

Water resources – Practical

Lab (1)

Water sampling from different water resources for analysis.

I. Water sampling

The process of taking a portion of water for analysis or other testing. e.g. drinking water to check that it complies with relevant water quality standards, or river water to check for pollutants, or irrigation water to check the kind and amount of salt present in the water.

II. Objectives of water sampling.

1. The **primary goal** of water sampling is to measure how water quality changes over the time. Water samples must be taken and analyzed repeatedly over a period of weeks, months, and years.
2. To identify the acidity and alkalinity of water.
3. To help determine if there is a problem with the construction components of the water source.
4. To help ensure you are using water suitable for your agricultural use.

III. Type of water sampling.

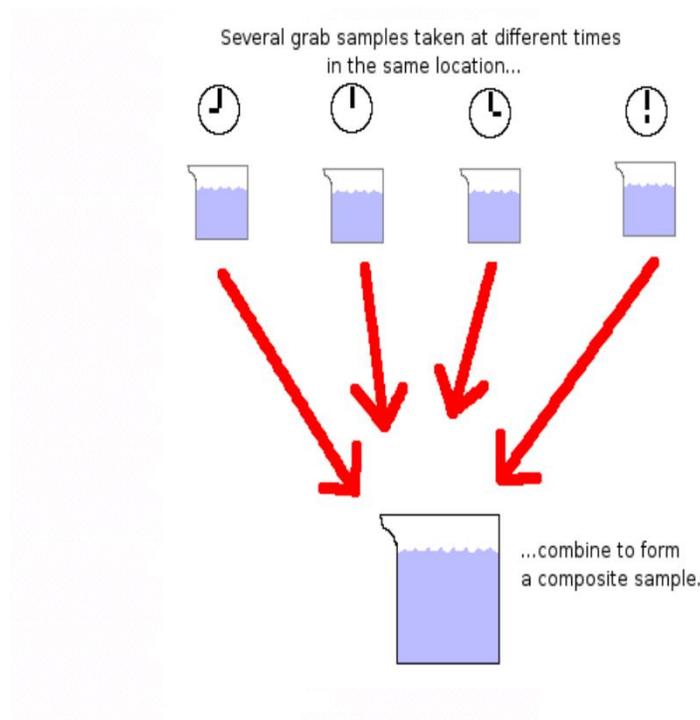
1- Grab samples

Consists of a single sample taken at a specific time (typically seconds or minutes). This is the most common type of sample and is the sampling technique you will use for most of your labs. For example, you took a grab

sample when you collected a beaker of raw water and tested it for (pH, Dissolved oxygen and Total residual chlorine).

2- Composite samples.

Also known as an integrated sample, is a sample which consists of a mixture of several individual grab samples collected at regular and specified time periods, the duration of sampling often 24 hours (this usually means that the samples are refrigerated to 4 °C). composite samples cannot be used for tests of water characteristics which change during storage (such as dissolved gases) or of water characteristics which change when samples are mixed (such as pH).



IV. The procedure of water sampling.

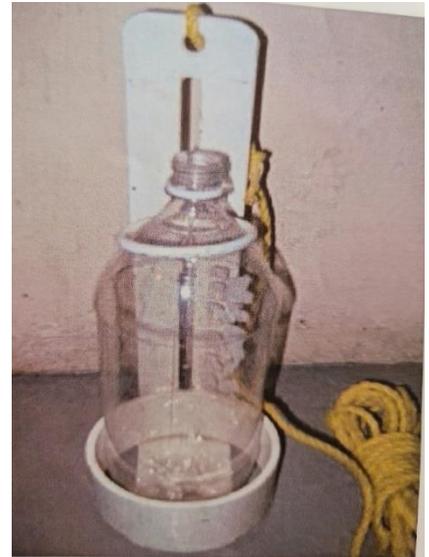
1. Written the description of site.
2. Map of Site (electronic or sketched, photograph if possible).
3. You should always include the following information: Time, date and location sampled, analysis to be done, bottle number, depth temperature.
4. In case the water is being collected from the ground sources e.g., through well or tube well, enough water should be pumped out before collecting the samples.
5. Rinse the bottles twice with the sample water.
6. Collect all samples in 500mL or 1L bottles.
7. Fill the bottle as possible.
8. If the sample can't be sent immediately, it must be protected against bacterial growth either by adding 2-3 drops of toluene or by keeping it under refrigeration (4°C) for the time required .
9. Be sure to pack securely, include ice packs.
10. If the water is to be collected from the surface stream or river, it should be collected about 40-50 cm below the surface to avoid the collection of surface impurities oils, tree leaves, etc.

V. Water sampling equipment:

There are several types of samplers that can be used to collect water samples. Some are available commercially and others are simple enough that they can be constructed with easily available materials.

1. Sampling iron.

A sampling iron is a heavy device usually made metal. typically, it uses a 2 L sample bottle. in some cases, sampling irons may have provision for additional weights to ensure a vertical drop in strong currents.



2. VanDorn sampler

- The Van Dorn water sampler (horizontal water bottle) has been specially designed for the sampling of open water at depths of 2m or greater.
- The sampler is available in both PVC and acrylic plastic materials.
- The cylinder capacity varies from 1 to 20 L.



3. Ruttner bottle.

The Ruttner Bottle allows samples to be taken at different water depths. The robust design of the bottle improves sampling verticality in the water column. The thermometer located on the inside of the transparent tube, making it easy to see the temperature of the sample (range $-10^{\circ}\text{C}/50^{\circ}\text{C}$).



4. Water sampling with Drone.

- Faster Than Traditional Sampling.
- Samples can be re-collected at the same exact location using high-precision GPS.
- The drone and sampling equipment can fly out over the lake and gather water from the surface layer and a deep layer.
- The Drone Mounted Water Sampling System Increases Sample Rates by 75%, While Reducing Costs by 90%.