ABSTRACT

The dairy industry is among the most polluting of the food industries due to its large water consumption. There is a need for efficient treatment technologies which are also energy intensive. In the present study, the vertical rotating cylindrical aluminium electrode has been used for the treatment of simulated dairy waste water(SDW) by electro-coagulation process. Experiments were conducted in a laboratory scale cylindrical mono-polar batch reactor. Full factorial central composite design (CCD) was employed for responses: chemical oxygen demand (COD) and specific electrical energy consumption(SEEC).Four factors namely current density, initial COD, electrolysis time and RPM with each factor at three levels were used for the study. Regression model equations were developed which were validated by high R^2 values of 98.26% and 98.29% for COD and SEEC respectively. It was discovered that the COD removal efficiency of the reactor with rotating electrode was more (approx.91%) as compared to other batch reactors with static aluminium or iron electrodes. It consumes appreciably low energy (0.170 J/mg COD which is about 92-100% reduction compared with static electrodes) which is important from the point of cost consideration. Also, the requirement of cleaning the electrode is much less than the same with the static electrode.