

Chapter four

EXPERIMENTAL WORK

4.1 Introduction:

The experimental work is conducted in the sanitary engineering laboratory, department of environment engineering, college of engineering, Al- Mustansiriya University in Baghdad.

A total of eight samples per month and for four months are tested during this study for TS, TSS, and TDS.

In this chapter, description of the experimental procedure and equipments used in the test are presented.

4.2 water samples:

The water samples used in all experiments are taken from a part of the Tigris River flowing through Baghdad from the intake of eight water treatment plants located consequently on it, these plants are:

Shark dijlah, Al-khademya, Al-karama, Al-wathba, Al-qadisayah, Al-doura, Al-wahda, Al-rasheed treatment plants respectively, as shown in map no. (1) In the appendix.

4.3 experimental equipment:

4.3.1 The oven:

The oven is used in all experiments in order to drying the samples putting in the evaporating dishes and the filter paper. As shown in **fig (4-1)**.



Fig(4-1): the oven

4.3.2 Water path:

The water path is used to evaporate the samples putting in the evaporating dishes. As shown in **fig (4-2)**.



Fig (4-2) water path

4.3.3 Desiccator:

The desiccator is used to cool the dishes and the filter paper to room temperature. As shown in **fig (4-3)**.

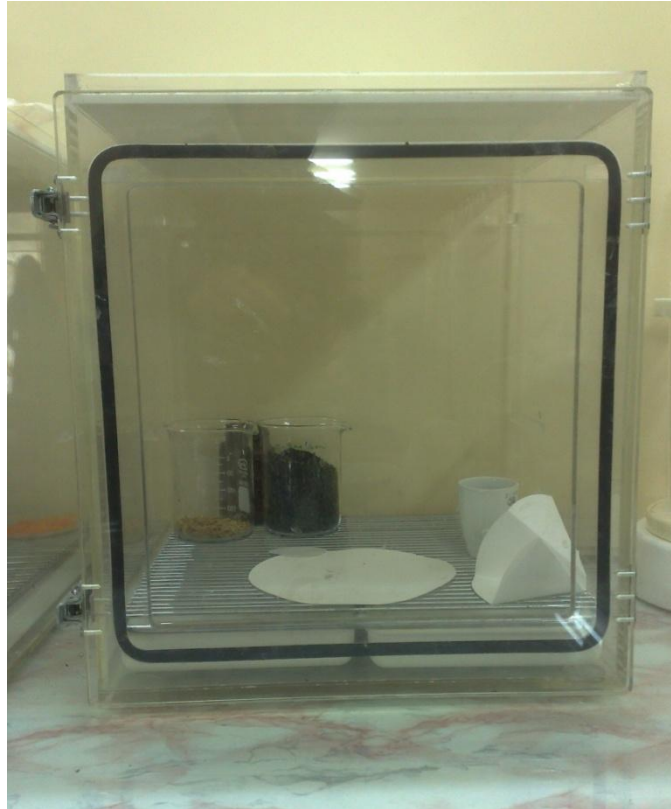


Fig (4-3): the desiccator

4.3.4 Sensitive balance:

It's used to measuring the weight of the dishes and the filtering papers before and after the drying.

4.3.5 Membrane filter:

It's used to filtering the samples. As shown in **fig (4-4)**.



Fig (4-4): membrane filter

4.4 Experimentation:

4.4.1 Objectives:

As stated in chapter one the experimental work is planning to steady the pollution in a part of Tigris River by knowing the amount of total solids , suspended solids , and dissolved solids and comparing it with the allowable limits.

3.4.2 Total solids measuring:

The following steps are done in laboratory to measure TS:

1. Wash an evaporating dish with distilled water [DW] and dry in the drying oven at 180°C for a minimum of 1 hour.
2. Cool the evaporating dish in the desiccators.
3. Transfer the evaporating dish to the analytical balance using forceps and record the initial tare weight.
4. Measure 50 ml by a graduated cylinder of sample and put it in the evaporating dish. Rinse the cylinder with small volumes of DI water and put it in the evaporating dish.
5. Transfer the evaporating dish to the water bath at 90°C until the water has evaporated it takes 1 hour approximately. Then put the dish in the oven again at 105°C to complete the drying.
6. Wait the evaporating dish cooled and then re-weighs the dish.
7. Computing the amount of total solids by using the following equation:

$$TS \text{ (mg)} = [A-B/\text{volume of sample}] \times 10^6$$

Where (A) present the weight of the dish with the total solids in gram.

(B) presents the weight of the dish in gram.

Volume of sample= 50 ml

4.4.3 Suspended solids measuring:

The following steps are done in laboratory to measure SS:

1. Put the filter paper 0.45 on the drying oven at 105°C for a minimum of 1 hour.

2. After cooling by the desiccator put the paper on the glassy dish and then transfer them to the balance and record the initial tare weight.
3. Measure 50 ml by a graduated cylinder of sample.
4. Remove the paper from the glassy dish using forceps and place it in the membrane filter equipment drop the 50 ml above the paper while the equipment is turned on. Rinse the cylinder with small volumes of DI water and put it above the paper.
5. When the filtering complete (1 minute) take the paper and put it on the oven again at 105°C. And keep the volume of the sample passes through the paper.
6. Waiting the paper until cool and then re-weight it with the glassy dish.
7. Compute the amount of SS by using the following equation:

$$SS \text{ (mg/l)} = [A-B/\text{volume of sample}] \times 10^6$$

Where (A) present the weight of the paper with the suspended materials in gram.

(B) presents the weight of the paper in gram.

Volume of sample= 50 ml

4.4.4 dissolved solids measuring:

The following steps are done in laboratory to measure DS:

1. Wash an evaporating dish with DI water and dry in the drying oven at 550°C for a minimum of 1 hour.
2. Cool the evaporating dish in the desiccator.

3. Transfer the evaporating dish to the analytical balance using forceps and record the initial tare weight.
4. Put the volume passes through the paper in the evaporating dish and transfer it to the water path at 90°C until the water has evaporated it's take 1 hour approximately .Then put the dish in the oven again at 180°C to complete the drying.
5. Waiting the evaporating dish cooled and then re-weighs the dish.
6. Compute the amount of DS by using the following equation:

$$DS \text{ (mg/l)} = [A-B/\text{volume of sample}] \times 10^6$$

Where (A) present the weight of the dish with the dissolved materials in gram.

(B) presents the weight of the dish in gram.

Volume of sample= 50 ml