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Growth, survival and pigmentation of turbot (*Scophthalmus maximus*) larvae fed live-prey enrichment

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1. Introduction

After more than 5 years of turbot culture in China, low percent survival and high occurrences of abnormally pigmented juveniles are still major problems for fish farmer. Much research has been directed toward determining the optimal feeding strategies and nutritional requirements for marine flatfish larvae, and considerable advances have been made. The most common live feeds include :*Artemia*, rotifer and copepods. Although live foods are often good sources of nutrition for many species of fish larvae these traditional food sources have found to be inadequate to support larval development. The nutritional content of prey items such as rotifers, it is a reflection of its food source, the nutritional quality of the rotifers, as a larval food source will vary with culture conditions used to rear the rotifer. Enriching live-prey with n-3 polyunsaturated fatty acids (PUFA), phospholipids and vitamin A, and administering the enrichment feeds prior to or during metamorphosis has also been successful improving pigmentation of several flatfish (Miki et al., 1990; Kanazawa, 1993; Reitan et al., 1994). The present study was undertaken to investigate the effects of different commercial enrichments, by means of enriched live-prey, on the survival, growth and pigmentation of turbot larvae.

2. Materials and methods

Enrichment diets : Two emulsions were used to enrich rotifers and *Artemia*: commercial emulsion A (ESP, Korea), commercial emulsion B (S.S).

Lipid analysis : Lipids were extracted as described by Folch et al. (1957) and fatty acid methyl esters were analyzed by a gas chromatograph

Sampling : Growth of larvae was determined from wet weights of 30 fish. Dead larvae were removed daily and counted. Specific growth rate (day-1) was calculated as in (Hopkins,1992) using the initial (day 3 post-hatching) and final dry.

3. Results

The fatty acid composition of *Artemia* and rotifer fed by different emulsions used in the experiment. Rotifers and *Artemia* fed with emulsion ESP had a high DHA content compared with those fed with emulsion S.S. Rotifers and *Artemia* fed with emulsion ESP had a similar content as those fed with emulsion S.S. The EPA/DHA ratio was significantly higher in ESP-enriched rotifer and *Artemia* and significantly lower in S.S-enriched rotifer and *Artemia*. The results of feeding trials, in terms of survival, pigmentation and growth of the turbot after 45 days, are presented Table 3.No significant differences were observed in SGR ($P>0.05$). The pigmentation percentage was notably and significantly higher in fish fed with ESP-enriched ($P<0.05$). There was a higher survival rate in fish fed with ESP-enriched ($P<0.05$). Fatty acid composition of turbot larvae fed *Artemia* by different emulsion was showed in Table 4. No significant difference was observed in EPA content of turbot larvae fed with *Artemia* by two emulsions. However, the percentage of DHA and DHA/EPA ratio of turbot larvae fed *Artemia* by ESP-enriched was significantly higher compared with that fed with S.S-enriched.

4. Reference

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