



Distribution of phosphorus, nitrogen species and carbon in below-cage sediments at the rainbow trout farms in the southern of Caspian Sea (2018-2019)

Nasrollahzadeh Saravi H.^{1*}; Afraei Bandpei M.A.¹; Makhloogh A.¹; Baluei M.¹; Ahmadnezhad A.¹

1-Caspian Sea Ecology Research Center (CSERC), Iranian Fisheries Science Research Institute (IFSRI), Agricultural Research, Education and Extension Organization (AREEO), Sari, Iran

*Corresponding autor's Email: hnsaravi@gmail.com

Abstract

Marine aquaculture activities are accompanied by a high volume of nutrients, suspended matter and organic matter in sediments, especially in the vicinity of cages. In the present study, the accumulation of carbon, nitrogen and phosphorus compounds in sediments at fish cage farming during 2018 and 2019 at 30 meter depth (cages location) is performed. In addition, the results were compared with standards of sediments quality and previous studies. Based on the results mean (\pm SE) of different forms of phosphorus such as Loosely-P, Fe-P, Al-P, Bioava.-P, Ca-P, TIP, Res.-P and TP were measured as 6.3 ± 2.9 , 58 ± 13 , 80 ± 25 , 144 ± 27 , 1226 ± 294 , 1370 ± 295 , 11 ± 28 and 1314 ± 230 $\mu\text{g/g.dw}$, respectively. The order of different forms of phosphorous were registered as $\text{Ca-P} > \text{Al-P} > \text{Fe-P} > \text{Res.-P} > \text{Loosely-P}$. The mean (\pm SE) of different forms of nitrogen such as NH_4/N , NO_x , TIN, TON and TN were obtained 22.6 ± 9.2 , 1.10 ± 0.52 , 23.7 ± 9.3 , 58 ± 18 and 82 ± 19 $\mu\text{g/g.dw}$, respectively. Also, the mean of pH, Eh and TOC% were observed 8.38 ± 0.17 , $(-66)\pm(11)$ and 2.12 ± 0.96 percent, respectively. Comparison of these data with previous studies showed that the changes of sediments nutrient were varied around the cage culture, but the concentration of residue phosphorus (Res.-P) was decreased. The percentage of organic carbon (TOC%) in the sediment was classified in the medium quality (1 to 3%) compared to the standard values. In addition, although based on Eh, sediment is in hypoxic conditions, but since the range of changes in pH of sediments (8.12-8.65) is in the Normoxic condition, and constantly under the influence of water and its buffer pH, it has an effective role in maintaining proper oxygen conditions for demersal aquatics.

Keywords: Sediments Quality, Fish cage culture, Caspian Sea, Iran