Fermented pollen of indigenous stingless bee as an alternative food additive to improve growth and immune response of tambaqui.

INTRODUCTION & OBJECTIVE

Tambaqui (Colossoma macropomum) is the native species most produced native species in Brazil, occurring naturally in the Amazon and Orinoco river basins. (Gomes et al., 2020). As it is a rustic species and resistant to fish farming, it has excellent potential for intensive production. However, the intensification of production causes fish to be exposed to stressful situations that end up reducing their immunocompetence, leaving them vulnerable to diseases. (Urbinati et al., 2020). Factors linked to the health and nutritional status of the species reinforce the need for alternatives to diet formulations. In this sense, fermented pollen (FP) from stingless bees is an excellent alternative for improvement in aquaculture diets due to its ability to strengthen the immune system through the antioxidant action of bioactive compounds and its antimicrobial, anti-inflammatory, antifungal, hepatoprotective and chemopreventive (Abdelnour et al., 2018). Therefore, the aim of this study was to evaluate the inclusion of FP from Melipona seminigra merrillae in the growth performance and immune responses of tambaqui.

METHODS

144 fish (18.42 ± 3.8 g) Water recirculation system and complementary aeration 12 fish/200L-tank

Fed for 15 days, twice a day (3% of biomass) with FP-free diet (control), 2% and 3% FP to the experimental diet. After 15 days of experiment, 3 animals from each tank were sampled and subjected to anesthesia to calculate weight gain and blood collection.

RESULTS & DISCUSSION

• The results pointed to a linear trend in improving weight gain as the inclusion of FP in the diet increases (Figure 1). The same was observed in the works by El-Asely et al. (2014) and Abbas et al. (2012), in which 2.5% of Apis bee pollen in Nile tilapia (Oreochromis niloticus) diet improved specific growth rate, feed efficiency and weight gain. This can be attributed to bee pollen components such as vitamins, minerals and enzymes or coenzymes, which increase food digestion and assimilation.

• The metabolic parameters showed that there was a decrease in plasma glucose in the groups with inclusion of 2% fermented pollen in the diet when compared to the control group. While the respiratory activity of leukocytes and globulin were higher in fish fed with 2% FP, compared to the control treatment (Table 1). The results corroborate Soror et al. (2021) and El-Asely et al. (2014), who found a significant increase in globulin levels and increase in the number of phagocytic cells in an NBT (Nitroblue tetrazolium) assay in tilapia fed 2.5% pollen, respectively. These results are evidence of immunostimulation in the non-specific immune system of these animals and the effects may be related to more than 20 phenolic compounds secreted by bees through the hypopharyngeal glands and incorporated into pollen during fermentation (Abdelnour et al., 2018).

• There are no reports in the scientific literature that explain how pollen can modulate glucose in fish. However, a possible explanation may be related to the symbiotic microorganisms present in the stingless bee colony that ferment and conserve pollen in cerumen pots, such as Lactococcus and Lactobacillus, which act as a probiotic in various living organisms (De Paula et al., 2021). It was observed by Rebolo et al. (2021) that in diabetic and obese mice stingless bee pollen can reduce insulin resistance and regulate hyperglycemia.

Table 1. Values of plasma glucose, leukocyte respiratory activity and globulin of juveniles of tambaqui (Colossoma macropomum) fed FP from stingless bees.

In the present study, it can be concluded that the incorporation of 2% fermented pollen from stingless bees in the diet improves growth performance and immune response in tambaqui.

REFERENCES

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