

Highly unsaturated fatty acids composition of *Artemia* sp. fed microcapsules containing marine oils

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Introduction

A number of recent studies have shown that the highly unsaturated fatty acids (HUFA) eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are essential dietary components for marine fish larvae (Rimmer and Reed, 1990; Webster and Lovell, 1990; Lemm and Lemarie, 1991) these essential fatty acids (EFA) must be supplied in the diet to ensure good growth and survival of cultured marine fish larvae.

This paper presents data on changes in the HUFA composition of *Artemia* nauplii following enrichment with gelatin-acacia microcapsules containing cod liver oil and squid oil. The effects of enrichment duration and the density of *Artemia* nauplii on HUFA content are also assessed.

Materials and methods

Gelatin-acacia microcapsules containing either cod liver oil or squid oil were prepared by a method based on those described by Green and Schleicher (1957) and Langdon and Waldock (1981). cod liver oil and squid oil were chosen as they are rich in EPA and DHA (Numaguchi and Nell, 1991).

A 2% (w/v) solution of acacia (BDH) and a 2% (w/v) solution of gelatin (Merck, pH 4.8) were made up in distilled water at 40°C. Equal volumes of these solutions were mixed and maintained at 40°C. Either cod liver oil or squid oil (2.5 ml) was added to the gelatin-acacia solution (200 ml) and the mixture was homogenised using a 4-blade blender at maximum speed for 70 s. The homogenate was then poured into a glass beaker and stirred at 40°C.

The pH of the emulsion was reduced to 3.7 by drop-wise addition of dilute hydrochloric acid; stirring was continued for a further 5 min. The pH was then increased to 9.3 by drop-wise addition of 0.5 M sodium hydroxide solution and

stirring was continued for a further 5 min. The resulting microcapsule suspension was poured into an equal volume of cold (5°C) distilled water and placed into a refrigerator for 2 h.

Results

Preparation of gelatin-acacia microcapsules containing cod liver oil or squid oil, and their use for highly unsaturated fatty acid (HUFA) enrichment of *Artemia* nauplii is described. These microcapsules were readily ingested by *Artemia* nauplii and were visible in the gut a few minutes after the start of enrichment. Ingestion of microcapsules containing cod liver oil or squid oil resulted in a significant increase in the HUFA content of *Artemia* nauplii after only 1 h. The level of HUFA enrichment was influenced by the density of *Artemia* nauplii during the enrichment procedure; a reduction in the density of *Artemia* nauplii resulted in a large increase in their HUFA content. The levels of HUFA enrichment achieved in this study compare well with similar studies. Gelatin-acacia microcapsules containing marine oils are a suitable means for HUFA enrichment of *Artemia*; they allow inexpensive enrichment diets to be made on-site and may offer a cheaper alternative to commercial enrichment preparations.

Reference

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