

ASSESSMENT OF CONSTRUCTED WETLANDS EFFICIENCY ON WATER QUALITY FOR TILAPIA CULTURE

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Wetlands are areas where water saturation is the dominant factor, like as marshes and swamps. In the U.S., many are used as natural systems for treatment of domestic sewage. According to Metcalf & Eddy (1991), natural systems can remove up to a certain point, almost all major constituents, and to a lesser extent those who are considered pollutants - suspended solids, organic matter, nitrogen, phosphorus, trace elements, compounds trace organics, and microorganisms. The advantages over conventional treatment systems are low cost, low power consumption and maintenance required. By filtering mechanism and through bacterial action, pollutants are removed from the water and nutrients are utilized by macrophytes forming plant biomass, or used by microbes as a food that takes and transforms them into other chemical forms. The constructed wetland systems are therefore a technology with great potential for application in fish farms (Michael, 2003), mainly because it doesn't require electricity and occupy relatively small areas, mainly the subsurface flow systems.

At Embrapa Environment (Jaguariúna, SP), a system composed by 54 plastic boxes was constructed to test three kinds of porous media: crushed stones, clay and a mixture of both (mix). The plant Vetiver (*C. zizanioides*) was used as another part of the treatment system. It is expected to verify a great reduction in important parameters like total nitrogen, total phosphorus, biochemical oxygen demand, total suspended solids and others.

Table 1 presents hydraulic parameters of the closed cycle system.

Preliminary results (Table 2) show with exception of total phosphorus, all the other major parameters are in accordance with the CONAMA Resolution Number 357/05 for Class 2 freshwater.

Table 1. Flow values and hydraulic retention time (HRT) for each porous media.

	Flow (L.min ⁻¹)	HRT (hours)
Stone	1,60	2:15
Clay	1,70	1:40
Mix	1,90	1:15

Table 2. Median values for physico-chemical parameters of water quality at each porous media. Saf: stone affluent; Sef: stone effluent; Caf: Clay affluent; Cef: clay effluent; Maf: mix effluent; Mef: mix effluent.

	P total mg/L	NH ₃ ⁺ mg/L	Turbidity NTU	DBO (mg/L)	Total Coliforms
Saf	0,345	0,100	0,848	5,000	150,400
Sef	0,305	0,075	0,614	4,000	20,850
Caf	0,340	0,125	0,899	0,500	60,900
Cef	0,430	0,125	0,531	1,000	14,150
Maf	0,340	0,100	1,150	3,000	56,100
Mef	0,330	0,125	0,684	5,750	51,900

Parameters	Stone	Clay	Mix
pH	7,65	7,36	7,56
Cond (µS/cm)	351,75	283,75	347,25
Turbidity (NTU)	0,73	0,72	0,92
NO ₂ (mg/L)	2,75	1,75	1,50
NO ₃ (mg/L)	7,20	4,26	8,50
NH ₃ (mg/L)	0,09	0,13	0,10
N total (mg/L)	0,15	0,12	0,23
P total (mg/L)	0,33	0,39	0,34
DBO (mg/L)			
Tot Coliforms (NMP)	85,63	37,53	70,63



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ABSTRACTS



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