Physico-Chemical Analysis of Well Water and Sea Water in Ramanathapuram Selected Rural Area

T. Gowsulya Rita¹, J. Stanley Stella², M. Srimathi³
¹²Student, Department of Chemistry, Thassim Beevi Abdul Kader College for Women, Ramnad, India
³Professor & HoD, Department of Chemistry, Thassim Beevi Abdul Kader College for Women, Ramnad, India

Abstract: Water is the most precious natural resource after air. Though the surface of the earth is mostly consists of water, only a small part of it is usable, which makes this resource limited. This precious and limited resource, therefore, must be used with care. As water is required for different purposes, the suitability of it must be checked before use. The present study is focused on the determination of physico-chemical parameters, such as pH, dissolved oxygen, chlorides, alkalinity, hardness, MLSS, TDS, of water samples from different sampling points. That is used to analyzing the water quality.

Keywords: Physico-chemical analysis, pH, Quality analysis, Water sample.

1. Introduction

Water is nature’s most wonderful, abundant and useful compound. It is important to all living organism, most ecological systems, human health, food production and economic development. The safety of drinking water is affected by various contaminants which includes chemical and microbiological. Such contaminants cause serious health problems.

Due to these contaminants quality of the drinking water becomes poor. Sometimes such poor quality water cause many disease in the humans, so that quality of water must be tested for both the chemical as well as for the microbial contaminant’s. The 5 major application of water are hydropower, Domestic uses, irrigation, Industrial uses, and Commercial uses. The major water quality parameter considers for the examination in this study are pH, TDS, MLSS, Hardness, Dissolved oxygen, Alkalinity.

2. Sample collection

Water sample was collected from 10 different Ramanathapuram rural area well water and 5 sea water.

3. Materials and methods

A. Dissolved oxygen

This method is used to determination of strength of dissolved oxygen present in the water sample.

<table>
<thead>
<tr>
<th>No</th>
<th>ITEM</th>
<th>TITRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Burette solution</td>
<td>Sodium thiosulphate</td>
</tr>
<tr>
<td>2</td>
<td>Pipette solution</td>
<td>20ml water sample</td>
</tr>
<tr>
<td>3</td>
<td>Reagents to be added</td>
<td>2ml MnSO₄ + 2ml alkali iodide + 2ml con. H₂SO₄</td>
</tr>
<tr>
<td>4</td>
<td>Indicator</td>
<td>Starch</td>
</tr>
<tr>
<td>5</td>
<td>End point</td>
<td>Blue to colorless</td>
</tr>
<tr>
<td>6</td>
<td>Formula</td>
<td>Amount of DO=8*Ng/l</td>
</tr>
</tbody>
</table>

B. Chlorides

This method is used to determination of strength of chlorides present in the water sample.

<table>
<thead>
<tr>
<th>No</th>
<th>ITEM</th>
<th>TITRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Burette solution</td>
<td>AgNO₃</td>
</tr>
<tr>
<td>2</td>
<td>Pipette solution</td>
<td>20ml of water sample</td>
</tr>
<tr>
<td>3</td>
<td>Reagents to be added</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Indicator</td>
<td>K₂Cr₂O₇</td>
</tr>
<tr>
<td>5</td>
<td>End point</td>
<td>Yellow to reddish brown</td>
</tr>
<tr>
<td>6</td>
<td>Formula</td>
<td>Amount of chloride=35.46*N g/l</td>
</tr>
</tbody>
</table>

C. pH

Confirm the pH meter in the measurement mode. Thoroughly rinse the pH electrode between measurements with distilled water to prevent carryover contamination of the tested water.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Water quality test</th>
<th>Description</th>
<th>Instrument/method</th>
<th>Name of the method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dissolved oxygen</td>
<td>The amount of oxygen available in the water</td>
<td>Titrimetric method</td>
<td>Winkler’s Method</td>
</tr>
<tr>
<td>2</td>
<td>Chloride</td>
<td>Measurement of chloride amount in water</td>
<td>Titrimetric method</td>
<td>Mohr’s method</td>
</tr>
<tr>
<td>3</td>
<td>pH</td>
<td>The major of acidity in the water.</td>
<td>pH meter</td>
<td>Electrometric method</td>
</tr>
<tr>
<td>4</td>
<td>Alkalinity</td>
<td>Alkalinity of water is its quantitative capacity to</td>
<td>Titrimetric method</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Hardness</td>
<td>Measurement of and magnesium and calcium in the water.</td>
<td>Titrimetric method</td>
<td>EDTA method</td>
</tr>
<tr>
<td>6</td>
<td>TDS</td>
<td>The measurement of the amount of particulate solids in the water.</td>
<td>Boiling method</td>
<td>-</td>
</tr>
</tbody>
</table>
sample solution. Dip the pH electrode into a testing water sample the pH is completed when the pH reading is stable.

D. Alkalinity

<table>
<thead>
<tr>
<th>No</th>
<th>ITEM</th>
<th>TITRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Burette solution</td>
<td>Hcl</td>
</tr>
<tr>
<td>2</td>
<td>Pipette solution</td>
<td>20ml water sample</td>
</tr>
<tr>
<td>3</td>
<td>Reagents to be added</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Indicator</td>
<td>a). Phenolphthalain and b).methyl orange</td>
</tr>
<tr>
<td>5</td>
<td>End point</td>
<td>a) Pink to colorless and b) yellow to red orange</td>
</tr>
<tr>
<td>6</td>
<td>Formula</td>
<td>Amount of $OH^{-}, CO_{3}^{2-}, HCO_{3}^{-}$ =50*Ng/l</td>
</tr>
</tbody>
</table>

E. TDS

First took a 250 beaker. Record the weight of empty beaker (w1) after 100ml sample water taken a 250 beaker evaporates the water using the hot plate. Cool the beaker to room temperature and weight (w2)

Formula of TDS: TDS=w2-w1/100*10^6 ppm

F. Hardness

<table>
<thead>
<tr>
<th>No</th>
<th>ITEM</th>
<th>TITRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Burette solution</td>
<td>EDTA</td>
</tr>
<tr>
<td>2</td>
<td>Pipette solution</td>
<td>20ml of water sample</td>
</tr>
<tr>
<td>3</td>
<td>Reagents to be added</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Indicator</td>
<td>EBT</td>
</tr>
<tr>
<td>5</td>
<td>End point</td>
<td>Wine red to steel blue</td>
</tr>
<tr>
<td>6</td>
<td>Formula</td>
<td>$1000v_2/v_1_{mg/l}$, $1000v_3/v_1_{mg/l}$</td>
</tr>
</tbody>
</table>

4. Well water and sea water analysis result

<table>
<thead>
<tr>
<th>S.NO OF AREA</th>
<th>NAME OF THE AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Kilakarai (Bharathi nagar)</td>
</tr>
<tr>
<td>2.</td>
<td>Ramnad (collectorate)</td>
</tr>
<tr>
<td>3.</td>
<td>Ramnad (Gandhi nagar)</td>
</tr>
<tr>
<td>4.</td>
<td>Bogalur</td>
</tr>
<tr>
<td>5.</td>
<td>Erwadi</td>
</tr>
<tr>
<td>6.</td>
<td>Mayakulam</td>
</tr>
<tr>
<td>7.</td>
<td>Uttarakosamangai</td>
</tr>
<tr>
<td>8.</td>
<td>Devippatnum</td>
</tr>
<tr>
<td>9.</td>
<td>Paramakudi</td>
</tr>
<tr>
<td>10.</td>
<td>Rameshwaran</td>
</tr>
<tr>
<td>11.</td>
<td>Mayakulam Sea</td>
</tr>
<tr>
<td>12.</td>
<td>Devippatnum Sea</td>
</tr>
<tr>
<td>13.</td>
<td>Valinokkam Sea</td>
</tr>
<tr>
<td>14.</td>
<td>Rameshwaran Sea</td>
</tr>
<tr>
<td>15.</td>
<td>Kilakarai Sea</td>
</tr>
</tbody>
</table>

5. Conclusion

Water is most important in our world. So we must maintain the water quality.in the present study is focus the analysis value of water quality parameter such as pH, alkalinity, hardness, dissolved oxygen, chloride, and DTS, from all well and sea water sample collected from ramanathapuram rural area. Well water and sea water contain pH range 7.5-8.5. Well water contains medium level of chloride and the sea water contains high level of chloride. Well and sea water contain hydroxide, carbonate, and bi carbonate alkalinity most of the sea water contain hydroxide alkalinity.
References