

Hassan A. Omran

Building and Construction
Engineering Department,
University of Technology
Baghdad, Iraq.

Hassn7745@gamil.com

Mizher A. Kadhim

Building and Construction
Engineering Department,
University of Technology
Baghdad, Iraq.

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A Mathematical Model to Determination of Alum Amount Added for the Purpose of Coagulation in Water Purification Plants

***Abstract**—Chemicals are used to increase the settling velocity for suspended deposition colloids which are not settled in sedimentation tanks in water purification plants. For this purpose, the alum is used in wide spread across the water purification projects in Iraq. This research contains studying the factors that effect on alum amount added by conducting laboratory tests of water samples from Euphrates river at the purification plant in AL-Musayyab city over ten years (with monthly rate). It was noted that the amount added depends heavily on the turbidity of water entering the purification plant, in addition to water temperature and its pH. The results of laboratory tests have been approved, which included the measurement of the turbidity, pH, temperature, and the value of alum added. Since this method is applicable in all water purification plants. The results during the period of ten years are accredited, and subjected to multi -regression analysis. A mathematical model was conducted to calculate the alum dose, which must be added depending on the raw water turbidity, temperature, and pH. This model also has been examined by using data of another years and gave satisfactory results to be up to 91% each. This model compensates the use of the Jar-test of raw water to determine the amount of alum that must be added and sufficient by measuring the turbidity, temperature, and pH of the raw water only, and then calculating the value of the required dose of alum.*

Keywords- Alum Dose, Coagulation, Turbidity, pH

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