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POTENTIAL USE OF LEACHATES FROM A MECHANICAL BIOLOGICAL MUNICIPAL SOLID WASTE TREATMENT PLANT AS FERTILIZERS

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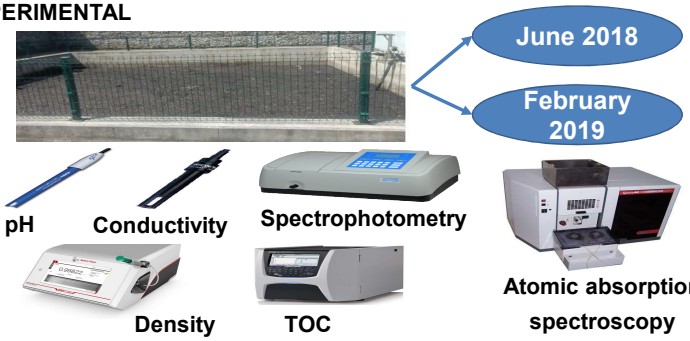
INTRODUCTION

Leachates produced from treatment plants contains carbon, nitrogen, phosphorus, potassium and trace elements. This work aims to assess if a leachate, generated from a mechanical and biological treatment of compost, can be used as a potential source for fertilizers, and thus develop and design a sequence of processes which could effectively convert the leachates to commercial fertilizers according to the requirements of the proposal of regulation of the European Parliament of 2016. The analysis shows that the leachate could result in an organo-mineral fertilizer with high organic carbon content. However, some heavy metals, nitrogen and phosphorous contents do not fulfill the legislation requirements, and potassium content remains to be characterized.

EXPERIMENTAL



RESULTS

Table 1. Chemical properties of original and concentrated leachates.

Samples		% TOC	pH	Density [g/cm³]	Dry Mass [%w/w]	Ash [%w/w]
EU 2016		3.00	-	-	<60	-
June 2018	Original	1.22	7.95	1.01	2.76	1.36
	3.19x	3.64	6.43	1.04	8.26	4.31
	3.23x	3.63	6.44	1.04	8.21	4.23
	3.33x	3.46	6.40	1.04	8.58	4.39
	4.23x	4.65	6.48	1.06	11.19	5.64
	4.39x	4.63	6.49	1.06	11.26	5.81
February 2019	Original	2.81	7.53	1.03	6.49	3.07
	Original Filtered	2.79	7.81	1.03	6.02	2.96
	1.19x	3.27	7.98	1.04	7.03	2.93
	1.85x	5.36	6.55	1.06	11.43	5.59

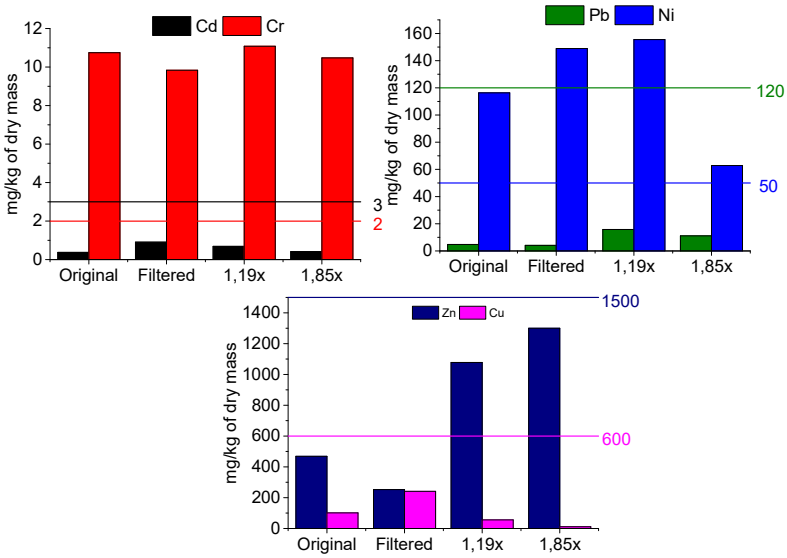


Fig 1. Heavy metals content.

CONCLUSION

The concentrated leachate cannot be used, at this point, as fertilizer, because it does not fit all the legislation requirements, but it still displays potential to be used after simple processing. It shows high concentration of total organic carbon (TOC). Heavy metals content must be reduced with adsorption materials and nitrogen and phosphorous nutrients are present in low levels even after the concentration procedure. Ultrafiltration or reverse osmosis could be viable solutions to remove the excess of water without affecting significantly the content of the product in other compounds, especially nutrients. Potassium determination remains to be carried out in order to assess if it fits the legislation specification. However, the potential use of these wastes as fertilizers is significant, especially because it promotes the use of liquid wastes with high organic carbon content for agricultural applications with the possibility of producing a high value-added material.

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