Evaluating

the durability and performance of biodegradable snoods after long-term storage.

PRESENTER AND AUTHOR
Anja Alvestad, SINTEF Ocean

BACKGROUND

The use of biodegradable materials in fishing gear components is receiving growing scientific attention as a strategy to reduce marine plastic pollution originating from commercial fisheries. However, their longevity under real-life conditions — including long-term storage and repeated use — remains poorly understood. This study builds on the work of Cerbule et al. (2022) and addresses key questions regarding the effects of long-term storage on biodegradable fishing gear. Specifically, it investigates whether biodegradable PBSAT snoods can retain their mechanical integrity after prolonged storage and how this might affect snood loss and catch efficiency in subsequent fishing seasons. The goal is to assess whether biodegradable gear can meet the practical demands of commercial operations over time.

METHOD

Field trials were conducted using commercial longline gear fitted with either biodegradable (PBSAT) or or conventional nylon (PA) snoods. The PBSAT snoods used in this trial were identical to those tested in Cerbule et al. (2022) and had been stored for over two years under realistic conditions typically found in commercial longline fisheries. The material was stored, mimicking standard industry practices for gear storage, for a little over two years.

Specifically, we investigate: whether long-term storage affects catch efficiency, whether twine thickness (1.0 mm vs. 1.1 mm) influences performance after storage, and how these effects correlate with changes in tensile strength.

Through this study, we aim to evaluate whether biodegradable alternatives can truly serve as viable replacements for PA snoods in longline fisheries thus contributing to a sustainable transition in commercial fishing practices.

DISCUSSION

Biodegradable snoods showed comparable catch efficiency to nylon, with overlapping confidence intervals. However, wide intervals in low-data subsets underscore uncertainty and a need for additional trials. Mechanically, PBSAT snoods differed from PA, particularly in strength. Reduced strength may lead to more frequent replacements, which complicates their environmental advantage. Preliminary findings support the conclusion from Cerbule et al. (2022) that long-term storage does not substantially compromise performance.

ACKNOWLEDGEMENT

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Cerbule, K., Grimaldo, E., Herrmann, B., Larsen, R.B., Brčić, J. and Vollstad, J. (2022). Can biodegradable materials reduce plastic pollution without decreasing catch efficiency in longline fishery? Marine Pollution Bulletin. https://doi.org/10.1016/j.marpolbul.2022.113577

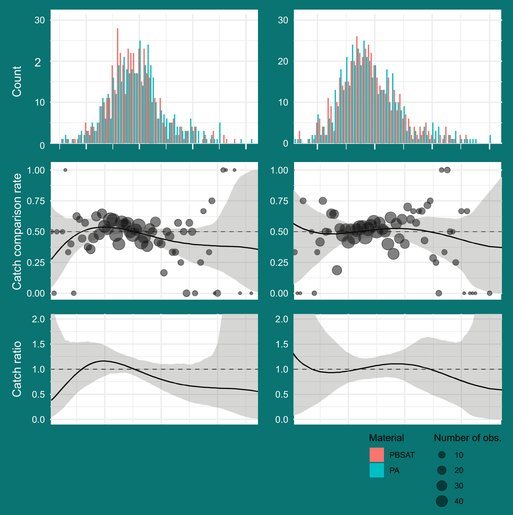
TESTED BY TIME

SFI Dsolve is a centre for research-based innovation headed by the Arctic University of Norway, UiT. Our ambition is to place Norway at the forefront of research, development and use of smart biodegradable materials to reduce the global problem of marine litter caused by the use of plastic in fisheries and aquaculture.

Our research aims to reduce plastic litter and associated problems such as ghost fishing, macro and microplastic caused by the fishery and aquaculture industries. The goal is that traditional plastics in these sectors can be replaced with new biodegradable materials. Scan QR code to read more.

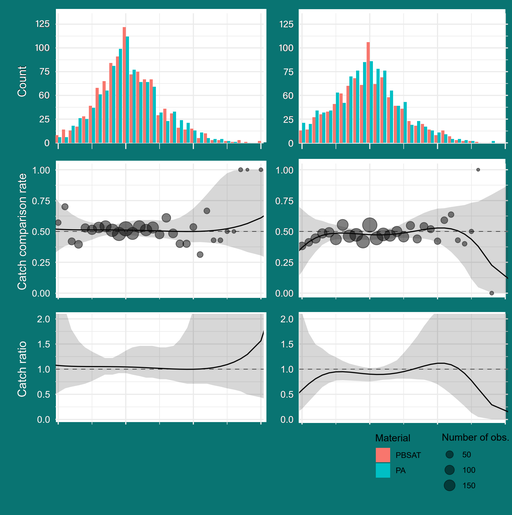
COD

Catch comparison



HADDOCK

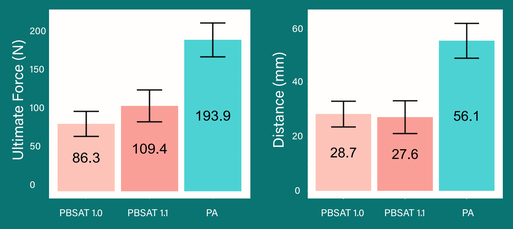
Catch comparison



MECHANICAL PROPERTIES OF SNOODS

Force at breaking point for new material with 95% CI.

Elongation for new snoods with 95% CI.



SNOOD PERFORMANCE

Overview of snood performance by material type by materiale type, with P_{loss} and $P_{replacement}$ including Efron 95% percentile confidence intervals.

	PA (1.0 mm)	PBSAT (1.0 mm)	PBSAT (1.1 mm)
Total number of snoods deployed	9545	5395	6225
Total number of lost snoods	744	581	643
Probability of loss P_{loss} (%)	7.8 [7.3--8.4]	10.8 [10.0--11.7]	10.3 [9.5--11.2]
Total number of snoods replaced	116	72	39
Probability of replacement $P_{replacement}$ (%)	1.2 [1.0--1.5]	1.3 [1.0--1.7]	0.6 [0.4--0.9]

CO-AUTHORS

Eduardo Grimaldo [2]
UiT
Norway

Roger Larsen [3]
UiT
Norway

Julie Grønlund [4]
SINTEF Ocean
Norway

Dsolve

Norwegian Centre for Research-based Innovation