



Escola de Camins

Escola Tècnica Superior d'Enginyeria de Camins, Canals i Ports
UPC BARCELONATECH

DISSERTATION

Title

**NATURAL SYSTEMS FOR WASTEWATER TREATMENT IN WARM CLIMATE
REGIONS (ANNEX II)**

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ANNEX II: Concentration values under heavy rain conditions**- COD (mg/l)**

Sample	Stirred tank	HUSB	Vertical SSF	Horizontal SSF	FWS	Total removal efficiency (%)
1	358,01	674,26	95,32	70,73	31,20	91,28
2	97,77	502,96	155,06	136,62	81,27	16,87
3	265,78	97,77	97,09	89,18	56,24	78,84
4	308,60	127,42	101,04	66,78	66,78	78,36
5	285,54	91,18	114,22	53,60	53,60	81,23
6	282,25	22,00	50,97	7,48	11,44	95,95
7	417,31	308,60	115,53	122,12	107,63	74,21
8	440,37	420,60	110,26	47,01	68,10	84,54
9	344,84	227,54	61,51	40,43	54,92	84,07
10	334,95		99,72	69,41	57,56	82,82

Table 1: Concentration of COD (mg/l) in each stage of the treatment during the heavy rain campaign

- TSS (mg/l)

Sample	Stirred Tank	HUSB	Vertical SSF	Horizontal SSF	FWS	Total removal efficiency (%)
1	61,33	150,14	21,75	6,33	2,00	96,74
2	1,60	25,75	8,60	0,83	0,00	100,00
3	161,17	16,88	17,17	7,79	0,20	99,88
4	64,25	10,33	30,75	3,67	1,88	97,08
5	178,83	9,00	7,21	0,88	0,50	99,72
6	115,75	14,50	10,33	1,00	0,25	99,78
7	85,21	89,43	7,00	1,25	1,00	98,83
8	124,00	63,92	11,73	0,50	0,00	100,00
9	55,00	63,25	2,50	1,40	0,20	99,64
10	110,07		16,75	3,62	1,92	98,26

Table 2: Concentration of TSS (mg/l) in each stage of the treatment during the heavy rain campaign



- **NH₄-N (mg/l)**

Sample	Stirred tank	HUSB	Vertical SSF	Horizontal SSF	FWS	Total removal efficiency(%)
1	22,75	32,95	6,11	5,37	5,30	76,69
2	2,47	8,66	17,61	7,12	6,66	-169,52
3	27,08	9,15	6,53	11,71	5,94	78,07
4	27,08	8,12	17,03	6,37	5,98	77,92
5	28,45	10,51	16,35	6,83	5,99	78,95
6	28,10	11,77	15,93	7,10	5,78	79,44
7	31,11	23,05	14,79	9,00	5,67	81,77
8	31,75	23,89	13,55	8,12	5,72	81,99
9	28,79	26,80	12,73	10,83	5,41	81,19
10	30,53	26,46	10,30	9,78	4,94	83,82

Table 3: Concentration of NH₄-N (mg/l) in each stage of the treatment during the heavy rain campaign- **pH**

Sample	HUSB	Vertical SSF	Horizontal SSF	FWS
2	7,65	7,55	7,53	7,45
3	7,75	7,4	7,55	7,35
5	8,16	7,88	7,32	7,15
8	7,29	7,08	7,07	7,07
10	7,37	7,09	7,27	7,21

Table 4: pH in each stage of the treatment during the heavy rain campaign



- Eh (mV)

Sample	HUSB	Vertical SSF	Horizontal SSF	FWS
2	-247,6	-197,2	-158	-125,2
3	-240,4	-76,5	-68	-135,7
5	-215,9	-48,1	-65,4	-87,5
8	-305,4	-33,4	63,7	38,2
10	-308,6	71,1	50,9	89,6

Table 5: Eh (mV) in each stage of the treatment during the heavy rain campaign

- DO (mg/l)

Sample	HUSB	Vertical SSF	Horizontal SSF	FWS
2	0,65	0,6	0,92	0,28
3	0,24	0,48	1,1	0,48
5	0,43	0,53	0,84	0,56
8	0,3	0,57	0,66	0,63
10	0,19	0,63	0,37	0,43

Table 6: DO in each stage of the treatment during the heavy rain campaign

