

### 3.- Chemometric methods for characterisation of textile wastewater

<b>Title and name of product or technology</b>
Chemometric methods as useful tool for characterization of textile wastewater streams ( Cross Correlation Table, Cluster analysis, Principal Component Analysis, Linear Discriminant Analysis)
<b>Abstract</b>
<p>Characteristics of textile waste waters are influenced by industrial processes such as sizing and desizing, weaving, scouring, bleaching, mercerizing, carbonizing, filling, dyeing and finishing. Chemical pollutants arise from the raw material itself and composition of the finishing recipe. Pollutants are non biodegradable highly coloured organic dyes, pesticides, metals, softeners, acids, bases, salts etc. It is evident that the textile waste water chemical composition is subject to considerable change due to the diversity of the textile processes and chemicals used. The aim of this work is focused on water quality classification of the textile waste water streams and evaluation of pollution. Data from the chemical characterization of the effluents were elaborated to identify a useful separation in potentially treatment for reuse. This was done with the aim of realizing a full scale characterization of effluents. In the two textile companies analyzed, machineries are used to carry out different production processes. Different process effluents from the same machinery were found to be very diverse in pollution level. 25 and 49 samples of textile waste waters from two different textile companies were analyzed and physical chemical measurements were performed. The following physicochemical and chemical water quality parameters were controlled: absorbance measured at three different wavelengths, pH, conductivity, turbidity, total suspended solids, volatile suspended solids, chemical oxygen demand, metals content (Ba, Ca, Cu, Mn, K, Sr, Fe, Al, Na) and total nitrogen content.</p> <p>For handling the results, basic statistical methods for the determination of mean and median values, standard deviations, minimal and maximal values of measured parameters and their mutual correlation coefficients, were performed. Different chemometric methods, namely, principal component analysis (PCA), cluster analysis (CA), and linear discriminant analysis (LDA) were used to find hidden information about textile waste water quality.</p>
<b>Description including main features/advantages</b>
<p>The proposed chemometric methods can be used for classification and characterization of textile wastewater streams. After basic statistic methods for the determination of mean and median values, standard deviations, minimal and maximal values of measured parameters and their mutual correlation coefficients, different chemometric methods were used to characterize water streams.</p> <p>The aim of the work is to find the best solution for both textile companies for reuse of waste waters. For water recycling it is necessary to find correlation between different textile waste water streams. Chemometric methods can help in characterization of textile waste water effluents and thus can be used for separation of concentrated textile waste waters from non concentrated streams. After collecting concentrated textile waste waters, evapoconcentration treatment process will be used before additional cleaning at waste water treatment plant. For treatment of non concentrated textile waste water streams AOP processes, like H<sub>2</sub>O<sub>2</sub>/UV process, and membrane filtration processes will be used. The cleaned waste water with the best quality can then be reused in different textile production processes.</p>
<b>Innovative aspects</b>
Chemometric methods for classification of different textile wastewater streams
<b>Current and potential industrial users/domains of application</b>
Wastewater treatment – separation of non concentrated and concentrated textile waste waters streams.
<b>Current state of development</b>

Tested on textile waste waters from Textina and Svilanit.

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