

## SUMMARY

Tilapia (*Oreochromis niloticus*) cultivation is heavily influenced by feed factors. The activity of fish digestive enzymes is largely determined by the nutritional value of the feed, including pepsin-like and trypsin-like enzymes. The nutritional content of the feed can be enhanced by supplementing it with microalgae, such as *Spirulina platensis* and *Chlorella vulgaris*. Therefore, an effective composition to increase pepsin-like and trypsin-like activity in tilapia is important. This study aims to determine the effect and obtain a composition of microalgae supplementation in feed that can increase pepsin-like and trypsin-like activity in the digestive tract of tilapia (*Oreochromis niloticus*).

This research was conducted experimentally using a *completely randomized design* (CRD) with 5 supplementation composition treatments, including *Spirulina platensis* 12 g.kg<sup>-1</sup> (P1), *Chlorella vulgaris* 8 g.kg<sup>-1</sup> (P2), *Spirulina platensis* 6 g.kg<sup>-1</sup> + *Chlorella vulgaris* 4 g.kg<sup>-1</sup> (P3) and *Spirulina platensis* 4 g.kg<sup>-1</sup> + *Chlorella vulgaris* 6 g.kg<sup>-1</sup> (P4) feed repeated four times. The supplementation treatment was given for 56 days. The variables observed were pepsin-like activity in the stomach and trypsin-like activity in the hepatopancreas, foregut, midgut, and hindgut on days 28 and 56 as dependent variables and the composition of the feed supplementation as independent variables. The parameters measured were the amount of tyrosine released per minute per milligram of supernatant protein. Pepsin-like and trypsin-like activities were measured using a spectrophotometer. The supporting parameters measured were the proximate levels of the feed. The study was conducted from December 2024 to July 2025. Data analysis of the results of measuring pepsin-like and trypsin-like activity between treatments was carried out using *One-way Analysis of Variance* (ANOVA), followed by the Tukey test if there were differences between treatments, while between observation times a T test was carried out with a significance level of 5% using SPSS 30.0 *Windows software version*.

The results showed that pepsin-like activity in the stomach between supplementation compositions and between times showed differences on day 56 ( $P < 0.05$ ), with the best treatment being *Spirulina platensis* 6 g.kg<sup>-1</sup> + *Chlorella vulgaris* 4 g.kg<sup>-1</sup> (P3). Meanwhile, trypsin-like activity in the foregut increased on day 28 ( $P < 0.05$ ) with the administration of *Chlorella vulgaris* 8 g.kg<sup>-1</sup> (P2), *Spirulina platensis* 6 g.kg<sup>-1</sup> + *Chlorella vulgaris* 4 g.kg<sup>-1</sup> (P3), and *Spirulina platensis* 4 g.kg<sup>-1</sup> + *Chlorella vulgaris* 6 g.kg<sup>-1</sup> (P4). However, on day 56 the activity increased ( $P < 0.05$ ) with the administration of *Spirulina platensis* 12 g.kg<sup>-1</sup> (P1) and *Chlorella vulgaris* 8 g.kg<sup>-1</sup> (P2). Trypsin-like activity between treatments and between times in the midgut only increased on day 56 ( $P < 0.05$ ) with the administration of *Chlorella vulgaris* 8 g.kg<sup>-1</sup> (P2) and *Spirulina platensis* 4 g.kg<sup>-1</sup> + *Chlorella vulgaris* 6 g.kg<sup>-1</sup> (P4). In contrast, trypsin-like activity in the hepatopancreas and hindgut did not show significant differences between treatments and tended to remain low from day 28 to day 56 ( $P < 0.05$ ). In conclusion, pepsin-like and trypsin-like activity for protein digestion in tilapia can be increased by single or combined supplementation of *Spirulina platensis* and *Chlorella vulgaris*.

**Keywords :** *Chlorella vulgaris*, *Oreochromis niloticus*, Pepsin-like, *Spirulina platensis*, Tripsin-like