3.3.2. Relationship Analysis

Apart from the removal efficiencies, the strength of the relationships among the selected water quality parameters was investigated based on the correlation coefficients. Investigation of the relationships among the parameters plays an important role in identifying the potential interaction between one parameter and another as well as data quality check. Statistically, when two or more parameters are characterized by high correlation as defined by the correlation indices or coefficients, portrays that there is a strong relationship between or among them. While a small correlation coefficient portrays that the parameters are hardly related.

Moreover, *t*-test (Two-Sample Assuming Equal Variances) was used to determine if there is a significant difference between the means of two groups of each parameter as determined by the two treatment approaches. The *t*-value expresses the magnitude of the difference in terms of the variation in the data. Therefore, the bigger the value of T, the more evidence there is that the null hypothesis is false.

3.3.3. Data Distribution Analysis

It was also of significant importance to investigate the nature of data distribution of the water quality parameters; this was achieved with the help of vertical box and whisker plots. The presentation of water quality analysis based on average concentration values alone can sometimes be highly misleading; as some of the averaged values might have been affected by outliers that are huge enough to distort the real representation of water quality. Therefore, box and whisker plots provide a more convenient way of summarizing the results of the water quality analysis; whereby, the numerical data distribution and skewness are displayed in a form of a graph. More specifically, the plots are segmented into data quartiles and averages. The boxplots with maximum or minimum outliers portray that the values are substantially greater or lower than the other values in a data collection, or a value that is outside the data set. Moreover, the data distribution check is an important aspect of water quality as it gives an understanding of the pollution levels in the studied samples.

4. Conclusions

The potential influence of polarity direction on the removal of pollutants from poultry slaughterhouse wastewater using titanium (Ti) and aluminium (Al) electrode materials has been investigated. Two main cases were covered in this study; case number one, the titanium electrode is used as anode and the aluminium electrode is used as cathode. Case number two, the aluminium electrode is used as an anode, and the titanium electrode is as a cathode. Nine physicochemical water quality parameters (turbidity, color, total suspended solids (TSS), biochemical oxygen demand (BOD), chemical oxygen demand (COD), ammonia (NH4)-nutrient, as well as potentially toxic elements; chromium (Cr), nickel (Ni), and manganese (Mn)) were used in the investigation. In general, a high dispersion in terms of concentrations in the raw wastewater was observed; the phenomenon can be highly linked to the fact that in some days the less polluted sources of wastewater in the slaughterhouse generate more wastewater leading to dilution. From the analysis results, it was observed that the two electrode arrangements were highly effective in terms of pollutants removal, with up to 100% removal efficiency achieved from turbidity when the wastewater was subjected to the Al-Ti electrode arrangement, as well as up to 99.95% removal efficiency when the wastewater was subjected to the Ti-Al electrode combination. Very high removal efficiencies were also observed from color, TSS, COD, BOD, Cr, Ni, and Mn. A little challenge in terms of removal efficiency for both electrode arrangements can be observed, marking the lowest removal efficiencies from the investigation. Generally, from the removal efficiencies, the Al-Ti electrode arrangement performed slightly higher than the Ti-Al arrangement, except for manganese. Based on compliance, was observed from the of Al-Ti electrode combination and TSS with 100% compliance. The lowest compliance can be observed from the combination of Ti-Al electrode combination and color, with compliance of -480%. In general, turbidity, TSS, COD, BOD, Cr, and Ni were within the compliance