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SORPTION OF COPPER IONS ON IMMOBILISED ZEOLITE AND YEAST

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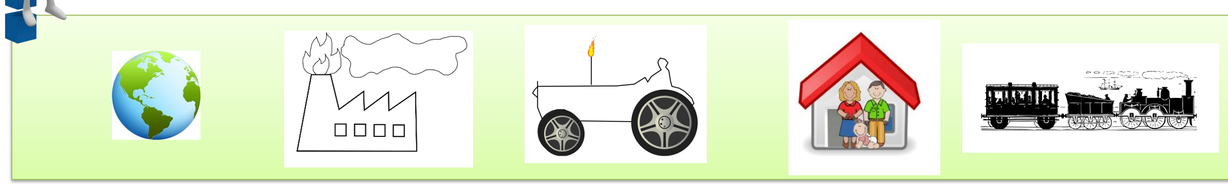
1) INTRODUCTION

An alarming environmental problem is heavy metal ions pollution.



NATURAL	INDUSTRIAL	AGRICULTURAL	DOMESTIC	MISCELLANEOUS
Aerosols	Thermal power	Inorganic fertilizers	Organic waste	Landfills
Rocks	Industrial waste	Pesticides	Inorganic waste	Medical waste
Dust particles	Mining industry	Wastewaters	Biomass burning	Traffic emissions
Volcanic eruptions	Refineries	Fungicides	E-waste	Incineration
Sea spray	Chemical industry	Fly ash	Used filters	Other emissions
			Used batteries	

Discharge of heavy metals in gaseous, liquid or solid form

Direct Pollution
through soil contamination

Indirect Pollution
through water and air contamination

2) EXPERIMENTAL PART

3) RESULTS

Parameter	Sorbent incorporated in alginate: zeolite NaX	Sorbent incorporated in alginate: Yeast *Saccharomyces cerevisiae*
$q_{max.e}$ (mmol/g)	0.437	0.065
	Freundlich isotherm	
K (mmol/g)	0.268	0.025
n	0.277	0.482
RMSE	0.022	0.014
χ^2	0.007	0.019
	Redlich-Peterson isotherm	
K (dm^3/mmol)$^\beta$	1.528	4.743
M (mmol/g)	0.433	0.018
β	0.948	0.603
RMSE	0.019	0.014
χ^2	0.007	0.019

Parameter	Sorbent incorporated in alginate: zeolite NaX	Sorbent incorporated in alginate: Yeast *Saccharomyces cerevisiae*
$q_{max.e}$ (mmol/g)	0.437	0.079
	Langmuir isotherm	
K (dm^3/mmol)	1.153	0.228
M (mmol/g)	0.494	0.105
RMSE	0.016	0.013
χ^2	0.005	0.016
	Sips isotherm	
K (dm^3/mmol)$^\beta$	0.961	107.879
M (mmol/g)	0.538	0.067
β	0.817	0.213
RMSE	0.016	0.019
χ^2	0.004	0.035

	Sorbent incorporated in alginate			
	Zeolite NaX		Yeast *Saccharomyces cerevisiae*	
c_0 mmol/dm^3	q_e mmol/g	R %	q_e mmol/g	R %
2.165	0.226	70.21	0.025	7.67
3.334	0.279	56.96	0.034	6.83
5.249	0.387	50.41	0.079	10.34
7.010	0.410	39.55	0.059	5.71
9.825	0.437	30.29	0.065	4.51

4) CONCLUSIONS

The copper sorption data on immobilised NaX and yeast was best described with the Langmuir isotherm model. The FTIR spectra of the sorbents used, recorded prior and after the sorption, revealed no changes in the structure of the sorbents.