

QUALITATIVE AND QUANTITATIVE REQUIREMENTS FOR PROTEIN
IN THE DIET OF JUVENILE LOBSTER, (Homarus sp.)

By

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ABSTRACT

The purpose of this study was to establish baseline information about qualitative and quantitative aspects of the nutritional requirement for protein in diets for juvenile lobsters.

To test if a measurable response in growth rates would be obtained by using diets proteins of varying amino acid qualities, a range of purified proteins (20% by dry weight) were added to diets and fed to lobsters for a period of 60 days. Artemia and 0% protein diets were utilized as controls. Wet weight was found to be a poor predictor of true growth, especially for short term studies. Lobsters fed shrimp tail meat muscle had excellent growth rates and survival compared to the group receiving Artemia. However, in general, growth rates obtained on different proteins did not follow the ranking order in terms of their respective amino acid compositions as compared to lobster tissue.

Attempts were then made to quantify protein requirements of juvenile lobsters by utilizing diets containing from 0 - 50% protein. Either casein only or casein/shrimp tail meat muscle diets were fed for 90 days and resultant growth was measured in terms of both wet weight and dry weight. Minimal protein requirements

for juvenile lobsters were determined to be either 15% if casein/shrimp were used as the sources of protein or 25% if casein alone was used.

A combination of growth studies and serum evaluations were used to estimate the requirement for dietary arginine and test various means of amino acid supplementation. Additions of arginine singly equal to that contained in shrimp tail meat muscle were not as effective as intact proteins. It was concluded from experiments conducted and the levels of arginine in lobster body tissue, that diets containing 1% (or 6% of total protein) arginine in a bound form would meet the juvenile lobster growth requirement.

A final study investigated the influence of nutrient processing on growth rates of lobster. Spray dried egg white, with and without having been heated to 110° C for 20 minutes, performed poorly as a protein source in contrast to casein control diets. Egg white, which had first been cooked to coagulation; then dried, was significantly better than either the casein control diet or other egg diets. Trypsin activity was suppressed to the greatest extent in spray dried egg white, followed by cooked egg white; least inhibition

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was apparent in casein. It was concluded that the presence of antinutritional factors, such as trypsin inhibitor, may strongly influence the suitability of a protein source for lobsters and the use of appropriate denaturation techniques might minimize negative effects.