

EFFECT OF WASTEWATER RECLAIMED WITH MICROALGAE ON AGRICULTURAL SOIL CULTIVATED WITH *Scindapsus aureus*

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Introduction

The aim of this study is to assess the impact of reclaimed wastewater reuse in agricultural soil with ornamental plant *Scindapsus aureus*.

Wastewater regeneration is carried out in a biological photoreactors system in continuous operation, with the presence of microalgae, and solar radiation, that bring out the consequent over oxygenation in the reactor, Modified Natural Technology (M.N.T.)

Results and Discussion

Graphics 1,2 and 3. Comparison of irrigation water parameters

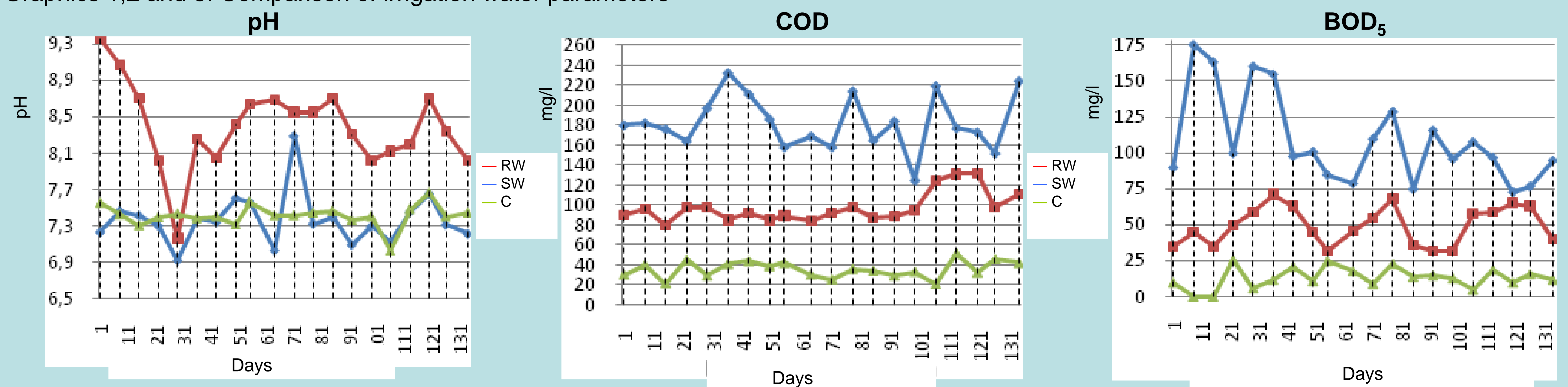


Table 1. Comparison of soils

	INITIAL	TREATED WATER		RECLAIMED WATER		WELL WATER	
		AVER.	SD	AVER.	SD	AVER.	SD
pH water	8,66	8,25	a 0,16	8,63	b 0,09	8,39	b 0,03
pH (KCl)	7,44	8,04	a 0,07	8,49	b 0,04	8,11	a 0,06
E.C. $\mu\text{s}/\text{cm}$	97,07	97,67	a 0,44	97,11	a 0,01	97,14	a 0,06
OM. %	1,82	0,52	a 0,09	0,80	ab 0,22	1,10	b 0,21
N %	0,17	0,03	a 0,00	0,04	ab 0,01	0,06	b 0,01
C/N	10,41	10,50	a 0,03	11,25	b 0,30	10,74	a 0,32
P- PO_4^{3-} mg/Kg	0,55	1,01	a 0,13	0,89	a 0,10	0,88	a 0,14
Na ⁺ mg/Kg	161,0	0,84	a 0,12	1,07	a 0,20	0,78	a 0,09
K ⁺ mg/Kg	6,6	6,6	a 0,04	6,6	a 0,06	6,6	a 0,02
Ca ²⁺ mg/Kg	5250,0	6316,7	a 202,1	6466,7	a 125,8	6216,7	a 256,6
Mg ²⁺ mg/Kg	200,0	291,7	a 38,2	275,0	a 25,0	250,0	a 0,0
Carbonates %	18,4	18,9	b 0,16	17,8	a 0,24	18,6	b 0,13

a Values followed by the same letter are not significantly different ($p < 0,05$)

Conclusions

- Reclaimed water and well water used in this paper are entirely suitable for their use in agricultural irrigation. This conclusion is supported by the results of the parameters COD, BOD₅, P- PO_4^{3-} , FC and TC
- It has been found a positive effect of re-using reclaimed water on soil and plants, attending to organics, nutrients, disposable cations and microbiological parameters.
- Soil acts as a treatment wastewater system

Methods

-A Two-steps biological photoreactors system in continuous operation. (See Poster: Determination and quantification of algae in a wastewater treatment system continuous closed photobioreactor).

-Plant: *Scindapsus aureus*.

- Well water (C), Secondary treatment water (SW) and regenerated with photoreactor water (RW). Weekly irrigations.

- Water, soil and plant samples were analysed using Standard Methods.

Table 2. Comparison of drained water

	TREATED WATER		RECLAIMED WATER		WELL WATER	
	AVER.	SD	AVER.	SD	AVER.	SD
pH	7,62	a 0,33	8,45	b 0,36	7,71	a 0,27
E.C. $\mu\text{s}/\text{cm}$	1263,95	b 115,52	1083,62	a 110,37	1037,28	a 67,86
COD mg/L	170,45	c 22,31	90,50	b 12,10	32,73	a 7,87
BOD ₅ mg/L	127,37	c 30,46	51,03	b 16,64	11,37	a 9,61
P- PO_4^{3-} mg/L	1,049	c 0,651	0,062	b 0,067	0,026	a 0,017
NO ₃ ⁻ mg/L	92,30	c 19,6	78,9	b 16,8	55,9	a 9,1
TC UFC/100 ml	5.0 E+5	-	1.3E+5	0	0	-
FC UFC/100 ml	5.2E+4	-	1.4E+4	0	0	-

Table 3. Comparison of plants

	PLANTS TREATED WATER		PLANTS RECLAIMED WATER		PLANTS WELL WATER	
	AVER.	SD	AVER.	SD	AVER.	SD
N _k mg/Kg	17 444,9	a 7 450,8	20 454,4	a 6 920,2	20 270,8	a 2 201,6
P- PO_4^{3-} mg/Kg	7 414,7	a 2 465,0	8 444,7	a 528,2	7 791,8	a 667,6
Na ⁺ mg/Kg	4 652,6	a 2 776,5	4 848,6	a 3 328,4	1 728,6	a 1 043,8
K ⁺ mg/Kg	24 244,2	a 6 897,3	28 010,6	a 3 130,4	24 750,3	a 1 159,7
Ca ²⁺ mg/Kg	16 025,7	a 2 964,1	23 352,0	a 4 686,3	19 271,0	a 3 339,5
Mg ²⁺ mg/Kg	2 872,3	a 545,0	4 778,6	a 1 091,3	3 058,8	a 451,2

References

- Standard Methods for the Examination of Water and Wastewater (2005). 21th ed, American Public Health Association/American Water Works Association/ Water Environment Federation, Washington DC, USA.
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