COMBINED APPLICATION OF CHEMICAL AND BIOLOGICAL COMPOUNDS FOR THE REDUCTION OF PHOSPHORUS IN WASTEWATER AND BIOLOGICAL FANGES.

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INTRODUCTION

Nowaday wastewater treatment is a really important topic that is receiving a lot of attention due to the need of continuously finding and improving mechanisms and new techniques that allow us to eliminate as much organic matter, metals, and other toxic compounds as possible of the drinking waters and that are discharged to the riverbeds.
This project was realised to study the possibility of combining some of the already used chemical coagulants with natural and biodegradable compounds to see how the phosphorus removal is modiffied to check if it is possible and profitable and in this way decrease the amount of chemical compounds in this industry.

RESULTS AND CONCLUSIONS

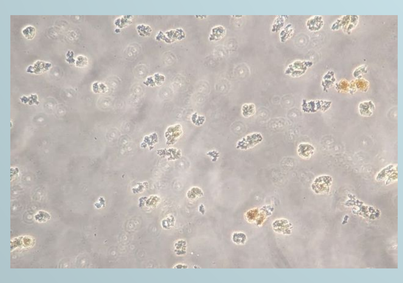
WATER RESULTS

Compounds	Optimal doses (µl)	% of sludge increase	% decrease un turbidity	% decrease in pH	% phosphorus removal
Aluminium polychloride	200	409,1	94,16	20,72	94,77
Ferric sulfate	300	480	58,53	2,24	95,82
Aluminium polychloride + hollocelullose	100+100	-7,01	-19,35	3,56	87,34
Ferric sulfate + hollocelullose	200+100	0	-30,82	24,11	99
Aluminium polychloride + gelatin	100+200	43,48	33,1	0,28	91,32
Ferric sulfate + gelatin	200+200	41,82	14,27	1,54	96,34
Aluminium polychloride + α cellulose	100+200	-7,7	8,18	0	92,79
Ferric sulfate + α cellulose	200+100	4,92	17,8	1,41	95,31
Aluminium polychloride + commercial starch	100+50	-13,9	15,64	0,7	85,88
Ferric sulfate + commercial starch	200+25	0	21,13	0,45	92,96

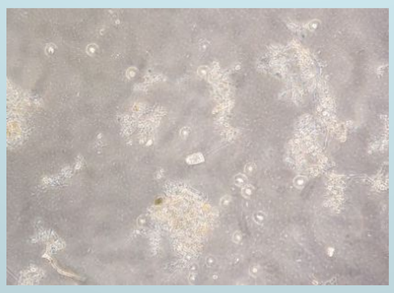
SLUDGE RESULTS

Compounds	Optimal doses (µl)	% of sludge increase	% decrease un turbidity	% decrease in pH	% phosphorus removal
Aluminium polychloride	75	15,55	12,01	2,04	88,82
Ferric sulfate	75	71,68	91,67	7,89	87,73
Aluminium polychloride + hollocelullose	25+25	2,03	20,09	0,13	90,97
Ferric sulfate + hollocelullose	25+25	51,33	24,64	1,69	84,8
Ferric sulfate + gelatin	25+200	28,44	32,1	0,4	62,79
Aluminium polychloride + α cellulose	25+75	0,74	0,78	0,27	85,33
Ferric sulfate + α cellulose	25+50	5	18,28	0	54,67
Aluminium polychloride + commercial starch	25+150	11,36	29,18	-1,55	50,12
Ferric sulfate + commercial starch	25+50	0,76	11,48	0	80,79

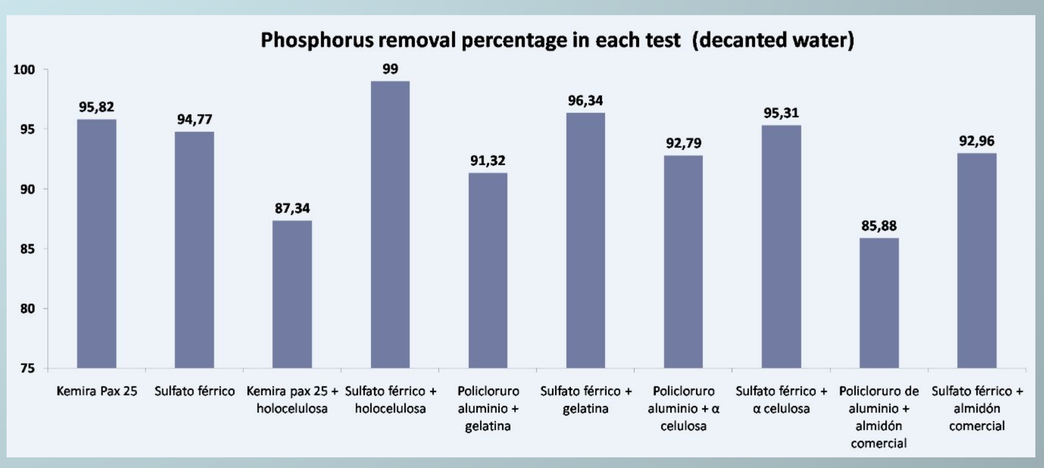
Decanted water without any compounds.



Decanted water with the optimal dose of Ferric sulfate. Small flocs formation. Death of the microfauna.



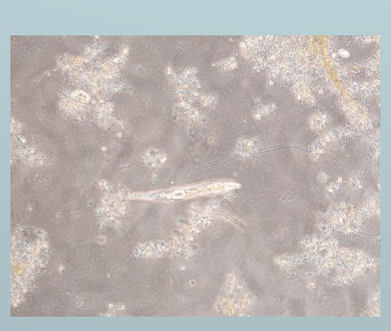
Sludge without any compounds. Opercularia sp.



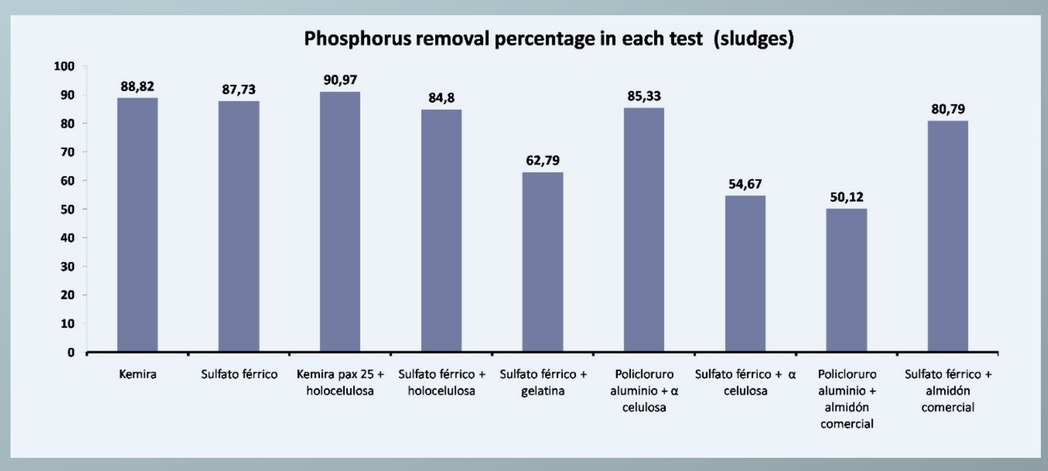
Conclusions

- The results obtained show that various organic compounds, like cellulose and starch, that are very cheap and easy to produce (some are even considered as wastes for some industries), can be used to decrease the concentration of phosphorus in sewage from wastewater treatment plants when used together with chemical compounds. However, more studies are required due to the characteristics of each water and the different organic and chemical compounds.

- The use of biological coagulants in combination with chemical ones could mean a new study field that has an enormous economic and environmental potential. However, the few studies carried out require further investigation of combinations with greater potential as well as in which type of water each one works better in order to optimize the process in each treatment plant according to their needs.



Sludge with the optimal dose of Aluminium polychloride. No involvement of the microfauna. Rotíffero.



Graphics of the percentage of disposal of phosphorus by chemical coagulants conjugated with biological coagulants in water and sludge

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