EFFECT OF CALCIUM HYDROXIDE AND POLY ALUMINIUM FERRIC CHLORIDE CONCENTRATION ON WATER QUALITY PARAMETERS OF MEAT PROCESSING PLANT EFFLUENT

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By

MADAMAGE JANAHARI MAHESHIKA RODRIGO

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ABSTRACT

This study was conducted to assess the effect of Calcium Hydroxide and Poly Aluminium Ferric Chloride concentration on water quality parameters of meat processing plant effluent. Effluent treatment plant of Gills Food Products Private Limited, Wattala was selected as the study site for the investigation. The current study was carried out at effluent treatment plant (ETP) of the Gills Food Products Private Limited at Wattala. Laboratory analysis was completed at Chemistry laboratory of Uva Wellassa University. $Ca(OH)_2$ (Ca = 54.092 % (w/w)) and PAFC (Al_2O_3 = 29 % (w/w), Fe = 4.5 % (w/w)) were added to the first retention tank and clarifier of the ETP for determining the best chemical concentration combination to achieve Environmental Protection Agency (EPA) level standard effluent. Their weight combinations were changed once a week and it was continued during six weeks. Laboratory scale preliminary trials were used for selecting effective weight ranges of two chemicals. The selected weights of $Ca(OH)_2$ were 5 kg (25 %) and 7 kg (35 %). The selected weights of PAFC were 1 kg (5 %), 3 kg (15 %) and 4 kg (20 %). Existing weight combination of ETP was used as the control. It was 4 kg (20 %) of $Ca(OH)_2$ and 2 kg (10 %) of PAFC. There were six treatments. $Ca(OH)_2$ and PAFC solutions were prepared and it was stored at ambient temperature. $Ca(OH)_2$ and PAFC solutions were added respectively to the first retention tank and clarifier at 1st day of the week. The rate of adding chemicals was 150 mL per hour. Water samples were collected at 4 locations of the ETP. Those are respectively discharge point from the factory, first collection tank, clarifier and final discharge point. Collected water samples were used to analysis COD, BOD, Dissolved Oxygen (DO) level, TSS, TDS, Turbidity, EC, pH, temperature and color absorbance for determining the effluent condition for each treatment. Second treatment had given the best results than other treatments with respect to every water quality parameters that were measured. Second treatment was consisted with 25 % $Ca(OH)_2$ and 5 % PAFC. Also it was cost effective than previous treatment that the company was used.