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NICHEL IONS REMOVAL FROM WASTE WATER USING *TYPHA ANGUSTIFOLIA* PLANT

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Introduction

Heavy metals are described as environmental pollutants because their toxicity, longevity in the atmosphere, and unfortunately their ability to accumulate in the human body thru bio-accumulation. Also, the pollution of terrestrial and aquatic ecosystems with toxic heavy metals is a major environmental concern that has consequences for public health. These heavy metals are characterized by their high atomic mass and toxicity to all organisms. Most of them cause environmental and atmospheric pollution, and more drastic can be lethal to humans. Heavy metals can become very toxic in contact with different environmental elements (water, soil, air). Eco-friendly and low-cost methods become new perspectives for near future. Our research development a process for removal of nichel ions from waste water. Using *Typha angustifolia* plant, were made experiments to perform the Ni (II) ions removal. It was observed an increase using more than a plant via a long period of time, the yield being approximately 85% when 5 plants were used, compared to 77% yield when only one plant was used.

Methodology

It were harvested *Typha anustifolia* plants from Ares area and it were utilized for 3 experiments (1, 3 or 5 plants). Waste waters were preparated in the lab, with the , 2.56 mg/L Ni ions. For 48 hours, the samples were aitated and ten were prelevated every 8 hours. The exposed samples were analyzed to observe the decrease in the concentration of nickel ions and also the ability of Typia stems to retain nickel ions.
Measurements were made with an photometer PhotoLab S12, until the plant reacted the maximum capacity of retaining nickel ions.
The measurement yields were calculated taking into account the measured concentrations of nickel ions, using following formula:

$$\eta = \frac{c_i - c_f}{c_i} * 100$$

Were: η = purification efficiency, %
Ci = initial concentration of nickel ions, mg/L
Cf = final concentration of nickel ions, mg/L

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Results

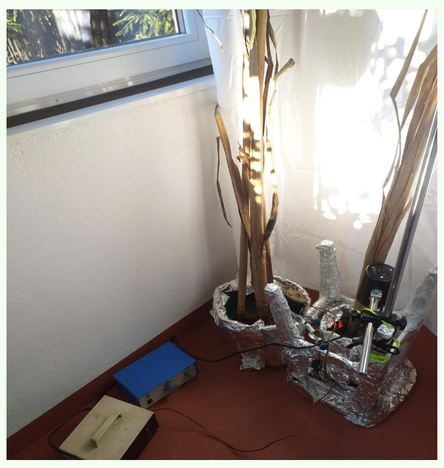

Fig. 1. *Typha angustifolia* experiment

Table 1. Concentrations and treatment efficiencies using Typha angustifolia plants to remove a concentration of 2.56 mg/L Ni(II)

Time		*Typha angustifolia*					
		1 plant		3 plants		5 plants	
h	min	Conc., mg/L	Yield, %	Conc., mg/L	Yield, %	Conc., mg/L	Yield, %
8	480	1,41	44,92	1,14	55,47	0,73	71,48
16	960	1,36	46,88	0,87	66,02	0,59	76,95
24	1440	1,26	50,78	0,81	68,36	0,65	74,61
36	2160	0,82	67,97	0,79	69,14	0,55	78,52
48	2880	0,59	76,95	0,74	71,09	0,39	84,77

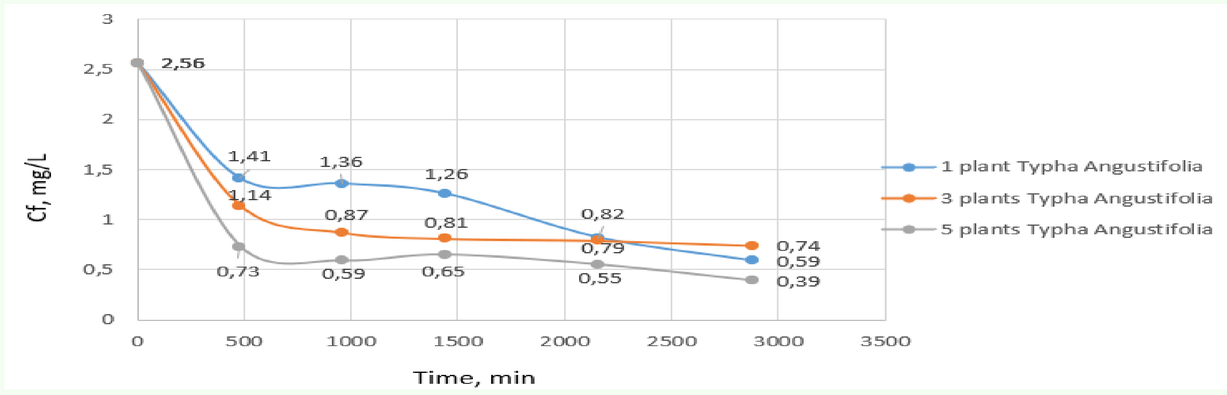

Fig. 2. Variation of concentrations over time

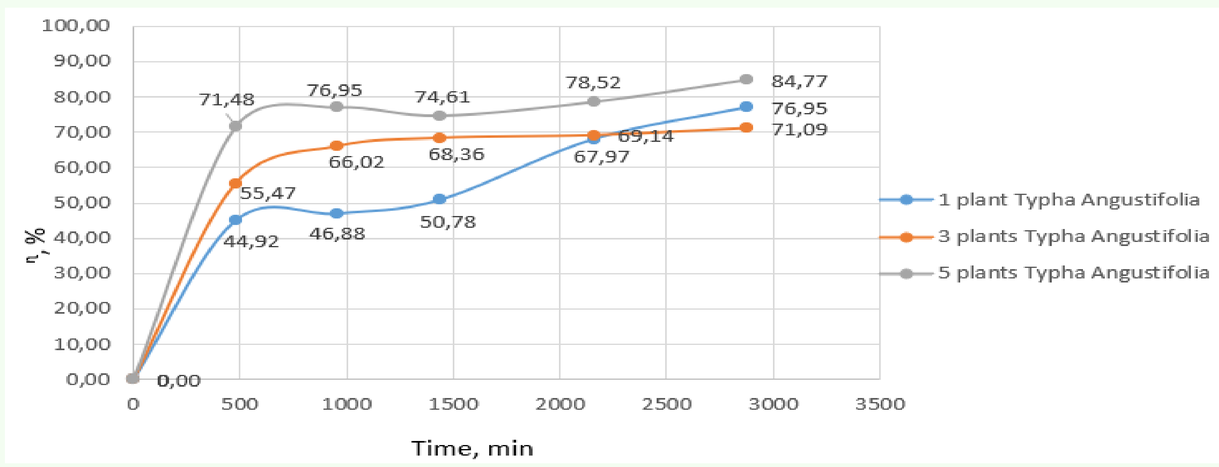

Fig. 3. Graph of the variation of Ni (II) ion yield over time

Conclusions

It was observed that *Typha angustifolia* plant is efficient to remove heavy metals from wastewater. The experiments demonstrated the capacity of removing nichel from industrial effluent. The roots have a better bioaccumulation capacity, than stems and leaves..

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