CHARACTERISTICS OF THE WASTEWATERS GENERATED FROM FOOD OPERATIONS

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Abstract

To investigate the characteristics of the untreated wastewaters generated by food industry, water samples were collected from a milk and meat factories, from Bihor County in the year 2012. All samples were analysed in duplicate for chemical oxygen demand, biochemical oxygen demand, solid content, pH, chlorides, total nitrogen and phosphorus. The results of the chemical parameters of water samples collected from milk factory were compared with the values obtained by the chemical parameters monitored at the meat factory. The significance of differences between these values were studied. Wastewater monitored from milk factory presented higher values of biological oxygen demand (BOD), chemical oxygen demand (COD, pH, suspended solids and chlorides concentrations than that of the wastewaters from meat factory. The wastewater from meat industry contain high nitrogen and phosphorus concentrations

Key words: wastewater, food industry, chemical parameters.

INTRODUCTION

The increasing amount of the wastewater from the industrial scale processing plants can no longer be totally resolved by discharging or applying to agricultural fields. Substantial amounts of food and agriculture wastewater have to be treated extensively to satisfy reulatory mandates and environmental laws (Sean X. Liu, 2007).

Compared to other industrials sectors, the food industry uses a much greater amount of water for each ton of product.

Wastewater generated from food operations has distinctive characteristics that set it apart from common municipal wastewater managed by public or private wastewater treatment plants throughout the world: it is biodegradable and nontoxic, but that has high concentrations of biochemical oxygen demand (BOD) and suspended solids (SS) (Sean X. Liu, 2007).

The constituents of food and wastewater are often complex to predict due to the differences in BOD and pH in effluents from vegetable, fruit, milk and meat products and due to the seasonal nature of food processing and postharvesting.

The dairy industry is generally considered to be the largest source of food processing wastewater in many countries. As awareness of the importance of improved standards of wastewater treatment grows, process requirements have become increasingly stringent.

The pollution potential of meat-processing is due to dissolved pollutants. Blood, one of the major dissolved pollutants in meat processing wastewater, has a chemical oxygen demand (COD) of 375 000 mg/L (Tritt and Schuchardt 1992).

Wastewater from meat industry also contains high concentrations of suspended solids (SS), including pieces of fat, grease, hair, feathers, flesh, manure, grit, and undigested feed. These insoluble and slowly biodegradable SS represented 50% of the pollution charge while another 25% originated from colloidal solids (Sayed, 1988).

MATERIAL AND METHODS

The research was done in the year 2012. The wastewater samples were collected from a milk and meat processing factories. The monitored food units are placed in Bihor County.

The characteristics of wastewater from milk and meat processing factories were monitored before treatment at the plant. All samples were analysed in duplicate for COD, BOD, solid content, pH, chlorides, total nitrogen and phosphorus. Analyses were done according to methods outlined in G. D. 188/2002. The results were evaluated using the Student test.

RESULTS AND DISCUSSION

In the following are presented the characteristics of wastewaters from milk and meat processing factories.

The results shows that wastewaters from the dairy processing industry contain high concentrations of organic material such as proteins, carbohydrates, and lipids, high concentrations of suspended solids, chlorides, or high biological oxygen demand (BOD) and chemical oxygen demand (COD) comparative with the wastewater from meat industry wich contain high nitrogen and phosphorus concentrations (Table 1).

Wastewater monitored in milk factory presented pH values and chlorides concentrations higher than that of the wastewaters from meat factory.

Degree of wastewater pollution was expressed according to mean values of pollution indicators: COD, BOD, total suspended solids, pH, chlorides, total nitrogen and total phosphorus.

Table 1

Significance of differences between the mean values of the chemical parameters monitored in wastewater samples collected before treatment and pre-treatment from monitored food units

Pollution indicator	Values		Significance of differences
	Milk factory (a)	Meat factory (b)	
CCO-Cr	15197	1431	p>0,001***
CBO_5	8488	753	p>0,001***
Suspension	6808	539	p>0,10
pH	8,8	7,4	p>0,001***
Chlorides	506	104	p>0,001***
Total nitrogen	811	1603	p<0,05*
Total phosphorus	280	420	p<0,01**

CONCLUSIONS

The results of the chemical parameters of the wastewater samples from a milk and meat factories shows that significant differences were registered in point of the following parameters: chemical oxygen demand, biochemical oxigen demand, pH, suspended solids, chlorides, total nitrogen and total phosphorus.

The wastewaters generated by milk factory present high concentrations of chemical oxygen demand, biochemical oxigen demand, pH in comparison with the wastewaters from meat factory wich present high concentrations of total nitrogen and total phosphorus.

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