

VACCINATION OF NILE TILAPIA FINGERLINGS WITH AN INACTIVATED IMMERSION AUTOGENOUS VACCINE REDUCES MORTALITY AND CLINICAL SIGNS PRODUCED BY AN INTRAGASTRIC EXPERIMENTAL INFECTION WITH *FRANCISELLA NOATUNENSIS* SUBSP. *ORIENTALIS*

Baratelli, M.¹; Barril-Basil, I.¹; Salla, T.²; Moutinho, J.F.²; Benito, R.¹; Díaz, E.¹; Merino, R.^{1*}
¹ HIPRA, Amer (Girona), Spain *Contact: rosa.merino@hipra.com
² HIPRA Brasil, Porto Alegre (RS) Brazil

Introduction

Francisellosis induced by *Francisella noatunensis* subsp. *orientalis* (FNO), is a major threat to the global tilapia industry. There are no licensed vaccines currently available against the disease in tilapia.

This study aimed to evaluate the efficacy of an inactivated autogenous vaccine against francisellosis in tilapia fingerlings.

Material & methods

Nile tilapia fingerlings (1.7 g) free of FNO were recruited for the study. Groups A (n=65) and B (n=65) were vaccinated by immersion with autogenous whole-cell inactivated mono and multivalent vaccines containing FNO; these were prepared with FNO strains that were homologous and heterologous to the challenge strain respectively. Groups C (n=43) and D (n=22) were vaccinated by immersion with a sterile physiological solution. Groups A-D were infected with FNO (3x10⁷ CFU) by the intragastric route 25 days after vaccination and previous anaesthesia. During the 21 days following the infection (dpi) the animals were maintained at 22°C and their health status was monitored twice daily. The number of clinical signs observed in each tank per 100 fish throughout the study was used to calculate the Area Under the Curve. The efficacy of the vaccine was calculated as Relative Percentage Survival (RPS).

Results

The infection of group C produced mortality and clinical sign commonly observed in francisellosis (Fig. 1 and 2). Group D did not show mortality or clinical signs, as expected.

Groups A-B presented lower mortality and thus showed improved survival compared to group C.

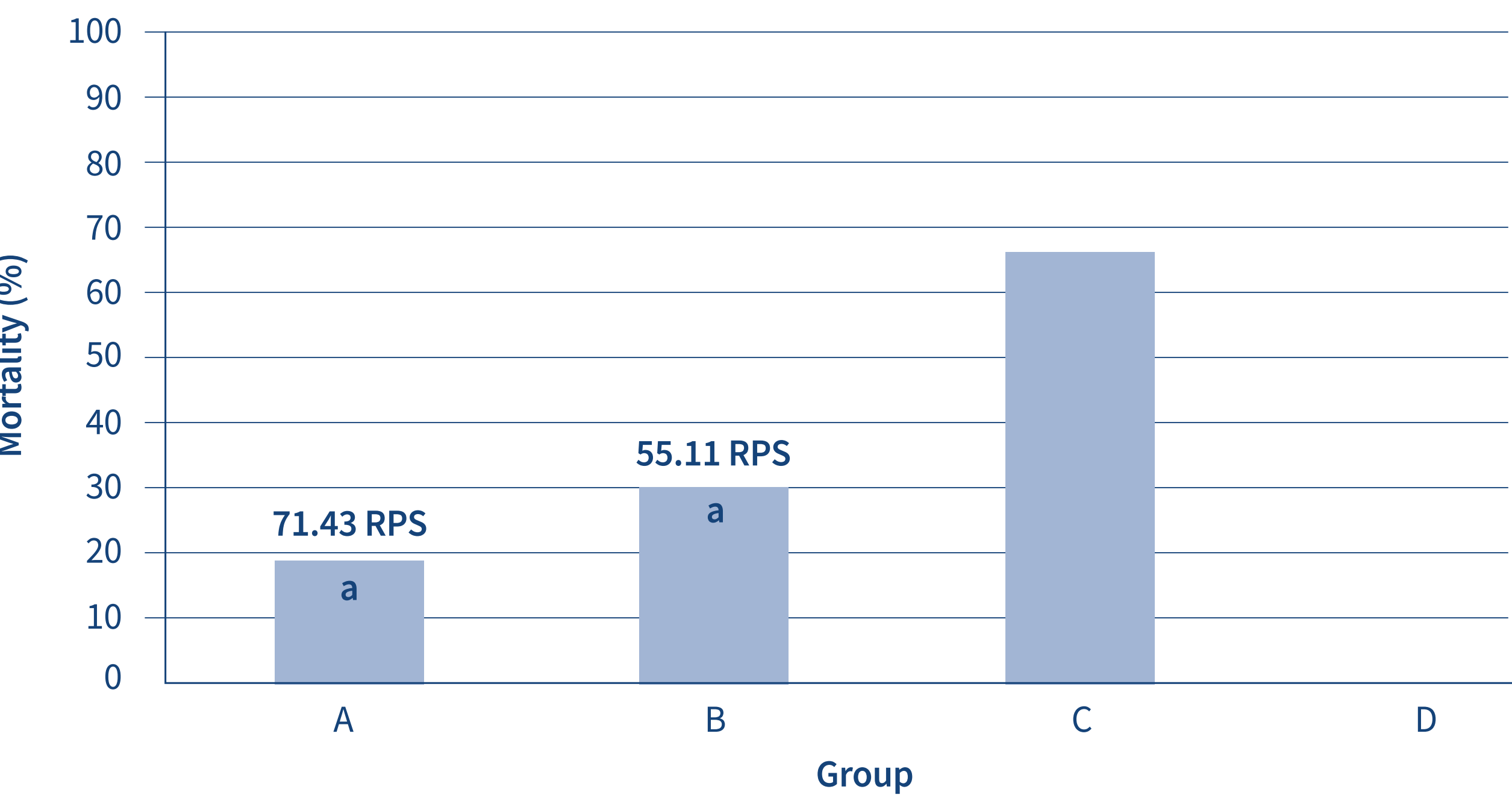


Figure 1. Cumulative mortality produced by the FNO infection. Numbers in bold indicate the RPS. Different letters indicate a statistically significant difference (Chi-square with Bonferroni's correction, p<0.05).

Moreover, groups A-B presented fewer clinical signs (AUC) compared to group C.

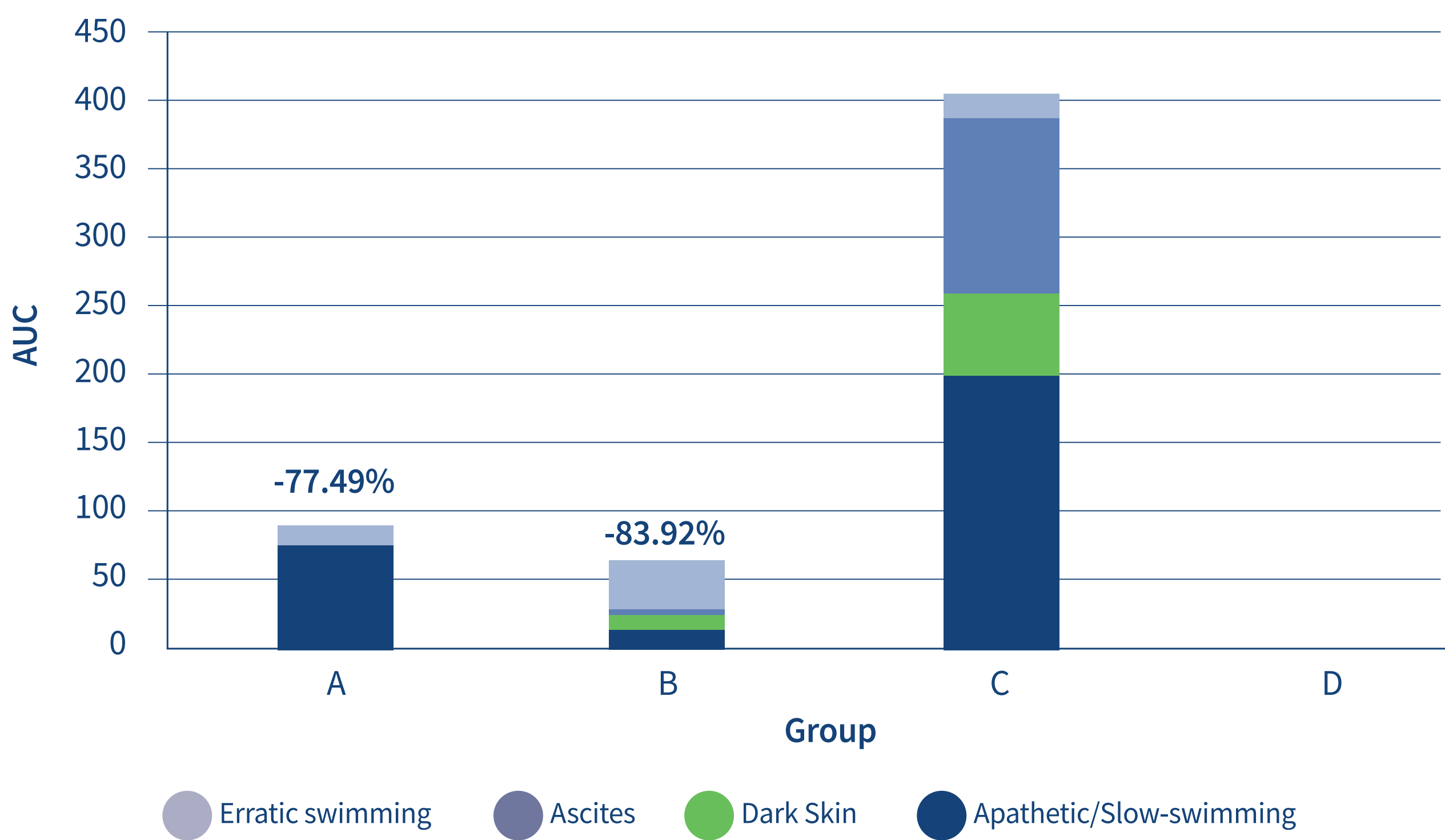


Figure 2. Clinical signs produced by the infection with FNO. The AUC quantifies the clinical signs observed in each group throughout the entire post infection period. Numbers in bold indicate the proportional reduction of the AUC compared to group C.

Discussion & conclusions

Previous authors have demonstrated that whole-cell inactivated immersion vaccines can achieve about 50% of RPS when administered to fingerlings challenged with FNO by the intraperitoneal route [1].

The gastrointestinal route is a natural gateway for bacterial infection. This study demonstrates that it can be used to test vaccine efficacy. The tested immersion vaccines reduced mortality as well as the clinical signs produced by the FNO infection in fingerlings and achieved RPS which can be over 50%.

Therefore, the inactivated autogenous vaccines tested in this study demonstrated to be a promising solution against francisellosis in Nile tilapia.

References

Oliveira TF, Quieróz GA, Leibowitz MP, Gomes Leal CA. Development of an inactivated whole cell vaccine through immersion for immunoprophylaxis of *Francisella orientalis* infections in Nile tilapia (*Oreochromis niloticus* L.) fingerlings and juveniles. *Fish Shellfish Immunol.* 2022 Jun 27;127:405-411. doi: 10.1016/j.fsi.2022.06.040.