The effect of dietary n-3 LC-PUFA on the responses to acute and prolonged stress of meagre (Argyrosomus regius, Asso 1801) juveniles

The replacement of fish oils in aquafeeds by vegetable oil sources is known to cause a depletion in dietary n-3 LC-PUFA, particularly in DHA and EPA. This decrease may influence several performance indicators in fish, including health status and stress resistance and response. The present study aimed to evaluate the effect of dietary n-3 LC-PUFA levels (0.8, 1.4 and 2.6%), below and above the requirement estimated for growth, in stress response of meagre juveniles exposed to an acute and prolonged stress. Fish were submitted to an acute stress by chasing for 15 s, and a prolonged stress by cage confinement for 7 days. The lowest n-3 LC-PUFA levels (0.8 and 1.4%) led to higher post-stress plasma cortisol levels than fish fed 2.6%. Besides, acute stress led to higher levels of post-stress plasma lactate, as well as a strong neuronal serotonergic activity in fish fed the lowest n-3 LC-PUFA diets, while prolonged confinement resulted in the highest relative catalase mRNA levels in fish fed 1.4% n-3 LCPUFA. Therefore, the dietary changes in n-3 LC-PUFA, essential for marine fish, induce a change in the stress response in meagre, significantly increasing glucocorticoid and serotonergic response in fish fed low n-3 LCPUFA contents. Furthermore, low n-3 LC-PUFA diets generates greater alterations in relation to basal levels of oxidative stress-related genes and, possibly increasing the oxidative stress damage. However, meagre denotes a good adaptation to both acute and prolonged stress, even when fed with low n-3 LC-PUFA diets, highlighting the high stress resistance of this species.