

# Research Methodology in Chemistry

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Edited by  
Fiona N.-F. How, Ph.D



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# **RESEARCH METHODOLOGY IN CHEMISTRY**

**Edited by**

**Fiona N.-F. How, Ph.D**



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## CHAPTER – 3

### SAMPLING, MEASUREMENT AND RESULTS ANALYSES

Jamaluddin Bin Mohd Daud

#### **Problem Background, Planning and Execution of Research Work**

The aim of every research in analytical chemistry is to obtain the required information within a specific duration of the research. It was first necessary to understand the problem, then select appropriate methods for analysis, collect samples with historical information, perform the analysis, evaluate the results, and finally correlate the results with the situation to resolve the problem. Since there is considerable difference in the effort (and expense) require to provide different levels of qualitative and quantitative information, researcher must work closely with research supervisor to define the objectives of analyses and determine proper limits for investigations.

Once the objectives and limits of the research work are defined and the literature search is completed, a more detailed plan of action must be developed. A combination of chemical and instrumental techniques may be used to provide the desired and reliable information from the analytical research.

Field sampling and laboratory sub-sampling procedures must be designed to ensure representative sample and integrity of results. The material to be sampled may be solid, liquid, or gas. It may be homogeneous or heterogeneous in composition. For homogeneous material, a simple "grab sample" taken at random will suffice for the analysis. Whereas for heterogeneous material, there are variations in composition throughout the sample, in which case several individual samples will be required. Proper procedures must be used to store both samples and standards. All samples must be properly labeled and recorded. Certain precautions should be taken in handling and storing samples to prevent or minimize contamination, loss, decomposition, or matrix change. In general, one must prevent contamination or alteration of the