This project aims to study the effect of sludge conditioning using two types of sludge conditioner, Aluminum sulfate and cationic polymer (PRAESTOL). Possible effect of temperature is also studied.

Sludge samples were collected from local municipal wastewater treatment plant and were stored at 4˚C. Then conditioning of these samples was investigated using two types of conditioners: aluminum sulfate and cationic polymer (PRAESTOL) at three different temperatures (10, 20, 30 ˚C).

Physical and chemical properties were measured including chemical oxygen demand(COD),  Biochemical oxygen demand (BOD), total solid (TS), total suspended solid (TSS), pH, flock structure, turbidity and viscosity.

The conditioned samples were dewatered using JAR TEST AND capillary suction time test (CST).

### Alum Coagulation

This achieved by using different concentrations of alum in the samples.

According this procedure:

1. Shaking the sample and make sure that the temperature is the required by using water bath.
2. By using 4 beakers of the jar test , pour 1000 ml of the sample in each one.
3. Weighing the required amounts of alum.
4. Put the beakers on its place in the jar test.
5. Turn on the mixer.
6. Put in each beaker one of the quantities which have been prepared .
7. After the test finished , turbidity test was achieved .
8. Then CST test was done.

### Polymer Coagulation

In this coagulants different concentrations were prepared .

By the following procedure:

1) After Weighing the required amounts of polymer , each amount was diluted in 1L of distilled water.

2) Shaking the sample and make sure that the temperature is the required by using water bath.

3) By using 4 beakers of the jar test , pour 1000 ml of the sample in each one.

4) Put the beakers on its place in the jar test.

5) Turn on the mixer.

6) Put in each beaker 2 ml of the diluted sample.

7) After the test finished , turbidity test was achieved .

8) Then CST test was done.

The data was analyzed using statistical methods, such as t-test and regression.

Relationship Between Optimum Alum Doses and Temperature

Relation Between the Optimum Polymer Doses with Temperature

The results showed that the optimum alum conditioner dosages at 30, 20, 10º C were, 300, 150, and 120 mg/L, respectively. Similarly, the optimum polymer conditioner concentrations were 0.236, 0.634, and 0.72 mg/L at 30, 20, and 10 ºC, respectively. The relationship between optimal conditioner concentrations and temperature was quadratic for both alum and polymer but in opposite direction. So the optimum concentration of alum increased with the increase of the temperature but optimum concentration of polymer decreased with temperature increase.