

BIM EMFAF Work Programme Project Report 2023

BENEFICIARY:	Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER:	23/IFCS/DIS-BG011-BR067
NAME OF PROJECT:	Developing a Formed Bait for the Commercial Whelk Fishery
IMPLEMENTATION PERIOD:	1 st January to 31 st December 2023

Project Scope

In 2021 BIM initiated a project focusing on whelk bait in collaboration with Atlantic Technological University (ATU) Galway, and guidance from industry. The overarching aim of the project was to assess the feasibility of developing an affordable alternative whelk bait to address the ongoing bait supply and cost challenges Irish whelk fishers are facing. Typically, co-products (fish frames and offal, poorer quality fish and shellfish) and underutilised fish and shellfish species are used as bait inputs. However, the competition for raw material has increased as fishers and processors that supply bait are increasingly diverting their raw material to higher value opportunities to maximise profitability. Whelk fishers are therefore finding it increasingly difficult to access a consistent affordable supply of quality bait, and often must compromise on quality of bait accessible to them. These challenges are impacting on whelk fishers' profitability, and in addition when poorer quality baits are used, they can impact negatively on catch performance. The project with ATU Galway kick-started in November 2021. They formed a research team comprising a research technician, project manager, chemist, and food development expert, and importantly BIM and the team at ATU set up an Industry Research Group (IRG) to help guide the project and ensure that addressing the sector's needs remained the focus. BIM, ATU Galway and the IRG have typically met bi-monthly, which helped track progress and adapt plans as results emerged. The team at ATU also reached out to experts (e.g., Nofima, Norway) that have additional experience including in bait development.

Objectives

- To progress the project as per the contract, ATU Galway will hold regular meetings with the IRG and BIM and report on outputs.
- Review the latest commercial innovations and R&D focusing on formed bait formulations for whelk and other pot caught species, and this will include reaching out to relevant experts.
- Regularly report on relevant chemical analyses, candidate bait raw materials, binding solutions and captive holding trials to allow constructive feedback from the IRG and BIM.
- Narrow down the best-fit bait solutions by conducting robust captive holding trials and assessing cost/benefit of formed bait solutions.

Outcomes

The project built on previous work conducted by Nofima (Norway) and BIM and aimed to increase the level of development of a sustainable alternative bait. The objective was to decrease the dependency on higher value bait species (brown crab), while still being productive and affordable for fishers to adopt and integrate into normal fishing operations. An Industry Reference Group (IRG) provided a multi-actor stakeholder platform (MASP) involving researchers, processors, fishers and other interested parties. The IRG helped to



validate key exploitable results and steer the direction of the research, ensuring the level of technological advancement was applicable to the industry in Ireland.

In the first phase of the project, several bait materials were tested for their attractiveness to whelk in a land based live holding environment. In the second phase, the best performing bait materials were used to produce formulated bait blocks which were tested for efficacy during small-scale opportunistic trials at sea on board fishing vessels. The formulated bait was derived using green crab bound with a kappa carrageenan gelling agent. Green crab is not currently commercially fished in Ireland and has been adopted as bait by some of the inshore fleet targeting whelk. The results showed that the formulated bait was attractive to whelk in a lab environment and was generally effective at catching whelk in a commercial fishing setting. It can be produced using less raw material than traditional bait usage and its size and shape is more suitable for use in pots than whole green crab which can get washed out of the pot during deployment due to its generally relatively small size.

Chemical characterisation of the various bait types indicated that the odour plume produced by the bait is likely to contain a mixture of complex molecules rather than a single attractant. Hydrolysed brown crab and green crab contained substantial amounts of trimethylamine (TMA), a compound which imparts a rotting fish smell. A chemically synthesised variant of TMA, trimethylamine-N-oxide dehydrate (TMAO) is a known fish bait. This compound warrants further investigation as a potential attractant.

With regard to technology readiness levels (TRL), the project has succeeded in raising the level of development of an alternative bait for the whelk fishery in Ireland from validation of a proof of concept in a laboratory setting (TRL 2-4) to testing of the new technology in its intended environment (TRL 5). The next steps towards commercial viability would involve more comprehensive testing under commercial fishing conditions and the development of a production system that can provide consistent volumes of bait that are sustainable, economic and practical for processors and fishers.

Recommendations were made for further development of sustainable baits for the Irish whelk fishery, which will form the basis of the next project (2024-2025).

Summary of Project Spend

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Total Approved Costs	€36,876
Total Eligible Expenditure	€36,876
EMFAF Eligible Expenditure	€18,438
Exchequer	€18,438

Report by: Michael Gallagher

Date: January 2024



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