Sea bream study: Haematococcus twice as effective as synthetic

ASFA: Aquatic Sciences and Fisheries Abstracts
TI: Title
   Pigmentation of red seabream with natural astaxanthin derived from the alga Haematococcus pluvialis comparison with synthetic astaxanthin
AU: Author
   Guerin, M; Hosokawa, H
SO: Source
DE: Descriptors
   Feeding experiments; Diets; Skin; Chromatic pigments; Pigments; Pagrus major; Haematococcus pluvialis

AB: Abstract
   Red seabream is a major aquaculture commodity in Japan. Astaxanthin is the main pigment deposited in the skin of red seabream and is responsible for the reddish coloration of their skin. Supplemental sources of astaxanthin are added to commercial diets for farmed red seabream to enhance skin pigmentation and maximize market value of harvest-size fish. Although synthetic astaxanthin is the most commonly used form of astaxanthin, natural sources are becoming increasingly attractive to fish farmers in response to a growing consumer demand for fish fed natural sources of pigment. The chlorophyte Haematococcus pluvialis is among nature's richest sources of astaxanthin. Astaxanthin from this alga is primarily in the esterified form of the 3S-S3'S stereoisomer. Early studies have demonstrated that processing can significantly affect bio-availability and pigmentation efficacy of astaxanthin derived from Haematococcus pluvialis. Aquasearch Inc., has developed a proprietary technology to grow, process, maximize astaxanthin content, and optimize bio-efficacy of dried Haematococcus pluvialis biomass. Aquaxan HD200, a supplement containing 2% astaxanthin from naturally produced, cell-broken, dried Haematococcus pluvialis, is the product of this technology. In a controlled study, at Kochi University, Japan, young red seabream (11.4g average body weight) were fed a cold pelleted base diet during a 10-day acclimation period. They were then allocated to ten 800-liter fiber-reinforced plastic tanks, at a stocking rate of 30 fish per tank. This allowed for 5 treatments (diets) with 2 replicates each. Experimental diets were fed daily at the rate of approximately 2% of their body weight (on a dry/wet weight basis). Five diets were tested: A-0 (base diet, no astaxanthin), A-1, A-2, and A-4, (A-0 supplemented with 10, 20, and 40 ppm natural astaxanthin from Aquaxan HD-200, respectively), and C-4 (A-0 supplemented with 40 ppm synthetic astaxanthin from a commercial source). HPLC analysis of diets confirmed the calculated supplemental levels. Pigmentation was determined by visual evaluation and with a Minolta colorimeter to determine the "a" value (redness), "b" value (yellowness) and "L" value (lightness). Pigmentation levels increased significantly with added levels of natural astaxanthin. Pigmentation of fish fed 20 ppm of natural astaxanthin was equivalent to pigmentation of fish fed 40 ppm of synthetic astaxanthin. Pigmentation of fish fed 40 ppm natural astaxanthin was higher than in fish fed 20 ppm natural astaxanthin or 40 ppm synthetic astaxanthin. Because of
the low number of replicates, the difference was significant (P<0.05) only when comparing “b” values. HPLC determination of pigment levels in the skin of five pooled experimental fish per treatment corroborated the pigmentation results. Astaxanthin levels deposited in fish fed 40 ppm natural astaxanthin were twice as high as in fish fed 20 ppm natural astaxanthin and in fish fed 40 ppm synthetic astaxanthin. The absence of replication did not allow for statistical analysis. The study confirms that natural esterified astaxanthin from processed Haematococcus pluvialis algae can be a very effective pigmentation source for red seabream, and suggests it can be twice as effective as synthetic astaxanthin in pigmenting red seabream.