Monitoring and Modeling of Anaerobic Treatment Process Using PCA and PLS Method

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PCA and PLS method is one of multivariate statistical process control (SPC) technologies that can be applied to the analysis of historical operating data, process monitoring, and empirical process modeling. Increased demands for process monitoring and modeling can be satisfied by SPC technology. In this study, the feasibilities of PCA & PLS method have been investigated with using an industrial anaerobic wastewater treatment process as a model system. In general, biological process is much more complex compared to other chemical processes. However, using the database accumulated for many years, multivariate projection method could model the behaviors of the system successfully. All data were collected by data acquisition system of industrial anaerobic wastewater treatment plant, and the analysis and monitoring of historical operating conditions show whether the operation was handled well or not. PLS is another multivariate SPC method similar to PCA. We use this method for the modeling of the process. By simple manipulations, PLS could successfully predict the performance of model process, and further study on the model has revealed the relative importance of involved variables.