STUDY OF SOME PHYSICO-CHEMICAL AND MICROBIOLOGICAL PARAMETERS OF WASTE WATER IN FOOD INDUSTRY

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Abstract

Water is important for sustaining life on the Earth. But, the ongoing uses making it contaminated, resulting in the production of a large amount of wastewater. Wastewater encompasses liquid wastes discharged from domestic residences, commercial properties, industry, agricultural activities and can contain a wide range of potential contaminants. There are different types of food waste generated by many steps of food production, processing and consumption. Factory wastes can be of various forms but this study has focused on aqueous waste and technological water monitoring in the production line. The main purpose of this study was to evaluate the content of some important parameters that may be present or may be created during the water treatment processes obtained from the tanks after the process of bakery production and comparison of these values by legislation norms on water quality in Albania.

Samples of type water, pre- and post-filtration water and also waste water in this research were taken from the tanks from a bakery industry near Tirana. Some physico-chemical parameters as: pH (pH-meter), electrical conductivity (conductometer), and total suspended solid (UV-visible spectrophotometer), present in water samples were tested. Chemical parameters of pollution (NH_4^+, NO_3^-, NO_2^-, and PO_4^{2-}) have been determined by UV-visible spectrophotometer, which may be present and the levels of these nutrients in the waste water. Water samples were analyzed for various microbiological parameters as: total aerobic mesophilic bacteria, molds, yeasts and *Streptococcus* group D, as well as coliform bacteria. Colony forming unit counting method was used for quantitative evaluation, using decimal scale dilution and plate count agar cultivation method.

The nitrite results showed that the values obtained are different. The rate for type of water examined should not exceed 0.50 mg/L. In all three samples such as well water, water before and after the filter this value was not exceeded but it was much lower. However, in the fourth sample (with the tank discharge water) the highest value reached up to 8.1906 mg/L, which is many times higher than the allowed rate. The results for NO_3^- had a slightly higher values in waste water than the others samples. The phosphate values in the samples ranged from 1.93 to 0.66 mg/L. The permitted values for this parameter ranges from 0.4 to 2.5 mg/L. Each of the samples showed values lower than the permitted rate. However, the highest values between them appeared in the sample of well water and the filtered sample, but both were below the norm value. The waste water had a lower phosphate values as it is created during the biological treatment process. The results showed that the highest values of ammonia occurred in the waste water, followed by the well water and the drinking water. The allowed value for this parameter is 0.05 mg/L and the waste water exceed this rate at the first measurement and at other measurements it is very close to the norm value. The microbiological quality analysis of the well water samples showed that the wastewater sample analyzed has a high quantitative value of total bacteria and the presence of fecal coliforms.

In this work is noted that waste water samples are the most polluted samples compared to well water or pre- and post-filter water samples. The nutrients or organic matter present is in large quantities as these water samples can be derived from the cleaning of various tanks in the factory. On the other hand, tank rinse water (waste water) has presence mostly for total bacteria, faecal coliforms, Srtreptococcus group D bacteria, yeasts and molds.

Key words: Water, Physico-chemical parameters, Microbiological parameters, Wastewater.