

國立臺灣海洋大學  
海洋環境與生態研究所 專題討論

題目：

水產養殖業的碳足跡分析：評估生態養蝦場

Carbon footprint analysis in the aquaculture industry: Assessment of an ecological shrimp farm

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**Abstract**

The study uses life cycle assessment to analyze the carbon footprint of an ecological shrimp farm located at Yijhu, Taiwan. The procedural study contains primary and secondary data. The quantization procedure follows the ISO/TS 14067. This study aims to estimate the white shrimp full life cycle carbon footprint using a function unit per kilogram. SimoPro 8.0 is used to calculate the carbon footprint in this study. The results show that the life cycle total carbon footprint of white shrimp is 6.9389 kgCO<sub>2</sub>e/kg. The top five factors in terms of carbon emissions were as follows: electricity (2.0093 kgCO<sub>2</sub>e/kg, 29.39%), feed (1.6395 kgCO<sub>2</sub>e/kg, 23.98%), indirect raw materials (1.4782 kgCO<sub>2</sub>e/kg, 21.62%), waste treatment (0.7783 kgCO<sub>2</sub>e/kg, 11.40%) and transport and refrigerant (0.7524 kgCO<sub>2</sub>e/kg, 11.01%). The results showed that wastewater treatment is one of the emission hotspots over the whole life cycle. To conclude, the carbon footprint of the shrimp supply chain can be reduced by employing energy-conserving technology, by utilizing simple wastewater treatment procedures, and by using territorial plants as feed, and such moves could help this industry achieve its goals with regard to a sustainable environment.

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**中文摘要**

該研究使用生命週期評估來分析位於台灣義竹的生態養蝦場的碳足跡。程序研究包含主要和次要數據。量化程序遵循 ISO/TS 14067。本研究旨在估計白蝦的整個生命週期碳足跡。SimoPro 8.0 用於計算本研究中的碳足跡。結果表明，白蝦的生命週期總碳足跡為 6.9389 kgCO<sub>2</sub>e/kg。碳排放量排名前五位的因素依次為：電力（2.0093 kgCO<sub>2</sub>e/kg, 29.39%）、飼料（1.6395 kgCO<sub>2</sub>e/kg, 23.98%）、間接原材料（1.4782 kgCO<sub>2</sub>e/kg, 21.62%）、廢棄物處理（0.7783 kgCO<sub>2</sub>e/kg, 11.40%）以及運輸和製冷劑（0.7524 kgCO<sub>2</sub>e/kg, 11.01%）。結果表明，廢水處理是全生命週期的排放熱點之一。總而言之，蝦供應鏈的碳足跡可以通過採用節能技術、利用簡單的廢水處理程序以及使用陸域植物作為飼料來減少，這些措施可以幫助該行業實現有關於永續環境的目標。

**參考資料**

Chang, C. C., Chang, K. C., Lin, W. C., & Wu, M. H. (2017). Carbon footprint analysis in the aquaculture industry: Assessment of an ecological shrimp farm. *Journal of Cleaner Production*, 168, 1101-1107.