

AMINO ACIDS' PROFILE OF *OREOCHROMIS SPECIES* IDENTIFICATION IN MEDITERRANEAN LAKES - A SUGGESTED MARKER FOR AQUACULTURE PURPOSES

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Abstract

Two *Oreochromis species* were collected from Mediterranean lakes near Alexandria according to their morphological characteristics. Those which were known to belong to the pure strain were induced for spawning in order to obtain the pure offspring and the resulting hybrid. The protein content and amino acid profile were studied. The suspected wild species was found to be a hybrid. Thus advice must be taken into consideration when choosing the brood stocks in aquaculture practices.

Keywords : Freshwater fish / protein content/ amino acid / identification / hybrid

Introduction

Species identification is an important issue when choosing fish for culture activities. The offspring will be similar to the parental brooders in a way or another. Amino acid's analysis is used in the present study to differentiate the pure strains from the hybrid. The experimental hybrids are also needed to be compared with those of the wild.

Materials and Methods

Two species of *Oreochromis* were investigated: *Oreochromis niloticus* and *Oreochromis aureus*. The samples were collected from three sites; two Mediterranean lakes near Alexandria and one Nile estuary as a control.

The main taxonomic criteria for species identification were determined morphologically.

Spawning of the pure parental species was induced by manipulating the environmental conditions. The hybrid was achieved by crossing male *O. niloticus* with female *O. aureus* to produce male and female hybrids (A1&A2) respectively while crossing male *O. aureus* with female *O. niloticus* produced the male hybrid (B).

The total protein of the white muscle in the pure strain and the resulting hybrid was determined using the microkeldahl method (1) and amino acid extracts were prepared (2) then injected in instrument capsule of Beckman 116 GI amino acid analyzer apparatus. Suspected hybrids (C) from the former wild locations were also investigated. All fish were reared under the same condition.

Results and Discussion

The majority of both selected pure strains had the same characteristics described at the beginning of the last century (3) and assured later (4) deviating little than Avault (5).

The present study demonstrated large differences in the concentration of protein content and amino acid profile from one species to another and from one sex to another. The highest crude protein content (15.31%) was found in male hybrid B followed by female *O. niloticus* (14.85%) while hybrid A1 showed the third ranking order in its crude protein.

Male hybrid A1 had the highest total aminoacid content over all pure species and hybrids (17.474 g/100 g fresh weight) followed by male hybrid B (17.106 g/100 gfw). The suspected wild male hybrid C, collected from lake Edku, had 17.085 g/100gfw; quite close to the experimentally resulting hybrids but still significant. The lowest values of total aminoacid content belonged to male *O. niloticus*, female *O. aureus* and female hybrid A2. Gunasekera *et al.* (6) found a significant difference in the free aminoacid content of two groups of *Oreochromis niloticus* larvae – their mothers were originally fed on 10.2 and 35% crude protein – but not in the total protein content values.

Concerning the aminoacid's profile (Fig. 1), Glutamic acid, Aspartic acid and Lysine were shown to be the highest aminoacids in the muscles of *Oreochromis* species and their hybrids while systine was the lowest aminoacid. Eight aminoacids possessed the highest values in the resulting male hybrid A1 over all other species and sexes. Four aminoacids had the highest values in male hybrid B. The suspected natural male hybrid C had both Valine and Tyrosine as the highest values over all other species and sexes. This reveals the significant differences in the aminoacids quality and composition of the species under consideration and its hybrid although other species (7) had no significant differences in their aminoacid composition when

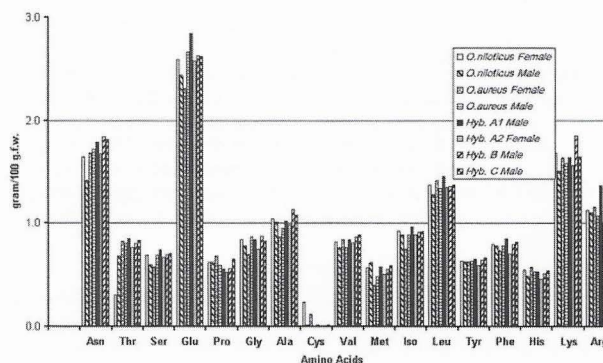


Fig. 1: Amino acid's content in the muscles of the pure strains of *Oreochromis species* and the resulting hybrids. Asn. = Aspartic acid, Thr. =Threonine, Ser. =Serine, Glu. = Glutamine, Pro. =Proline , Gly. =Glycine, Ala. =Alanine , Cys. Cysteine, Val.= Valine, Met. =Methionine, Iso. =Isoleucine, Leu. =Leucine, Tyr. =Tyrosine, Phe. = Phenylealanine, His. = Histidine, Lys. = Lysine & Arg. = Arginine.

expressed as g/100g aminoacids and suggested that the aminoacid requirements of flatfish may not be greatly different among species.

The problem of species identification for aquaculture practices is further complicated with the presence of hybrids which are usually intermediate in appearance to both parental species and biased to the maternal gamete (8,9) .

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