THE PHOSPHORIC ACID INFLUENCE ON THE DEPOLLUTION OF THE WASTE WATERS ORIGINATED IN THE PRODUCTION OF KRAFT PULP

Irina Ifrim, Domnica Ciobanu, Gabriela Andrioai

UNIVERSITY OF BACAU, Calea Mărăşeşti 157, RO-5500 Bacău, Romania

ABSTRACT: The obtaining of kraft pulp from softwood through the leaching of lignine in a highly alkaline environment leads to the pollution of the environment because of the existence of the alkalilignin and the tiolignin in the waste waters.
KEYWORDS: kraft pulp, wastewaters, phosphoric acid, depollution

INTRODUCTION

Sulphate waste waters resulted in the technological stages of the wood grinding, washing, screening and the recovery of the sodium salts are characterized by a highly polluting chemical composition high biodegradable.

Table 1. The chemical composition of sulphate waste waters

The label of the qualitative indicator	Absolute value
Fixed residue at 100 ± 5^0C, %	80
Content of the organic substances from fixed waste, %	90
pH	12
Chemical oxygen demand expressed as CODMn, mg/L	80000
Temperature, ^{0}C	20
Colour – brownish rendered through the photometric absorption, %	6,5

The chemical characterization of the waste waters indicates a highly polluted environment.

MATERIALS AND METHODS

The research that was carried out had in view the alkalilignin flocculation in a phosphoric acid medium. There is the general equation of the process:

$$3RONa + H_3PO_4 = 3ROH + Na_3PO_4 \quad (1)$$

The independent variables of the system were: the quantity of H_3PO_4, the temperature and time of reaction (table 2).

Table 2

Independent variables	The range of fluctuation (ΔX=cst.)				
	-1,678	**-1**	**0**	**1**	**1,678**
H_3PO_4 (mg/100 ml water) X_1	3	5	7	9	11
Temperature (^{0}C) X_2	10	15	20	25	30
Time of reaction (minutes), X_3	8	10	12	14	16

RESULTS AND DISCUSSIONS

The interpretation of the results has been carried out through the particularization of the general equation of regression established for the dependent variables:

$$Y = b_0 + \sum b_i X_i + \sum b_{ij} X_i X_j + \sum b_{ii} X_{ii} \quad (2)$$

The polluting degree of the waste waters is given in figures 1, 2 and 3 through the method of particularization for CODMn, the colour index and the pH.
The discoloring of the sulphate waste waters through the lignin flocculation is achieved dependent on the H_3PO_4 addition, the reduction of the CODMn reaching bellow 90% and down to 79% for that of the colour.
The discoloring of the waste waters is ended even if there is a minimum consumption of H_3PO_4 of 3 mg/100 ml waste waters when the time of reaction is kept within the centred range (the real time is 12 minutes) and the reduction of the colour from blackish-brown towards yellowish corresponds to a reduction of 79%.

CONCLUSIONS

The flocculation of lignine with H_3PO_4 in the sulphate waste waters leads to:

- the discoloring from the initial blackish-brown towards yellowish colour of the waste water with a positive influence on the quality of the surface water;
- the reduction of the polluting degree through the reduction of the polluting organic components, the reduction of CCOMn reaching to 90%;

- the surplus oh H_3PO_4 in the system may be used as a nutrient in the next stage of biological water treatment.

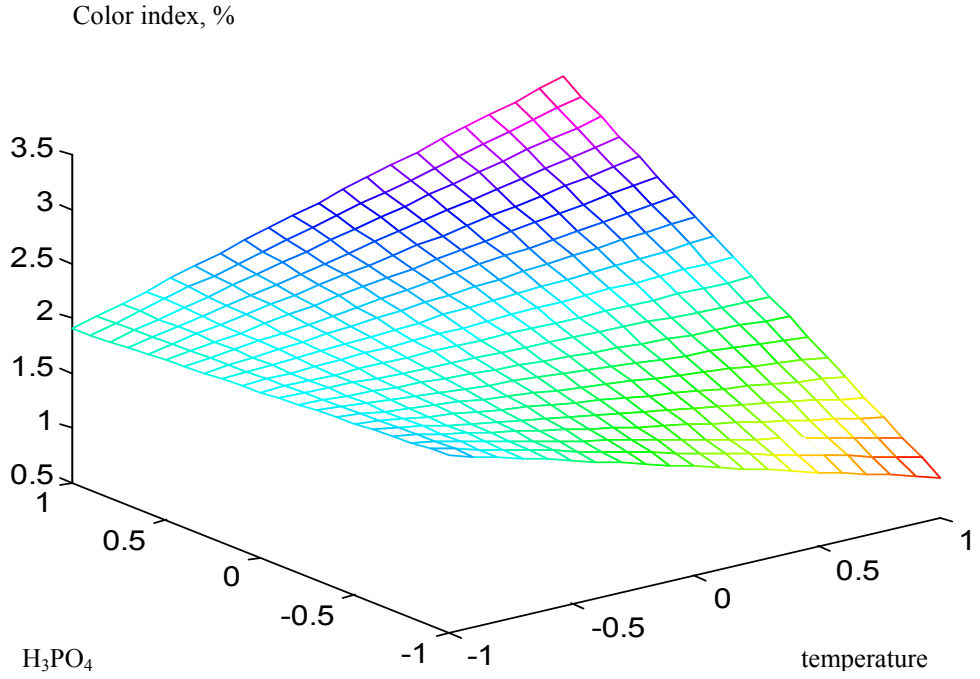

Figure 1. The colour index dependent on the H_3PO_4 addition and on the temperature when the maintaining of time of reaction within the centred range

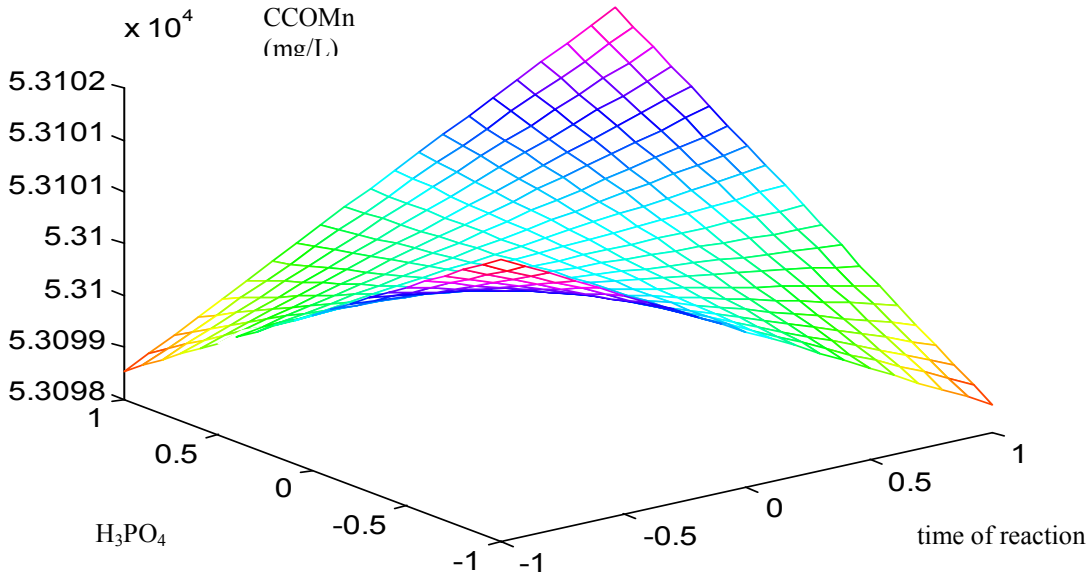

Figure 2. The CCOMn variation dependent on the H_3PO_4 addition and the time of reaction

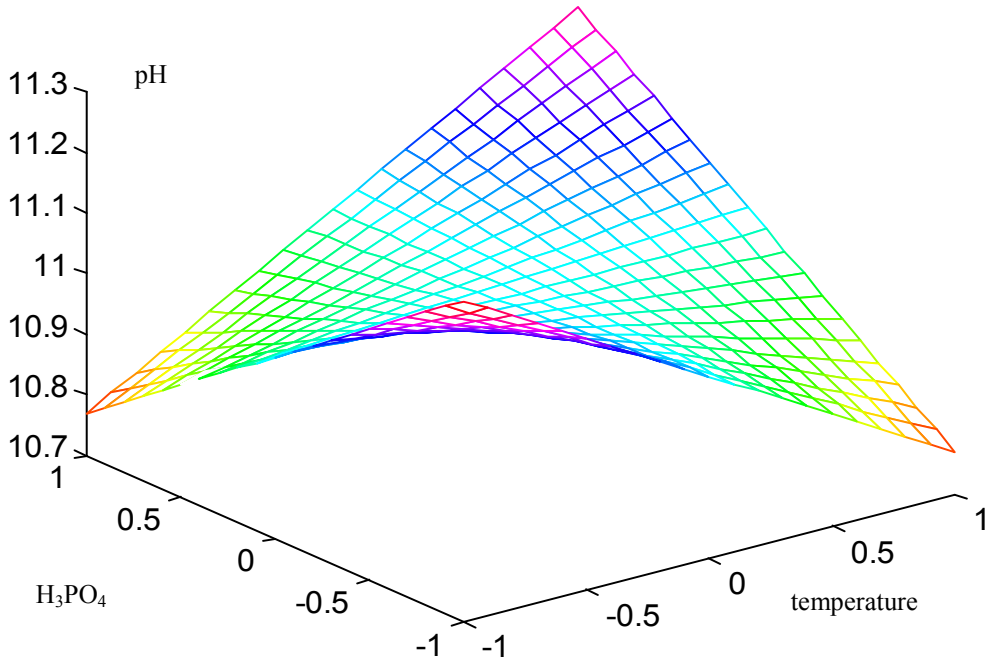

Figure 3. The pH variation dependent on the H_3PO_4 addition and on the temperature

REFERENCES

1. ROJANSCHI, V., BRAN, F., DIACONU, Gh., *Protecţia şi Ingineria Mediului*, Ed. Economică, Bucureşti, **1997**, p.37-40;
2. PĂTROESCU, C., GĂNESCU, I., *Analiza apelor*, Ed. Scrisul Românesc, Craiova, **1988**;
3. CIOBANU, D., NEDEF, V., ş.a., *Surse şi factori de poluare chimici în diferite medii industriale*, Ed. Tehnica-Info, Chişinău, **2002**, p. 130, 198;
4. DIACONESCU, V., OBROCEA, P., *Tehnologia celulozei şi hârtiei*, vol. II, Ed. Tehnică, Bucureşti, **1976**;

Received: 09.30.2003