Investigation on Removal of Turbidity in the Water Treatment Plant at Per Aru, Vavuniya, Sri Lanka

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Turbidity is a principle physical characteristic of water. It is caused by suspended materials or impurities that interfere with the clarity of the water. Excessive turbidity in drinking water is aesthetically unappealing and has a health concern. Generally turbidity is treated through the process of coagulation, flocculation and sedimentation in the conventional water treatment plants. The objective of this study was to find out the suitable coagulant with the correct dosage and the flocculation speed to optimize the water treatment plant newly constructed at Per Aru, Vavuniya. Jar test apparatus was used to conduct the testing and imitate flocculators in the treatment plant. Alum and Poly aluminium chloride (PACl) were used as coagulant for the water treatment along with different dosage and flocculation speed in Jar testing. Coagulant PACL was mixed with raw water rapidly with 200 rpm for one minute. Flocculation was done to mimic in two stages with different set of speeds for 10 minutes duration. Three different combination of flocculation speeds were tested in the treatment plant as 30 rpm and 15 rpm, 15 rpm and 10 rpm, finally 10 rpm and 10 rpm. The water samples before and after treatment were collected and analyzed for pH, EC and turbidity. The pH of the water before treatment ranged from 8.14 to 8.57 and EC from 734 µS/cm to 752 µS/cm. The turbidity value was 1.92 NTU to 3.02 NTU. The results revealed that PACl is more effective in turbidity removal than Alum. This may be due to high pH of water. Further the results indicated that the optimum dose of PACl was 30ppm with rapid mixing. The best combination flocculation speed was selected as 15 rpm and 10 rpm for 10 minutes each. It is concluded that turbidity removal of raw water depends on type of coagulant used, pH of the raw water, dosage rate and flocculation speed.

Key Word: Coagulation, Jar Testing, Per Aru, Water treatment, Turbidity