degree of potential hazard associated with the proposed experiment, it may be necessary to obtain the assistance of supervisors and safety professionals before proceeding with risk assessment.
3. **Evaluate type of toxicity**. Use the above sources of information to determine the type of toxicity associated with each chemical involved in the proposed experiment. Are any of the chemicals to be used acutely toxic or corrosive? Are any of the chemicals to be used irritants or sensitizers? Are any suspected to be reproductive toxins or neurotoxins?
4. C**onsider possible routes of entry**. Determine the potential routes of exposure for each chemical. Are the chemicals gases, or are they volatile enough to present a significant risk of exposure through inhalation? If liquid, can the substances be absorbed through the skin? Is it possible that dusts or aerosols will be formed in the experiment? Does the experiment involve a significant risk of inadvertent ingestion or injection of chemicals?
5. **Evaluate quantitative information on toxicity**. Consult the information sources to determine the LD 50 for each chemical via the relevant routes of exposure. Determine the acute toxicity hazard level for each substance, classifying each chemical as highly toxic, moderately toxic, slightly toxic, and so forth.
6. **Select appropriate procedures to minimize exposure**. Use basic prudent practices for handling chemicals. These include practicing good housekeeping, safe storage of chemicals, using personal protective equipment that is appropriate for the material and disposing of hazardous waste properly. In addition, determine whether if any of the chemicals meet the definition of a particularly hazardous substance due to high acute toxicity and/or reproductive toxicity. Use this information to determine whether it is appropriate to apply additional procedures for work with highly toxic substances, and whether additional consultation with safety professionals is warranted.
7. **Prepare for contingencies**. Note the signs and symptoms of exposure to the chemicals to be used in the proposed experiment. Note appropriate measures to be taken in the event of exposure and accidental release of any of the chemicals.