

## Electrochemical water treatment solution

Process for treatment and reuse of marine and brackish water, with high removal rates of pollutants (TAN, nitrite and dissolved organic matter), together with high disinfectant efficacy.



## Low salinity technical note

This new concept of the ELOXIRAS® system has been tested and successfully validated by means of small-scale rainbow trout farming. In particular, a 30-day test was conducted using juvenile specimens of rainbow trout (*Ocorhynchus mykiss*) with an initial average weight of 88.6±9.9 g. This test was performed at a salinity level of 2.5‰ (2.5 ppt). In addition, to ensure the representativity of the results, intensive RAS conditions were applied, i.e, medium-high production —stocking density from 32.8 (initial) to 39.9kg/m3(final)—and low water renewal rate —270.3 L/kg daily-feed; ≤15%/day—.The system performance has been assessed from 3 different perspectives:

### 01 Fish health

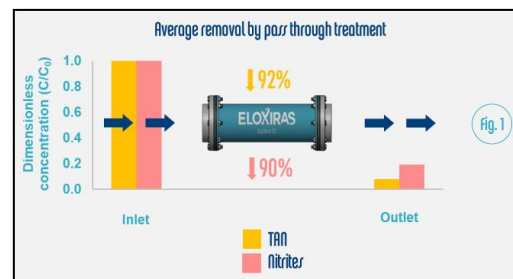
The low salinity version of ELOXIRAS® proves to be safe from the point of view of fish welfare. A histopathologic study was conducted to check the state of the fish. It was carried out by the Fish Pathological Diagnosis Service of the Universitat Autònoma de Barcelona. The evaluation of organs —gills, bowels, skin and muscles, liver, and kidneys—In a representative group of specimens evidenced that the animals were in very good condition and that no histologic alterations were produced in comparison with a control group reared using a flow-through system.

### 02 Fish growth

Growth performance was within standards, based on the feeding, fish size and stocking conditions<sup>1</sup>. Specifically, with a specific feeding rate (SFR) of 1.5 %/day, an average weight increase of 28.4 g was obtained, which led to a specific growth rate (SGR) of almost 0.9%/day.

### 03 Reading water quality

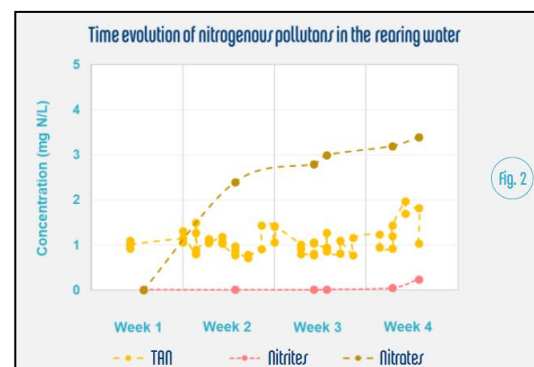
The new concept of ELOXIRAS® deals with the main pollutant resulting from the metabolic activity of the fish —total ammonia nitrogen (TAN)—and their oxidation derivatives—nitrites and nitrates—showing a performance equivalent to that of the regular ELOXIRAS® systems, i.e., average removal rates of NAT and nitrites higher than 90%and no significant generation of nitrates(fig.1). This is the reason why —despite a low water renewal rate—the level of these pollutants in the rearing water were kept within quality limits(fig.2), and with no significant accumulation of nitrates, unlike biofiltration —conventional technology in RAS—



### Quality criteria for rainbow trout farming

Pollutant	Recommendation <sup>2</sup>	Mean value observed
TAN (mg TAN/L)	< 9.4 <sup>a</sup>	1.08
Nitrite (mg N-NO <sub>2</sub> /L)	< 0.06	0.04
Nitrate (mg N-NO <sub>3</sub> /L)	< 50	1.8 (max. 3.4)

<sup>a</sup>Calculated from ammonia recommendation, based on pH and temperature values during the test.



## References

- Morales, G.A. (2004). Crecimiento y eficiencia alimentaria de trucha arco iris (*Oncorhynchus mykiss*) en jaulas bajo diferentes regímenes de alimentación. Universidad de Buenos Aires.
- Noble, C., Gismervik, K., Iversen, M. H., Kolarevic, J., Nilsson, J., Stien, L. H., Turnbull, J. F. (Eds.) (2020). Welfare Indicators for farmed rainbow trout: tools for assessing fish welfare, 310 pp. Norwegian Institute of Food, Fisheries and Aquaculture Research (Nofima).