



INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

"KEY ELEMENTS FOR A SUSTAINABLE WORLD: ENERGY, WATER AND CLIMATE CHANGE"

Environmental Benefits of Water Recovery in a Tilapia Production System, by Using Emergy Environmental Accounting

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Abstract

The emergy environmental accounting developed by Odum was applied to evaluate the water recovery system used to treat water released from a tilapia production system known as aquaponic. For this purpose, the whole aquaponic system (including the water recovery process by a coupled rhizospheric-hydroponic system) was compared with the same tilapia production system but in the absence of the water recovering system. The present work aims to quantify the emergy environmental benefits when water is treated and recover through the coupled rhizospheric-hydroponic system. Benefits related to renewable inputs (R) were negligible but purchased inputs (F) show an emergy decrease of 29% when water is recovered inside the aquaponic system. Also tilapia transformity shows an improvement of 24 % with water recover. Emergy flow difference resulted from water recovering is $5,86 \times 10^{15}$ sej, representing an improvement of global efficiency of 25%. The emergy sustainability index shows that both systems are within the range of non-sustainability. Even so, water recovering inside the aquaponic systems enables an improvement of 50%.

Keywords: Environmental accounting; Emergy; Aquaculture; Water recovery; Tilapias.
