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Study concerning the influence on the waste waters from starch industry on the increase of the pollution received waters

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Abstract

This work paper focuses results from a study during three years (2005-2007) regarding the increase of the pollution received water, effect of the increased toxicity in the waste water from starch factory.

On studying the main physical-chemicals parameters for this water and report to the same standard parameters for distinguish pollution received water.

Keywords: starch industry, waste waters, preventive measures

1. Introduction

Because the waste waters can act with a greatest importance in to human and animals life domain it has studied them carefully the increased pollution as a result of increased sewage pollution from starch industry.

From the marketing wishing to obtain food at a price/quality ratio as good, very often are disregard the important aspects of sewage sludge from starch factories.

In the manufacture of starch range - from potatoes or corn – can be produced large quantities of wastewater (20-25 m3/t product), with suspensions 1000-4000mg/dm3 with generally acid pH and oxygen biochemical consumption to 3000 - 4000 mg/dm3 [1,2].

They can cause major environmental disturbances, through the major toxicological changes or hazardous environmental accidents [3].

Therefore one of the most important directions of development of European Union Drafts include the promotion of new and clean technologies and monitoring of water from the food industry and other industries with high risk contaminant potential.

2. Materials and methods

In an extensive program of monitoring the waste water from food industries that was developed over a period of three years (2005-2007) were studied the changes of main physical-chemical parameters of wastewater from a factory starch production in Southern Oltenia. In this draft, were followed the Variability of pH, conductivity, alkalinity, fixed residue, total hardness, CCOMn, BOD_5 and concentration of chloride, nitrates, nitrites, sulfates, phosphates, ammonium – all the results were comparing with the maximum allowable values for Standard water from the food industry.

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For Analysis were used Ion-meters for laboratory type 3205 and type 3345 and specific kits for ever compounds.

Samples met all the conditions of repeatability and were differentiated, as appropriate (normal operation of the plant, abnormal operating conditions, and stop accidental or planned revisions). For correct and results were previously separate all substances that could interfere in the analysis.

3. Results and discussions

The waste water tends acid fermentation, promoting the rapid development of fungi [4], consuming faster the solved oxygen in to the receiver water, allowing the anaerobic decomposition phenomena with formation a sulfhydric acid. Following the determinations were obtained the results from Tables 1. and 2.

Table 1. The main physical-chemical items calculate of wastewater from the starch factory (averages values from 2005-2007)

	pH (unit for pH)	**Conductivity (μS/cm)**	**Fixed residue (mg/L)**	**CCOMn (mg/L)**	**Total Hardness (^{o} G)**	**Alkalinity (mE/L)**
The obtained average values	4,33	1220	812	**1880**	**15,4**	Colour
The maximum allowable values (STAS 4706-74)	7,2	1640	2000	**40**	**15**	4,5

Table 2. The variation of mean ion concentration determined in to wastewater from the starch factory (averages values from 2005-2007)

	Chlorides (mg/L)	**Nitrites (mg/L)**	**Nitrates (mg/L)**	**Sulfates (mg/L)**	**Phosphates (mg/L)**	**AmmoniuM (mg/L)**
The obtained average values	**266**	0,498	**61**	**253**	1,731	**26,4**
The maximum allowable values (STAS 4706-74)	**60**	1	**25**	**70**	4	**2**

The increased of acidity in to wastewater can be provided by the greatest content of chlorides, sulfates and the great increased of ammonium and nitrates concentration can determined the abnormally color of waste water.

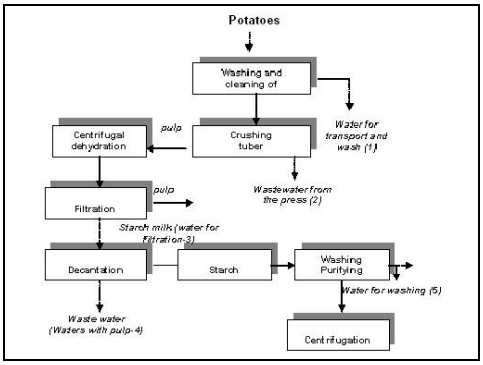

Figure 1. Scheme of starch production process (the main source of wastewater)

Apart from sand, raw and earth materials (5-20% by weight of tubers), water for washings (1) containing small pieces of potato and to a certain extent elements in solution.The wastewater with pulp (3 and 4) contain large amounts of organic matter, that can fermented and rot in dissolved state or not, and small amounts of minerals (especially K and P compounds), each characterized by a tendency for fermentation the secondary products and can formation of lactic acid and butyric acid, butyric cleared through its combination of a series of odors, that can changing negative sensorial qualities of the receiving waters.

The used water for washing the starch (4) contains a large dilution of soluble elements of tuber or maize and less starch granules or pulp. The wastewater from (2) are similar to (3), except that nitrogen –in to albumin form - is present here (0.3 kg N/tone of processed potatoes).

An effective and efficient management must include getting the optimal report price/ product quality and the pollution standard's agreement for the environment too. So, introducing and respecting the quality' standard QMS ISO 9000: 2008 specific for the food processing and the environmental standard EMS ISO 14000:2005 too – are principal conditions that will be obligatory (and in rapport with the requirements imposed by the process of the UE integration) for all the future food factories[5].

The product's custom satisfaction will be complete, in the clean, ecological environment keeping conditions. Corresponding to ISO 14001 Standard for Environmental Management, to ISO 9001:2008 and for to improve the product's quality (with lower pollution) is needed to estabilish and respects the quality indicators [6-9]:

- the efficiency indicators and the efficacity indicators (for the internal quality)
- the perception indicators and the pollution indicators (for the perceptual quality)
- the consumer's expectation indicators – for ecological food

These indicators are established on introduction and keeping the Quality Systems (figure 2).

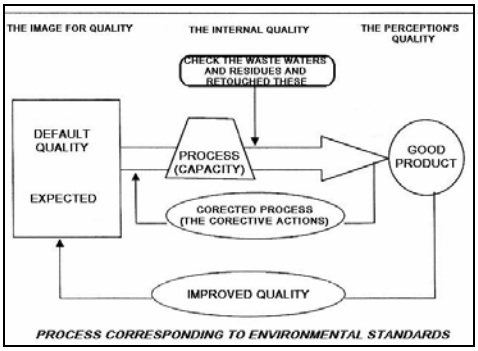

Figure 2. A simple model of Quality System

4. Conclusion

1. Due to the significant volume and loading them is not advisable to evacuate the wastewater from starch factories in urban drains without prior their treatment in to especially fermentation tanks or with activated sludge for conduct to a convenient value;
2. In plants of starch is possible the recirculation for washing water for starch as a very advanced recovery of substances;
3. the wastewater from the starch industry may cause significant increases in receiving waters for the concentration of organic matter and dissolved oxygen, the BOD_5, germs, including the number of cols (an increase of about 8 to 18 times), but using modern technology, through the advanced hydro-separators performance leads to improved extraction efficiency but also to more advanced water purification;
4. When using sulfuric acid to soak corn, it must be neutralized even shipped with lime, sodium carbonate and calcium sulfate, the best curves of sediment for wastewaters, raw, from manufacturing of starch achieving a dose of 900 mg CaO /L (compared to the current 300-1200 mg CaO/L).

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