

POTENTIAL OF AQUACULTURE VERSUS AGRICULTURE IN SUSTAINABLE RESOURCE UTILISATION

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Abstract

We are approaching rapidly an age of diminishing resources and there is a global need to conserve the remaining natural products and services and use them in more sustainable technologies of aquaculture, agriculture and animal husbandry. The growth of human population is continuing and the ambitious goal of „zero discharge” pollution strategy is killed by resource limitation and by the quantified discovery that using the oil based treatment technologies we transfer the surplus materials in the biosphere simply from one compartment to the other. The new applied discipline of ecotechnology both in aquaculture and agriculture is emerging from the basis of the rapidly growing quantitative ecology. Ecological engineering applies the tools and principles of ecotechnology and helps to develop, introduce and practice environmentally sustainable technologies in meat production processes. Coupling ecotechnology with biotechnology has a real perspective, where the protein production traditionally applies the technologies of living processes. This new way of producing products and services is already realized in integrated aquaculture practices relying mostly on microbial processing of nutrient and on the manipulation of energy transfer rates. Based on ecotechnological principles the nitrogen pathways, fluxes and cycles were selected to quantify the biotechnological processes of protein production in integrated aquacultural and ecosystems of animal husbandry.

Nitrogen cycling and retention have been quantified in fish-cum-livestock, livestock, arable and mixed ecosystems including detailed transfer rates together with potentials of farm inputs and consumable farm outputs. Environmental cost of farming with the parameters of nitrogen leached to soil, water or lost to the atmosphere have been also quantified in the same types of meat producing farms. The energy cost of the sustainable and environmentally viable meat producing ecosystem was compared to the industrialized, energy intensive meat producing technologies.