

IMPACT OF MYCOBINDER PRODUCTS ON GROWTH AND HEALTH OF INTENSIVELY FARMED FISH

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Introduction

Plant proteins have been widely used in aquafeeds as a substitute of fish meal diets

Mycotoxins are secondary metabolites produced by fungi, found in agricultural products, used to feed livestock & pose a health risk to both livestock and consumers

Aflatoxin B1 (AFB1), deoxynivalenol (DON), and fumonisin B1 (FB1) are among the major mycotoxins contaminating feed materials (4)

Mycobinders are a promising strategy to bind mycotoxins and avoid their absorption from the gastrointestinal tract of animals (1)

Aim: to evaluate the effectiveness of two different technologies of mycobinding supplements against the combination of mycotoxins FB, DON and AFB1 on growth factors and health parameters in gilthead seabream (*Sparus aurata*)

Materials and Methods

Fish : Gilthead seabreams, *Sparus aurata* L. (3.40±0.5g)

Experimental diets: MYC (DON: 3000 ppb, FB: 3000 ppb, AFB1: 50ppb); A1 (identical combination of toxins as in MYC diet + Mycobinder 1); B1 (identical combination of toxins as in MYC diet + Mycobinder 2). The control group (CTRL) was fed a mycotoxin-free diet.

Feeding method: Hand-fed, ad libitum, 6 days a week

Experiment duration: 12 weeks

Daily record: Food consumption and mortality

Sampling:

- ✓ Energy utilization (feed intake and growth)
- ✓ Histological analysis of the liver

Discussion & Conclusions

✗ Dietary addition of mycotoxins showed a negative effect on growth and health of gilthead seabream

✓ Both categories of mycobinders seemed to have a positive effect in terms of shrinking the problem
In the case of yellow catfish (*Pelteobagrus fulvidraco*), using a mycobinding supplement in fishfeed, based on clay minerals, also showed positive results against toxicosis (2), while the modified zeolite addition to an aflatoxin-contaminated diet successfully mitigated the overall adverse health effects of Nile tilapia (3).

References

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Results

➔ The MYC group fed with the mycotoxin cocktail showed a tendency for reduced feed consumption and significantly reduced growth (lower mean weight, length and biomass increase).

➔ The CTRL group had the best growth results followed by groups with the dietary addition of mycobinders (Fig 1).

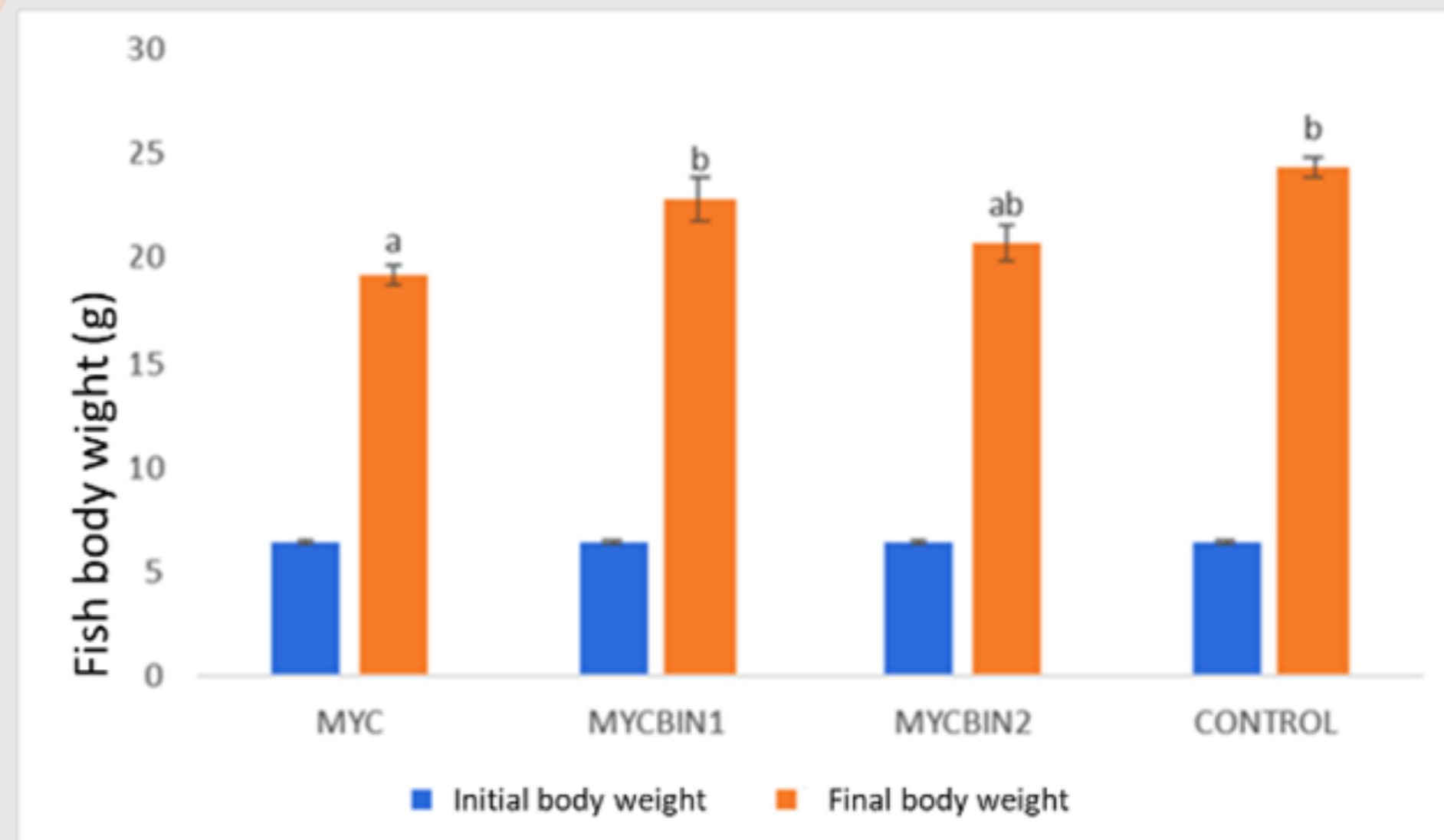


Fig 1. Final average weight per individual. Values are presented as means ± standard deviation of each treatment. In each parameter examined, symbol with a different letter indicates a statistically significant difference between treatments (P<0.05).

Microscopic examination of liver samples

CTRL group: normal liver parenchyma

MYC group: mild to extensive degenerative changes of hepatocytes, showing hydropic and fatty degeneration and early necrotic changes

A1 group: almost normal liver parenchyma, with some samples showing mild degenerative changes of hepatocytes, with a mild degree of hydropic and fatty degeneration

B1 group: mild, diffuse, degenerative changes of the hepatocytes, showing various degrees of hydropic and fatty degeneration (Fig 2).

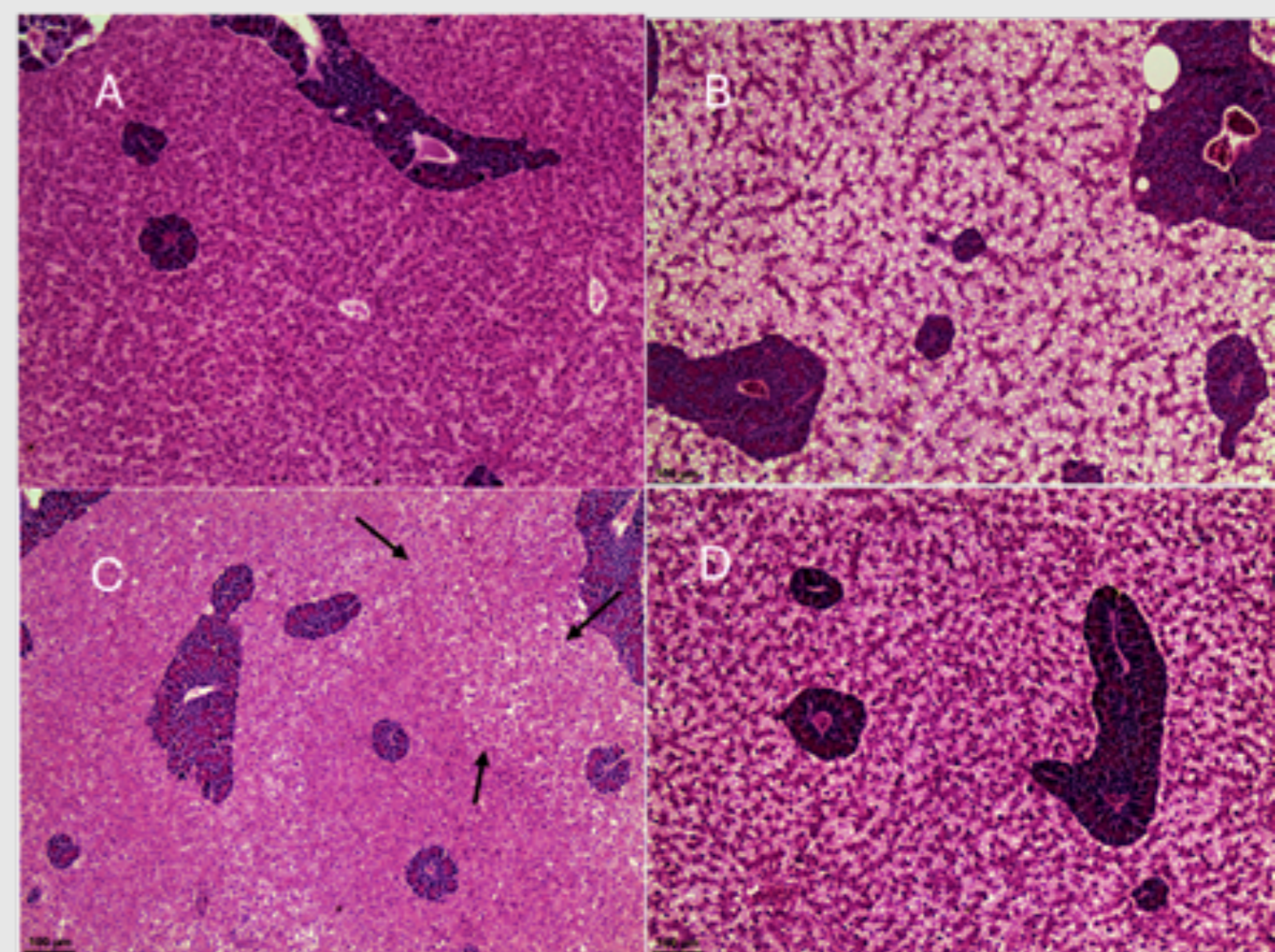


Fig 2. Photograph of a liver section. (A) Control group. Normal liver parenchyma. (B) MYC group. Severe degeneration of the liver parenchyma, with vacuolation of hepatocytes. (C,D) Groups A1, B1. Almost normal liver parenchyma. Mild degeneration in small areas of the liver.

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