



CAPACITY OF Vetiver GRASS IN TREATING A MIXTURE OF LABORATORY AND DOMESTIC WASTEWATERS

Thao Minh Tran⁽¹⁾; Jean O. Lacoursilre⁽²⁾; Lena B. M. Vought⁽²⁾;
Phuong Thanh Doan⁽³⁾; Man Van Tran⁽⁴⁾

(1) Danang College of Technology, Vietnam

(2) Kristianstad University, Sweden

(3) University of Education, Vietnam

(4) Danang Department of Planning and Investment, Vietnam



PRESENTATION content

1-Introduction of research

2-Installation & feeding wastewater

3-Results and discussion

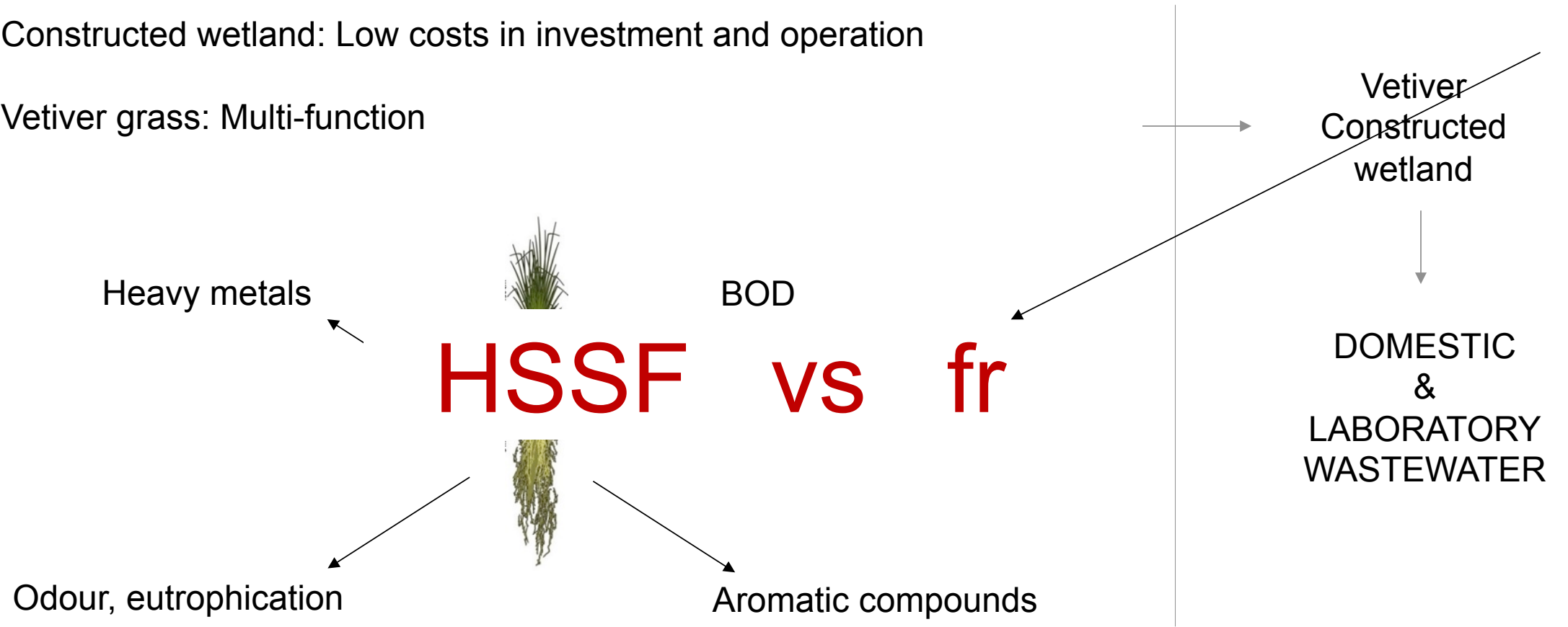
4-Conclusions & recommendations

5-Acknowledgements



INTRODUCTION OF RESEARCH

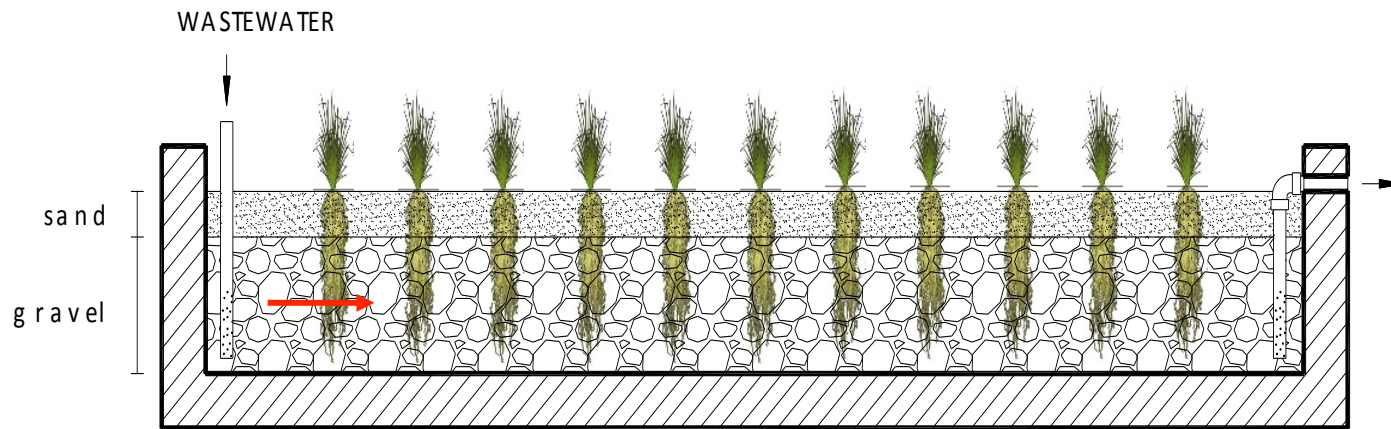
- Constructed wetland: Low costs in investment and operation
- Vetiver grass: Multi-function



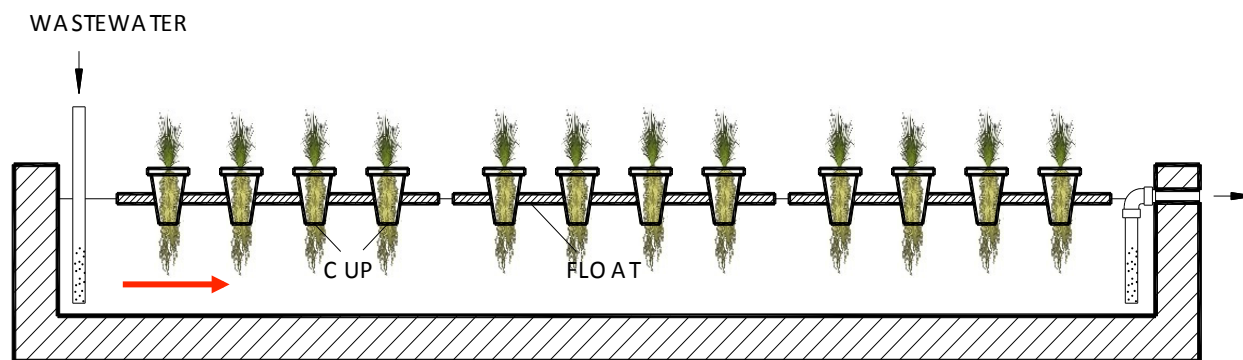


Installation & feeding wastewater

Installation



(HSSF)



(FR)



Installation & feeding wastewater

Constructed wetland systems at the beginning:





Installation & feeding wastewater

Feeding wastewater

Parameter	Dimension	Value		
		DW	LW	Mixture
pH		TAP WATER → 3 WEEKS		6.0 ± 0.2
BOD		↓		220 ± 12
TN		↓		55 ± 3
TP		DW:TAP WATER = 1:1 → 8 WEEKS		11 ± 2
Cr ⁶⁺		↓		4.5 ± 0.4
Fe ²⁺		↓		19.8 ± 0.3
Mn ²⁺		↓		24.2 ± 0.6
Cu ²⁺		↓		17.6 ± 0.7
Benzene	mg.L ⁻¹	DW:LW = 1:1 → 7 WEEKS		2.3 ± 0.4
Phenol	mg.L ⁻¹	ND	7.8	3.8 ± 0.2

Results & discussion



After 3 weeks with only tap water



After 8 weeks with DW & tap water



After 7 weeks with DW & LW



Results & discussion



1 week ago

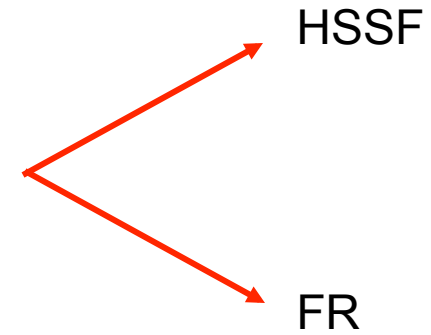




Results & discussion

- 1- Contaminants removals efficiencies of HSSF & FR;
 - + BOD, N, P;
 - + Heavy metals;
 - + Aromatic compounds;

- 2-Microbial investigations





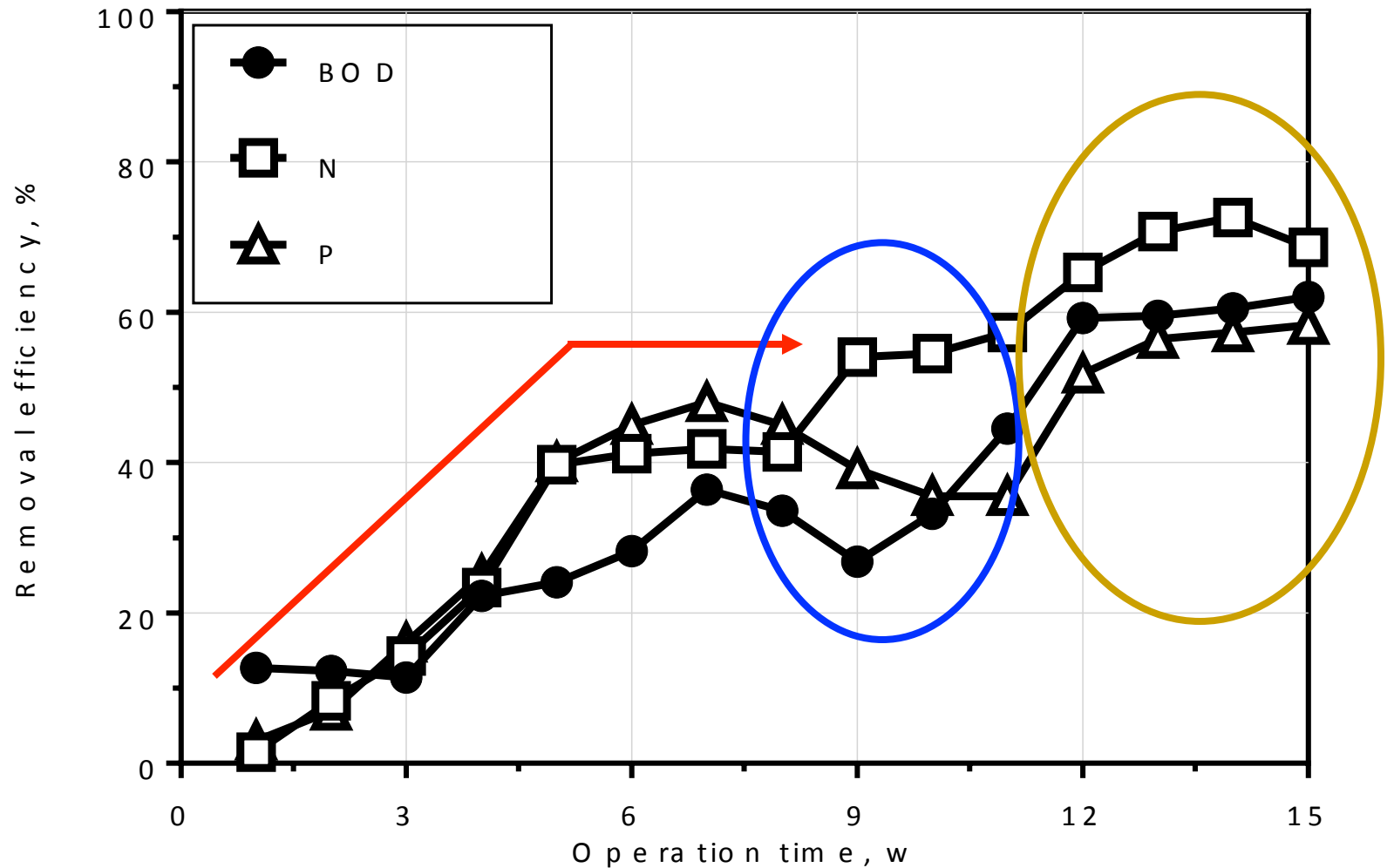
Removal performance of organics and nutrients

hssf:

1- Diluted DW

2- Start LW

3- Acclimatized





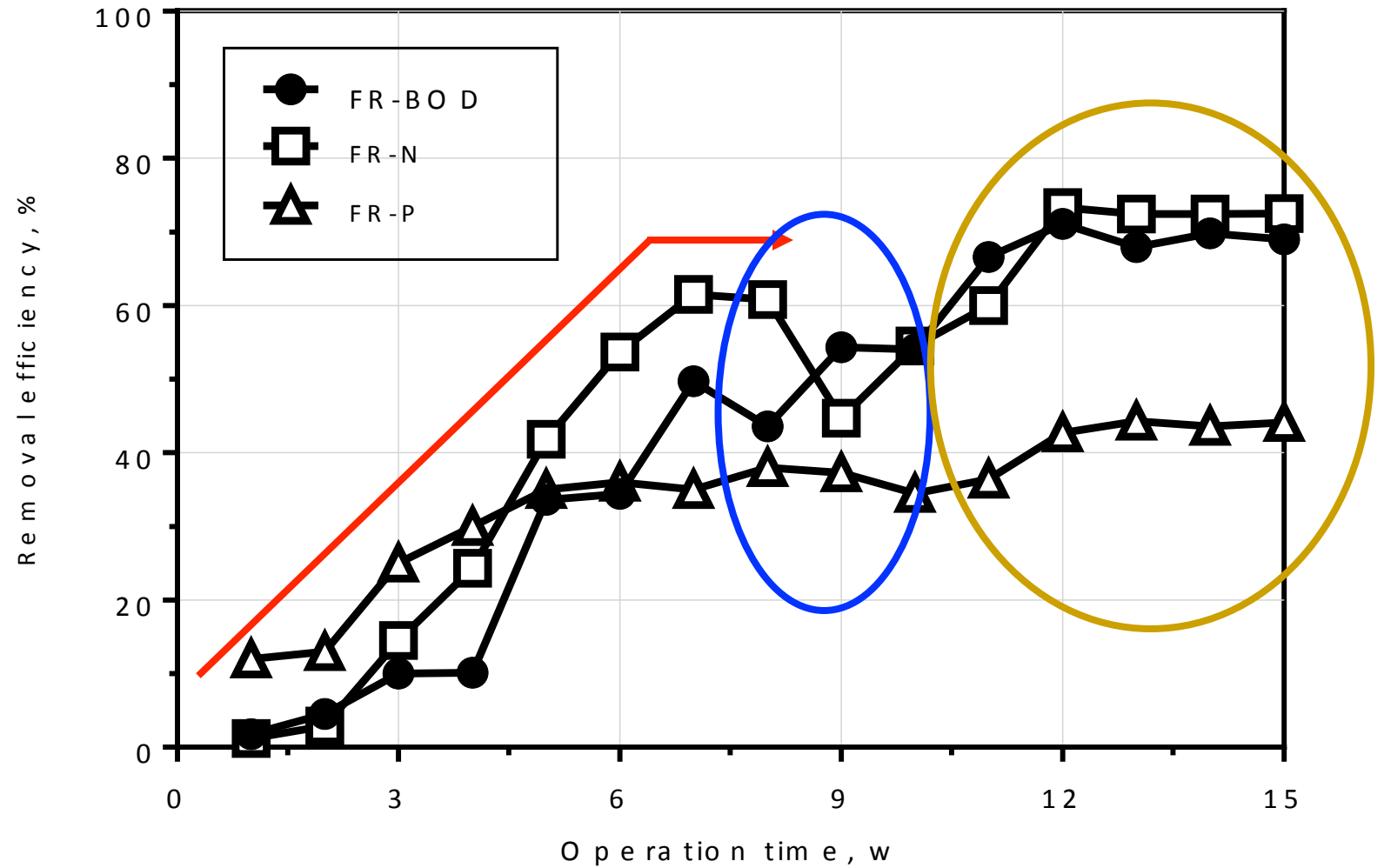
Removal performance of organics and nutrients

FR:

1- Diluted DW

2- Start LW

3- Acclimatized



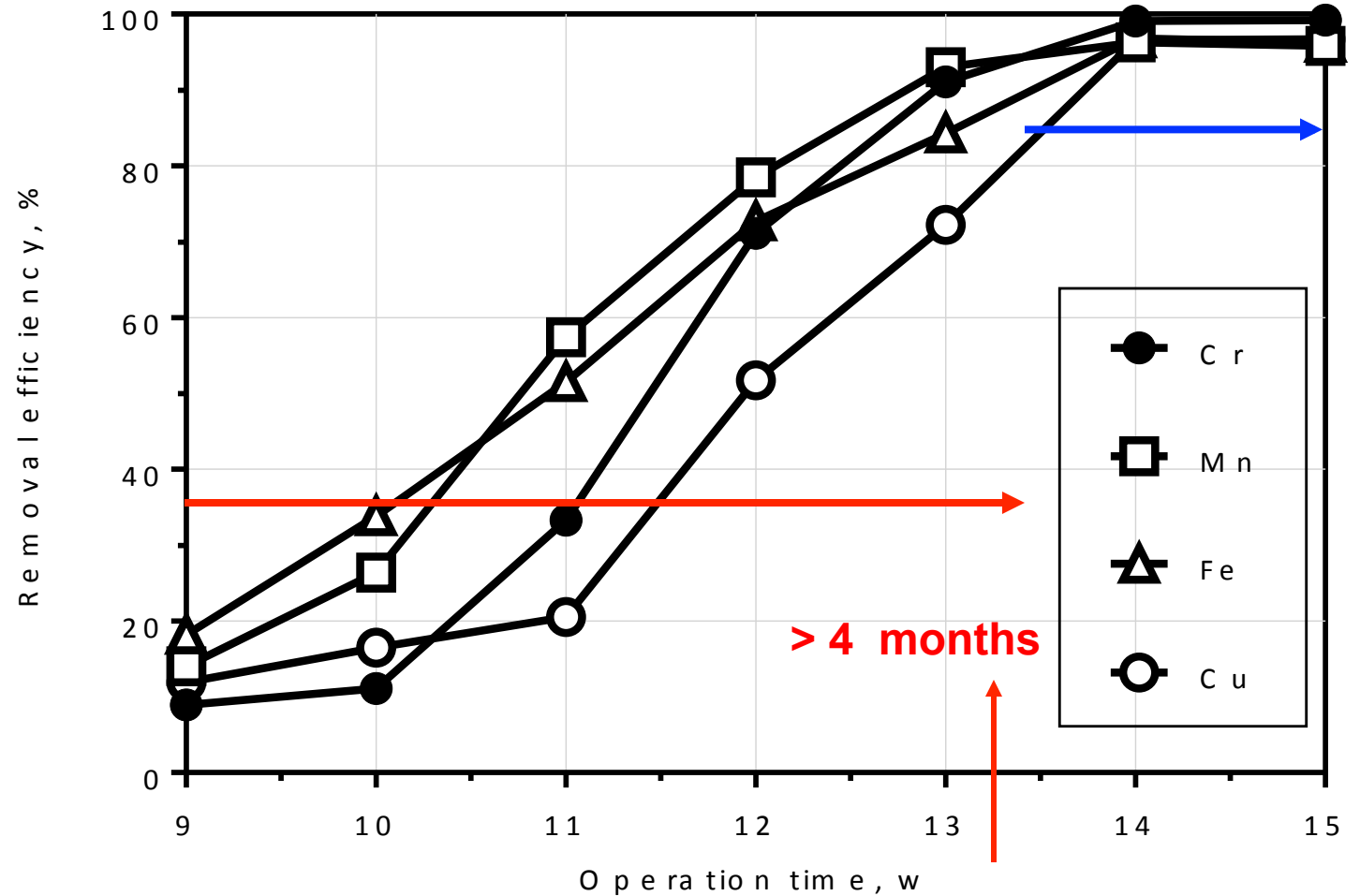
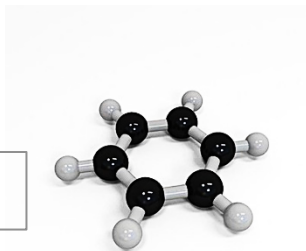
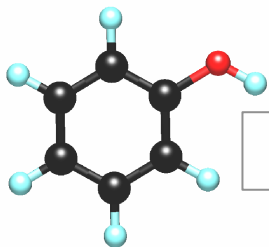


Removal performance of Heavy metals & arom. Comp.

HSSF:

1-Acclimatization

2-Steady state



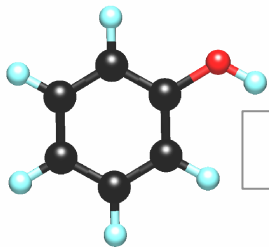


Removal performance of Heavy metals & arom. Comp.

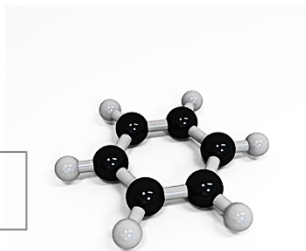
FR:

1-Acclimatization

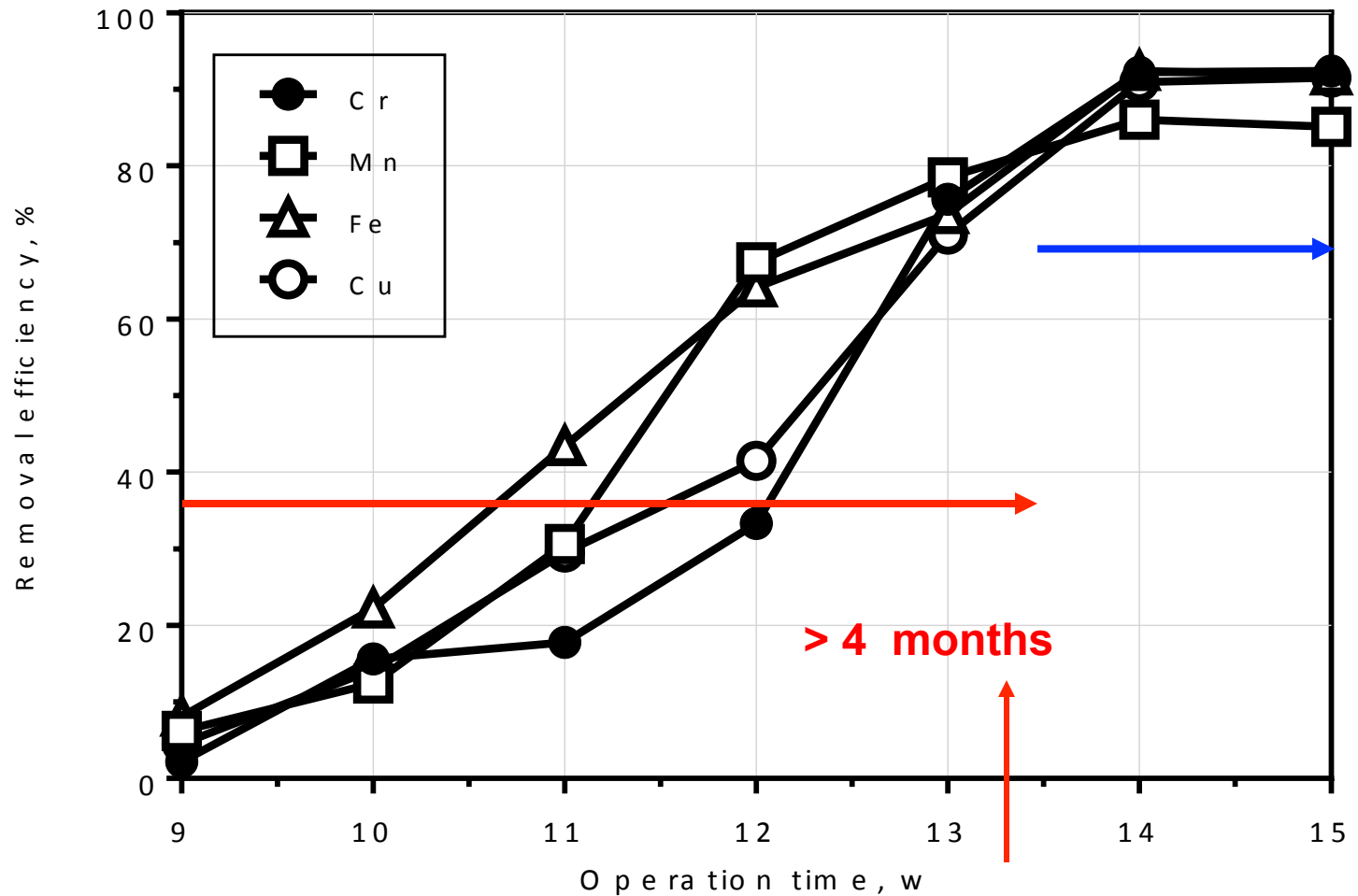
2-Steady state



91.5%



96.0%





Microbial behaviours

HSSF:

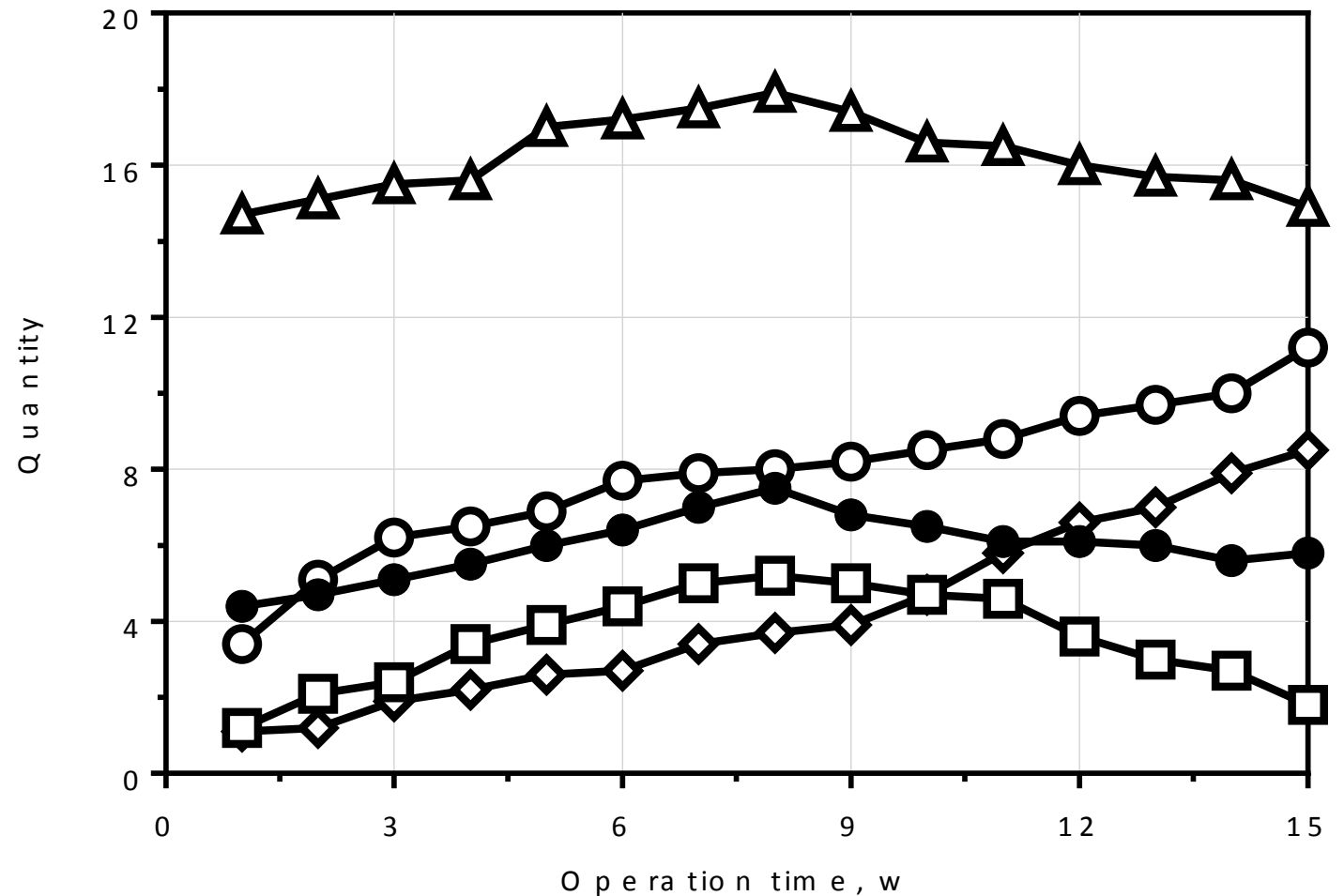
● *Azospirillum* sp.
(x 10⁴ CFU/100 mL)

□ *Azotobacter* sp.
(x 10⁴ CFU/100 mL)

△ *Bacillus* sp.
(x 10⁴ CFU/100 mL)

○ *Pseudomonas* sp.
(x 10⁸ CFU/100 mL)

◇ *Zoogloea* sp.
(x 10⁷ CFU/100 mL)





Microbial behaviours

HSSF:

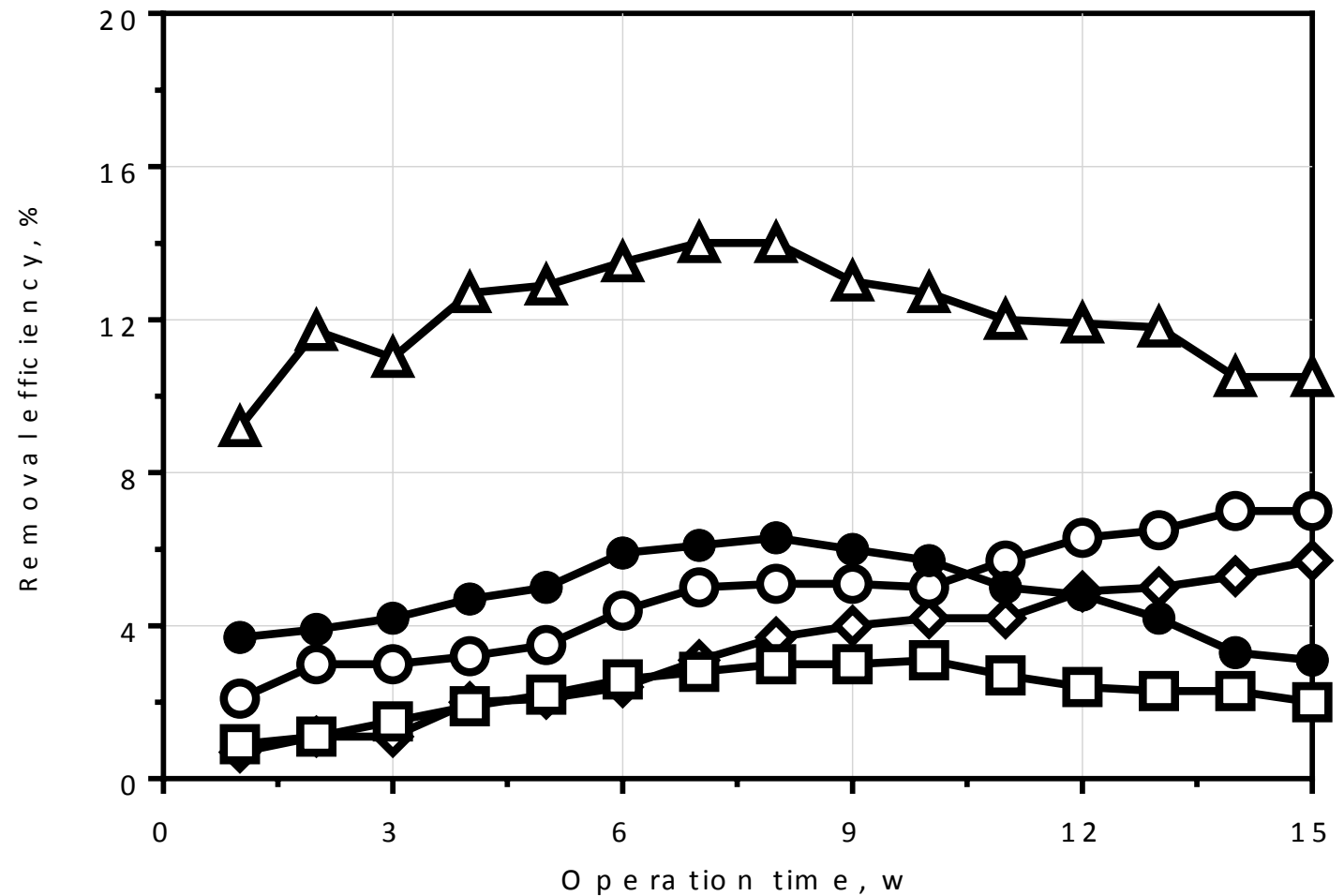
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(x 10⁴ CFU/100 mL)

○ *Pseudomonas* sp.
(x 10⁸ CFU/100 mL)

◇ *Zoogloea* sp.
(x 10⁷ CFU/100 mL)





Conclusions & recommendations

- HSSF:
 - + HM and AC: slight effect on N removal
 - + HM and AC: significant effect on P removal
 - FR:
 - + HM and AC: slight effect on P removal
 - + HM and AC: significant effect on N removal
 - Addition of LW: BOD and nutrient removal performances are improved
 - *Azospirillum*, *Azotobacter* and *Bacillus* sp.: affected by LW
 - *Pseudomonas* and *Zoogloea* sp.: free of influence
 - HSSF >< FR: Little difference in performance
- Larger scale for domestic & laboratory wastewater treatment



Thank you for attention