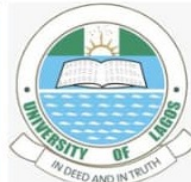


Choice of sample container for marine sample collection – Some guiding considerations, and rule.

Nubi Olubunmi Ayoola [PhD]



Coastal Ocean Environment Summer School in Nigeria. August 1 - 5, 2022



Outline:

- Sampling - different objectives;
- Importance of sample container;
- General considerations
- The fundamental guiding rule.

Background Statements

- The analytical protocol(s) to be used for sample analysis often requires the use of a particular type of sample container.
- The type of container also may depend on the sample matrix & analyte of interest.
- A standard operating procedure (SOP) is a set of written instructions that describes the step-by-step process that must be taken to properly perform a routine activity.
- This presentation therefore is geared towards bringing out some scientific details of its contents in relation to sampling and sample containers.
- There are varied considerations based on different fields of marine science, however, there are some unifying ones.

Sample and different types from the Ocean

Sample: A part of the whole, that can be examined to see what the rest is like (Khadse, 2010).

Different Oceanic Samples:

Water, biological samples (from Phytoplankton to higher organisms), geological samples (sediment, mineral deposits, etc..), debris (e.g. plastics),.....



Sampling and its importance

- **Sampling is the method or process of selecting a small section of a larger group in order to estimate the characteristics of the entire group.**

Why is SAMPLING important particularly in Oceanography?

Several Reasons but the few.....

1. Some ocean parameters still require it;.....Immobility of some equipment / mobile types are expensive or yet to be produced, pre-treatment / prior-analyses procedure.....
2. Analysing every drop of water in the ocean is practically impossible;
3. It allows for better coverage within a shortest practical time;
4. Knowing that Ship time is expensive.

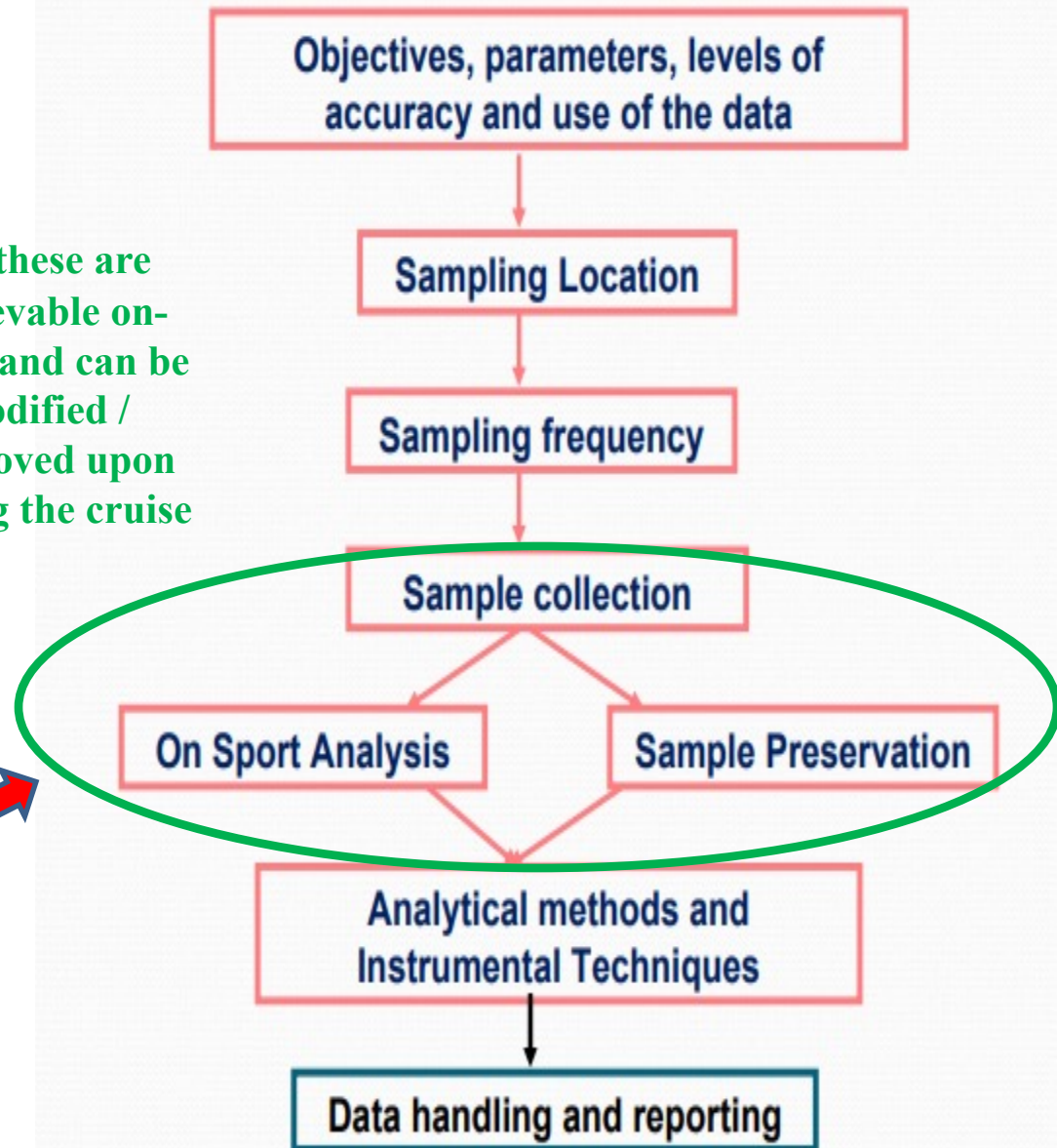
Sampling Design

- Setting objectives is critical to sampling design.
- **Pollution study;**
- **Productivity status;**
- **Climate change impact;**
- **Etc.....**

All these are achievable on-shore and can be modified / improved upon during the cruise

Sample Containers: required at this stage, and it is **CRITICAL** to the whole design.....

1. Importance of sample integrity can not be overemphasised.
2. Achievable on-shore but cannot be modified or improvised during the cruise.



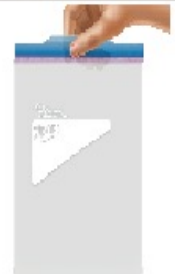
Sample Container – Types / General Considerations

Sample container holds your sample prior to analysis. Using the correct sample containers is important to reduce the possibility of contamination of the sample or sample degradation by light, oxidation, etc.

There are of two types based on their chemical nature: 1. Organic and 2. Inorganic



Inorganic



Organic

Some General Considerations

1. Depending on the physical state of sample (solid, liquid or gaseous), use appropriate container for safety.

Liquid: bottle or jar

Solid: wrapper or bag.



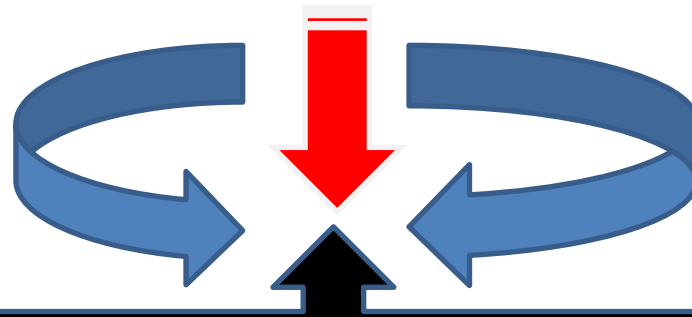
General Considerations.....

2. If samples are to be preserved or fixed, sample containers must be such that it won't react with the added fixer or preservative (e.g. fixing with conc. acid for heavy metal samples; and also the use of formalin for biological samples).

3. Waiting time between sample collection and sample analyses: Sample containers must be able to prevent degradation of sample within this period (e.g. the use of amber bottles to prevent photochemical reaction).

General Considerations.....

- 4. It must be designed to allow leak-proof or air-tight closure.
- 5. Strong enough to withstand transport and storage.
- 6. The material or design must be capable of being tagged or labelled.



It must ensure that sample integrity is maintained

The Guiding Rule

Depending on the chemical nature of your “analyte of interest”
(organic or inorganic), the guiding rule is:

“Organic for Inorganic, Inorganic for Organic”

If organic (e.g. PCB, PAH, OCP, oil & grease etc....), use inorganic sample containers (e.g. glass bottle or Aluminium foil).

a. Let us discuss possible error in wrong choices.....

Sample for oil & grease in plastic containers???

“Oil Coating and Retention”

The Guiding Rule

If inorganic (e.g. heavy metals, nutrients, etc....), use organic sample containers (e.g. plastic bottle, Ziploc, polythene bags, etc).

b. Let us discuss possible error in wrong choices.....

Sample for heavy metals in glass containers???.....

Let us look at chemical formation of glass materials

and metal leaching in an acidic medium.

Ship Time is not Cheap!!!



It is **costly** to take along wrong sample containers.....,

It compromises the integrity of the sample,

Introduction of error in the whole research design,

It cripples the efficiency and morale of the research team.

So, what your sample is sitting next to matters, it goes a long way to.....

Reference



- G.K.Khadse (2010): Collection and Preservation of Samples and Field Analysis. Paper presented at Training Programme on QAQC in Water Quality Monitoring and Assessment, Oct.21--22, 2010. National Environmental Engineering Research Institute, Nagpur (CSIR, New Delhi).
- https://www.epa.gov/sites/default/files/2015-03/documents/samplers_guide.pdf

MANY THANKS

