

Study reveals migration law and recycling strategy of nitrogen in innovative recirculating aquaculture system

November 3 2022, by Li Yuan

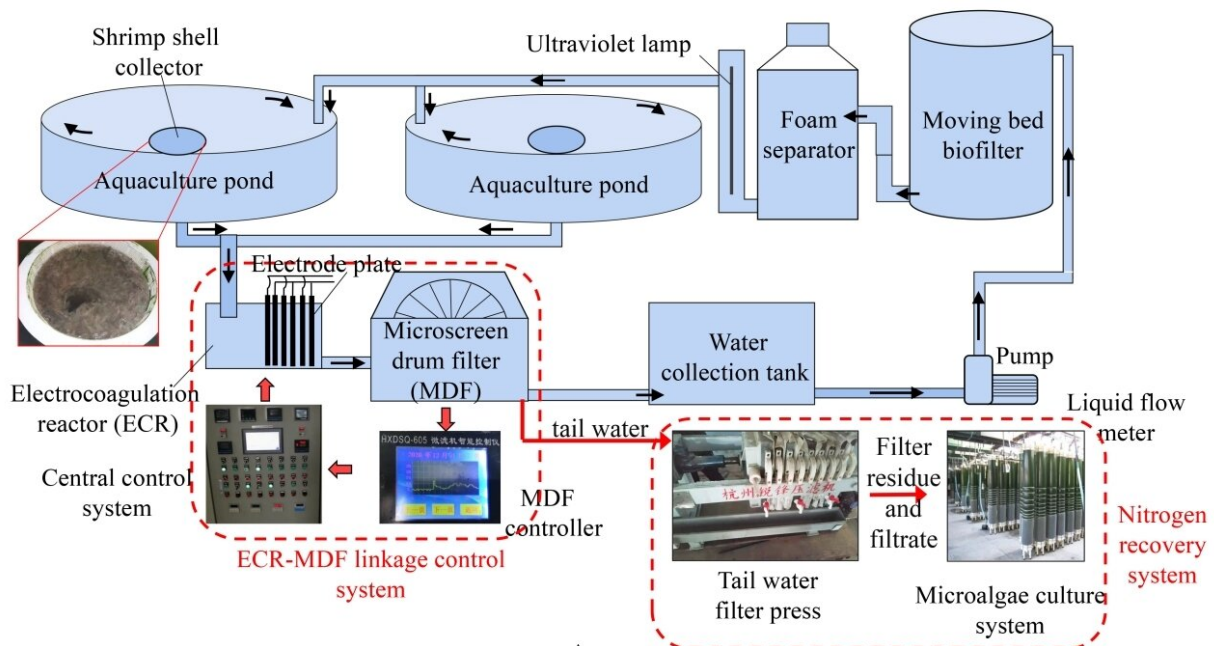


Fig. 1 Schematic diagram of the experimental system. Credit: IOCAS

In aquaculture, scientific introduction of nitrogen is necessary to achieve economic production and prevent environmental pollution.

Litopenaeus vannamei (*L. vannamei*) is an important species in the [aquaculture industry](#), providing humans with a large amount of high-

quality proteins. Therefore, it is of scientific and practical value to study the nitrogen budget and recovery during the cultivation of *L. vannamei*.

Recently, a research team led by Prof. Sun Jianming from the Institute of Oceanology of the Chinese Academy of Sciences (IOCAS) studied the utilization, migration, transformation, and accumulation of input nitrogen in the *L. vannamei* recirculating [aquaculture](#) system (RAS) between aquaculture objects and each water treatment unit.

The study was published in *Journal of Water Process Engineering* on Oct. 26.

The researchers used a green and efficient water treatment technology called electrocoagulation (EC) to improve the performance of the *L. vannamei* RAS.

Moreover, they analyzed the application of *Chlorella vulgaris* in nitrogen recovery from RAS [solid waste](#) and aquaculture tail water. They used a *Chlorella vulgaris* culture system to recycle the waste nitrogen produced during aquaculture of *L. vannamei*, and the nitrogen recovery rate was more than 80%. Using microalgae to recover nitrogen from aquaculture tail water not only improved resource utilization, but also protected the ecological environment.

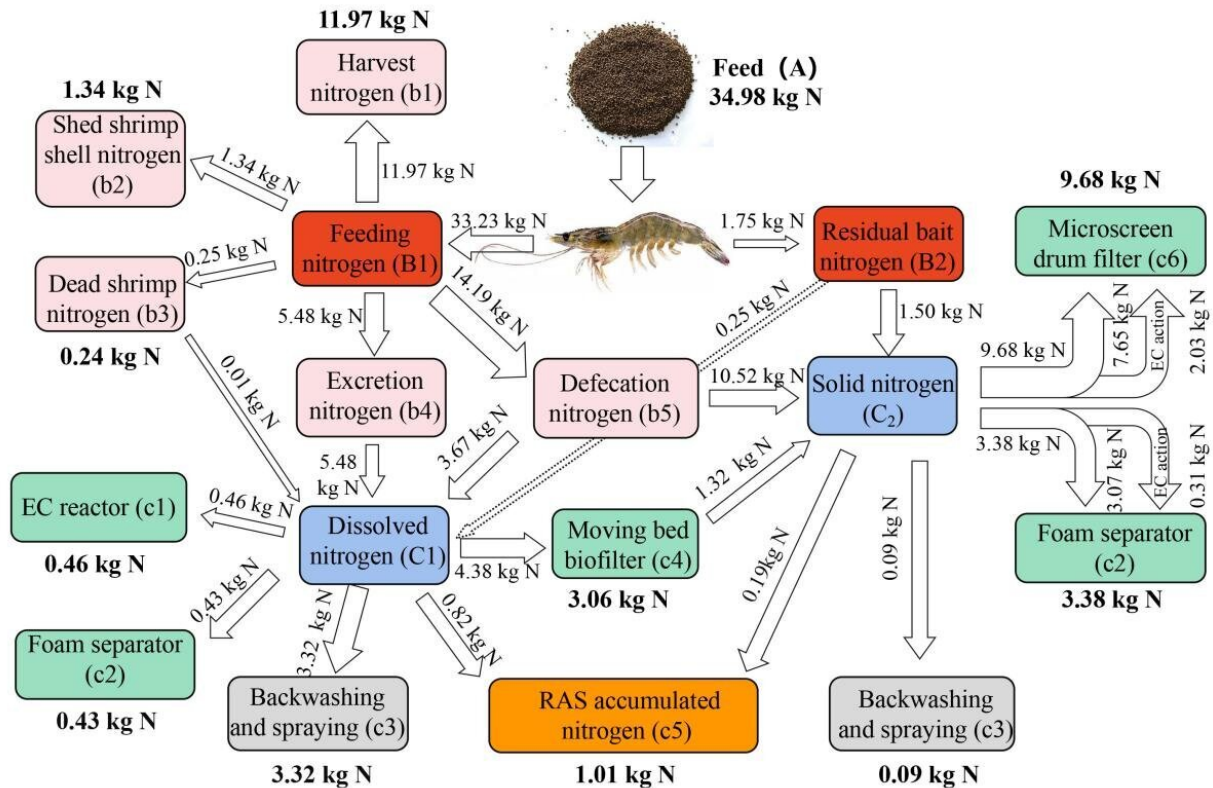


Fig. 2 The budget of input nitrogen (N_{Input}) in the RAS of *L. vannamei*. Credit: IOCAS

"We systematically studied the migration and transformation law of nitrogen in RAS, and formulated a [recovery](#) strategy for waste nitrogen, which is of great significance for the green and healthy development of the aquaculture industry," said Xu Jianping, first author of the study.

"The results comprehensively explained the flow characteristics of [nitrogen](#) element in large-scale recycling aquaculture, and provided a data support for comprehensive understanding of RAS and targeted improvement of water treatment equipment," said Prof. Sun, the corresponding author of the study.

More information: Jianping Xu et al, Nitrogen migration law and recycling strategy in an innovative recirculating aquaculture system: Enhancing performance through electrocoagulation, *Journal of Water Process Engineering* (2022). [DOI: 10.1016/j.jwpe.2022.103275](https://doi.org/10.1016/j.jwpe.2022.103275)

Provided by Chinese Academy of Sciences

Citation: Study reveals migration law and recycling strategy of nitrogen in innovative recirculating aquaculture system (2022, November 3) retrieved 26 June 2024 from <https://phys.org/news/2022-11-reveals-migration-law-recycling-strategy.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.