

# Field study on reducing stress of catfish in a recirculation aquaculture system: an innovative tank design for autonomous movement from holding unit to stunning unit

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## Abstract

The aim of the present field study was to compare the stress response and fillet quality parameters of European catfish (*Silurus glanis*, Linnaeus 1758) between conventional handling (i.e. netting) and autonomous movement of fish from their holding tank to a stunning unit in a commercial warm-water recirculation aquaculture system. Furthermore, various factors and designs of a newly developed fish tank, consisting of a holding and a potential stunning unit, were investigated regarding the success of autonomous movement of the fish. It was found that the fish which autonomously swam to the stunning unit had significantly lower haematocrit and blood-lactate concentrations but significantly higher blood-glucose concentrations than the fish that were netted. The pH 24 h *post mortem* was significantly higher in the fillets of fish that swam to the stunning unit when compared with fillets of fish that were netted. Therefore, the results indicated a positive effect on stress response and product quality parameters of fish that autonomously swam to the stunning unit compared with conventional handling. However, no significant differences between the two treatments were found with regards to plasma cortisol concentrations, fillet lightness, and colour. Furthermore, we observed, that the design of the novel holding tank influences the success of autonomous movement of the fish.

## Introduction

Fish, especially catfish, in warm-water recirculation aquaculture systems are usually caught by first reducing the available space in the holding tanks and then removing the fish with nets. Not only at slaughter but every time the fish are moved, e.g. from rearing to grow out tanks.

This action causes a lot of distress to the fish that are caught as well as to the fish remaining in the tanks (Barton and Iwama, 1991; Wendelaar Bonga, 1997). Stress negatively affects the immune system and leads to behavioural changes, e.g. an increased respiratory burst activity, increased aggressiveness, abnormal

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