



Editorial on the research topic: case of excellent research performance of the National Institute of Fisheries Science in 2021

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The National Institute of Fisheries Science (NIFS) is the only comprehensive national research institute in the field of fisheries in Korea, which has contributed to the development of all Korean fishery industries (NIFS, 2019). Although the NIFS was officially established alongside the Korean government in 1949, it has over 100 years of research history since the beginning of modern and contemporary fisheries science in 1921 (NFRDI, 2001; Won & Kim, 2021).

The NIFS is responsible for developing and disseminating technologies necessary for fisheries and supporting fishery policies through a wide range of research. For effective implementation of these responsibilities, the NIFS has established four major strategic directions: technology innovation for the future of fisheries, achievement of a sustainable fisheries industry, development of technologies for responding to fisheries issues, and strengthening of internationalization and industrialization capabilities. These directions show that the NIFS aims to improve the quality of life through ‘research and solution development,’ rather than by exclusively supplying science and technology knowledge through pure research and development.

I would like to introduce achievements toward these strategic directions by the NIFS in 2021. The first achievement is related to strengthening sustainable fishery resource ecology and artificial

intelligence (AI)-based marine information prediction. The behavioral characteristics of major species in the East Sea of Korea (cod, walleye pollock, and giant Pacific octopus) were investigated using advanced remote technology for the first time. Korea secured 110 tons of Antarctic toothfish through an approved scientific research survey by a regional fisheries management organization. The NIFS responds to damage from marine disasters by establishing a water temperature prediction system based on AI techniques.

The second achievement by the NIFS is the development of new aquaculture breeding technologies, with the aim of producing convenience foods. The NIFS restored the endangered dragon kelp, built a foundation for industrialization, and developed and distributed training techniques for breeding giant grouper, a value-added aquaculture variety that can endure high water temperatures. The NIFS developed and commercialized red sea bream and rockfish meal kits and soft abalone retorts, which removed the fishy smell. The NIFS also developed skin cosmetics using *Lactobacillus* obtained from the vicinity of Dokdo island.

The third achievement for NIFS is focused on environmental management to ensure safety of aquatic products and the development of aquatic accident prediction technology. In this

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area, the NIFS developed: (1) a wireless emergency stop device linked to fishing nets to prevent accidents during their operation; (2) an oral vaccine to prevent streptococci in flatfish for the first time in Korea; and (3) big data and prediction technology for oxygen-deficient water.

The final achievement is production of an untact field manual for the fisheries sector in response to the health damage caused by COVID-19. The operating system of the disease information sharing platform, Smart Fish Doctor, was systematized and equipped with an untact two-way information exchange system through SNSs. Relevant and useful information on fisheries science was produced and made available to the public.

This special issue of the Fisheries and Aquatic Sciences (FAS) includes four studies related to the four key strategic directions laid out by the NIFS. In the first study, we investigated sustainable fishery ecosystems. Lee et al. (2022a) presented the international community's efforts to mitigate sea turtle bycatch and the implementation of relevant measures by Korean tuna longline fisheries. In the second study, we considered new aquaculture breeding technologies and the development of customized convenience foods. Jin et al. (2022) compared the maturation and secondary spawning of the fleshy shrimp *Fenneropenaeus chinensis* subjected to different diets. The third study considered environmental management to ensure safe aquatic products and the development of aquatic disaster prediction technology. Lee et al. (2022b) presented the concentration of heavy metals in shellfish and undertook a health risk assessment for the coastal areas of Korea. In the fourth study, untact on-site support was provided in response to the spread of COVID-19. Kim et al. (2022) analyzed the genetic differentiation and population structure of the Korean peninsula-endemic genus *Semisulcospira* using mitochondrial markers.

Following these achievements in 2021, we hope that fishery-related industries will be further developed, fishermen will be enriched, and people will be able to safely consume seafood. The external conditions in global fisheries are becoming increasingly challenging. To continuously develop the fishery industry, more advanced technology development should be conducted based on systematic research.

Competing interests

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Availability of data and materials

Upon reasonable request, the datasets of this study can be available from the corresponding author.

Ethics approval and consent to participate

This article does not require IRB/IACUC approval because there are no human and animal participants.

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