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A Simple Field Test for Determination of Salinity of Water Supplies

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In most South Pacific countries and territories the problem of obtaining adequate supplies of potable water is one which necessitates careful investigation of the available water resources. As a general maxim, groundwater frequently proves to be the most suitable source from considerations of bacteriological quality, continuity of supply and avoidance of the need for treatment. On many atolls and other low islands and in coastal areas, however, infringement of sea water on the ground water reservoir may increase the salinity of the water to the point where it becomes undrinkable. The following notes outline a simple field test for the determination of salinity (chloride concentration) of water. The test is applicable either to existing wells and coastal springs or in evaluating the potential of prospective sites for new wells or bores. It is particularly useful for detecting salt water contamination via faults or solution channels in the subsoil, the existence of which may not be apparent from other hydrogeological survey techniques. In interpreting the results of the test due cognisance should be given to environmental conditions such as recent heavy rainfall, prolonged drought, etc.

In assessing the potability of water, the following limits as stated in the World Health Organization's publication "International Standards for Drinking Water" should be used as a guide:

Maximum Acceptable Concentration of Chloride ... 200 mg/l
Maximum Allowable Concentration of Chloride ... 600 mg/l

Note that the designation "acceptable" indicates a water that would be generally acceptable by consumers. A concentration greater than that listed as "allowable" would markedly impair the potability of the water.

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SALINITY TEST

Equipment:

- 1 only 50 ml or 25 ml syringe
- 1 only 2 ml or 1 ml syringe
- 1 only clear glass jar or bottle
- 1 only 50 ml measuring cylinder (preferably)

Materials:

0.0282 Silver Nitrate solution:

Dissolve 4.791g of silver nitrate, dried at 105°C, in distilled water and make up to 1,000 ml.

(1 ml = 1.0 mg Cl)

Potassium Chromate solution:

Dissolve 5g of potassium chromate (K_2CrO_4) in 50 ml distilled water.

Add silver nitrate solution to produce a slight red precipitate.

Allow to stand overnight and filter.

Make up to 100 ml with distilled water.

Test:

Put 50 ml of sample in jar or bottle.

Add 1 ml Potassium Chromate solution using small syringe.

Titrate sample by carefully adding Silver Nitrate solution from large syringe until first reddish colour appears throughout sample. The sample should be shaken as Silver Nitrate is added to ensure thorough mixing of the reagents.

Record volume of Silver Nitrate added (X ml).

Calculations:

Chloride content (mg/l) = 20X.

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