DEVELOPMENTAL CHANGES IN ASSIMILATION OF PROTEIN BOUND, POLYPEPTIDE BOUND OR FREE ^{35}S-METHIONINE FORCE-FED TO LARVAL STRIPED BASS (MORONE SAXATILIS).

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Introduction

The study of larval fish digestion has practical importance to both fisheries and aquaculture. Knowledge of developing digestive function may provide incite on causes of poor survival of first feeding wild larvae and formulation of micro diets for fish culture.

Methods

A method for force feeding radio labeled nutrients to fish larvae was developed in order to compare the functional development of the digestive system in altricial larvae. The method uses micro-injection techniques preformed under a dissecting microscope. The larvae are anesthetized and immobilized in a petri dish. A DNA sequencing pipet with a 190 µm (OD) tip is then inserted through the mouth to the anterior portion of the fore gut. A precise quantity of a liquid diet containing a radio labeled nutrient or pH indicator solution is then injected into the gut. To determine nutrient assimilation efficiency, radio-labeled nutrients are used. The larvae are allowed to clear their guts naturally, before counts are taken of the recovery water and the fish with a liquid scintillation counter. The method can also be used to determine sites of nutrient uptake by fixing the larvae and mounting sections on a microscope slide. Slides are then used for microscopic radiography (data not shown). A video titled: *How to force-feed fish larvae* is available from Washington Sea-Grant (206-685-6600) which further explains the method.

Results and Discussion

Initial methionine assimilation rates in larval striped bass varied inversely with the complexity of the molecule (free methionine > polypeptide bound > protein bound) with differences becoming less as the larvae reached metamorphosis. Assimilation rates of free methionine were high (< 80 %) and did not vary among all ages tested. One explanation of these results is that changes in polypeptide and protein hydrolysis were more important than changes in amino acid assimilation to overall methionine bioavailability.

Figure 1. Assimilation efficiency of ^{35}S-labeled methionine incorporated into protein, polypeptides or as free methionine by larval striped bass (*Morone saxatilis*). Data are mean ± standard error (n=3 to 5).