

A NEW METHOD FOR THE STUDY OF ESSENTIAL FATTY ACID REQUIREMENTS IN FISH LARVAE

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Introduction

The need to provide adequate dietary levels of essential fatty acids (EFA) for early developing fish with unusually high growth rates and large developmental demands is undoubtedly one of the highest priorities in larval rearing. Dose-response approaches are commonly used in juvenile and adult fish nutrition studies but have been difficult to adapt to marine fish larvae, which are initially fed on live preys with a variable and difficult to control nutritional composition. Nonetheless, the recent development of new products and live food enrichment technologies has enabled the use of dose-response designs to study EFA requirements in marine fish larvae (e.g., Bransden et al., 2005; Villalta et al., 2008). However, key indicators of larval performance commonly used, such as survival, growth, pigmentation and stress resistance, might not be the most sensitive to determine exact EFA requirements. Based on the premise that EFA, and docosahexaenoic acid (DHA) in particular, are mostly retained in body tissues and are a poor substrate for the energy-generating β -oxidation system (Sargent et al., 1999), we envisaged a new method to study EFA requirements in fish larvae. The methodology is based on following the metabolic fate of tube fed ¹⁴C-radiolabelled fatty acids (FA), in conjunction with dose-response studies. The underlying hypothesis is that dietary EFA supply above larval requirements will result in its increased oxidation, so the requirement for a particular EFA might be determined as the level from which it becomes significantly more catabolised (Morais and Conceição, 2008). This is the basis of a research project aiming to validate this hypothesis whose first preliminary results will be presented here.

Materials and methods

Two rearing trials were so far conducted with Senegalese sole (*Solea senegalensis*) post-larvae, looking at the dietary supply of graded levels of DHA (Trial 1) and eicosapentaenoic acid (EPA; Trial 2). In trial 1, post-larvae were reared