



UNIVERSIDADE FEDERAL DE MATO GROSSO DO SUL
CENTRO DE CIÊNCIAS EXATAS E TECNOLOGIA
CURSO DE GRADUAÇÃO EM ENGENHARIA AMBIENTAL

Adaptability study of ornamental plants in constructed wetlands fed by wastewater pre-treated in upflow anaerobic sludge bed reactor

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CAMPO GRANDE - MS
AGOSTO/2006

METHODOLOGY



Size:
5,0m x 3,0m x 0,5m



SCOPE OF WORK

To assess the adaptability of ornamental plants in constructed wetlands, fed by wastewater (domestic and hospital) pre-treated in upflow anaerobic sludge bed reactor

- To screen different ornamental plants for using in constructed wetlands.
- To show preliminary results of the efficiency of ornamental plants in constructed wetlands.

METHODOLOGY

ORNAMENTAL PLANTS SELECTION



- being active in the major part of the year;
- tolerating local temperatures and weather variations;
- having great root extension;
- being suitable to flooded environments;
- having a high nutrients demand.



METHODOLOGY

ORNAMENTAL PLANTS SELECTION

Preliminary selection

- Literature research
- Pantanal- ecosystem plants
- Flower store
- Weed



Selection

- cradle



METHODOLOGY

ORNAMENTAL PLANTS ANALYSIS OF ADAPTABILITY

Propagation rate



RESULTS AND DISCUSSION

ORNAMENTAL PLANTS SELECTION



Cyperus Isocladus




Hedychium coronarium



Heliconia psittacorum

RESULT AND DISCUSSION

ORNAMENTAL PLANTS SELECTION



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Flow

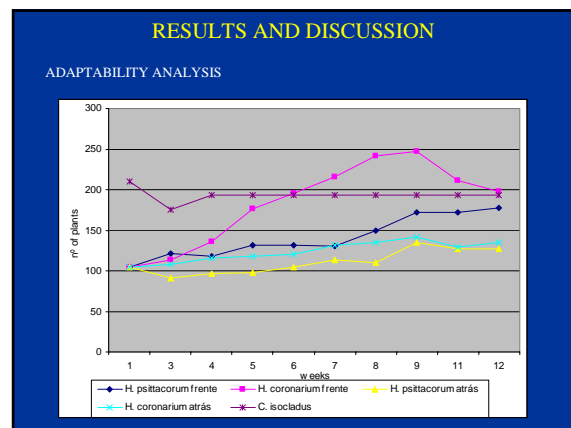
RESULTS AND DISCUSSION

ORNAMENTAL PLANTS SELECTION




Constructed wetland at the beginning

Constructed wetland 3 months later



RESULTS AND DISCUSSION

ADAPTABILITY ANALYSIS

Week	N° stem after <i>H. coronarium</i>	N° stem after <i>H. psittacorum</i>
1st	4,40	7,35
2nd	4,20	9,90
3rd	4,40	8,95

Average number of stem per plant - *C. isocladius* - location after *H. coronarium* or *H. psittacorum*

RESULTS AND DISCUSSION

PHYSICAL AND CHEMICAL ANALYSES

Parameter	Removal (%)	
	Effluent ornamental	Effluent control cell
Total phosphate (mg/L PO ₄ ³⁻)	86,54	88,01
N Total Kjeldahl (mg/L N)	56,88	58,12
Total coliforms (NMP/100mL)	31,71	43,90
<i>Escherichia coli</i> (NMP/100mL)	37,41	30,22
COD (mg/L O ₂)	72,02	73,22
BOD ₅ (mg/L O ₂)	75,98	54,41

CONCLUSIONS

- *Heliconia psittacorum*, *Hedychium coronarium* and *Cyperus isocladius* showed great potential to be used in constructed wetlands.
- Taking in consideration preliminary physical and chemical analyses, constructed wetlands planted with *Heliconia psittacorum*, *Hedychium coronarium* and *Cyperus isocladius* have a good contaminants reduction potential.
- The adaptation time of constructed wetland systems depends on several factors in addition to the plants stabilization.
- This is the first research using *Heliconia psittacorum* and *Cyperus isocladius* in constructed wetlands.

RECOMMENDATIONS

- Deeper studies, about allelopathy in constructed wetland systems, are necessary.
- Continuous physical and chemical analyses are necessary, after the stabilization of the system, to analyze the actual efficiency.
- Research about other type of ornamental plants should be conducted in constructed wetlands.