

Nutritional mitigation of winter thermal stress in gilthead seabream associated metabolic pathways and potential indicators of nutritional state - DTU Orbit (09/11/2017)

Nutritional mitigation of winter thermal stress in gilthead seabream associated metabolic pathways and potential indicators of nutritional state

A trial was carried out with gilthead seabream juveniles, aiming to investigate the ability of an enhanced dietary formulation (diet Winter Feed, WF, containing a higher proportion of marine-derived protein sources and supplemented in phospholipids, vitamin C, vitamin E and taurine) to assist fish in coping with winter thermal stress, compared to a low-cost commercial diet (diet CTRL). In order to identify the metabolic pathways affected by WF diet, a comparative two dimensional differential in-gel electrophoresis (2D-DIGE) analysis of fish liver proteome (pH 4–7) was undertaken at the end of winter. A total of 404 protein spots, out of 1637 detected, were differentially expressed between the two groups of fish. Mass spectrometry analysis of selected spots suggested that WF diet improved oxidative stress defense, reduced endoplasmic reticulum stress, enhanced metabolic flux through methionine cycle and phenylalanine/tyrosine catabolism, and induced higher aerobic metabolism and gluconeogenesis. Results support the notion that WF diet had a positive effect on fish nutritional state by partially counteracting the effect of thermal stress and underlined the sensitivity of proteome data for nutritional and metabolic profiling purposes. Intragroup variability and co-measured information were also used to pinpoint which proteins displayed a stronger relation with fish nutritional state.

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