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DIETARY TOOLS TO MODULATE GLYCOGEN STORAGE IN FISH MUSCLE: A PROTEOMIC ASSESSMENT

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SUMMARY

Post-mortem flesh deterioration is dependent on the energy reserves present at the time of death. Early depletion of muscle glycogen leads to the buildup of lactate and to the early onset of rigor mortis, resulting in the activation of endogenous proteases and the degradation of myofibrillar proteins, and consequent muscle softening. The purpose of this study was to modulate the energy status of the muscle at the time of death through the use of dietary muscle buffering compounds, namely glycerol and maslinic acid. Four fish groups of gilthead seabream (in duplicate) were fed for three months with four different diets. The four diets were obtained by starting from a commercial diet formulation and applying a 2 × 2 factorial design, with two levels of glycerol supplementation (0 and 5%) and two levels of maslinic acid supplementation (0 and 0,025%). The diets were formulated to be isonitrogenous and isolipidic. Fish were slaughtered by immersion in ice-salt water slurry and muscle samples were immediately obtained from three fish of each tank, for a total of six muscle samples per treatment. Sarcoplasmic proteins were extracted from each muscle sample, separated/quantified by 2D-DIGE and identified by peptide fragment fingerprinting using MALDI-TOF MS. Preliminary analysis of the results shows an effect of the diets on muscle parameters such as measured pH and onset of *rigor mortis*. At the proteome level, the addition of glycerol and maslinic acid to the diets seemed to have affected the abundance of proteins related to oxidative stress (HSC70, HSC71, peroxiredoxin, transferrin), aldehyde toxification (ALDH1A2, ALDH6A1, ALDH7A1), energy homeostasis (adenylate kinase, nucleoside-diphosphate kinase), cytoskeleton (cofilin-2) and signalling (phosphohistidine phosphatase).

Keywords: gilthead seabream, 2DE, glycogen, post-mortem degradation

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