

# Comparison of Microplastics in Store-Bought Mussels and Locally Harvested Mussels

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## Introduction

Comparing the health effects of locally harvested versus store bought food resources is a vital research topic for the One-Health of rural Alaska towns and villages, especially when it comes to microplastics. Microplastics are plastic particles with a size less than 5 mm, and have broken down from larger pieces. Microplastics have been linked to damaging immune and respiratory systems, and may have damaging effects on cell and brain health (Vethaak et al., 2021). Shellfish, specifically mussels, are strong indicator species of ocean health because of their process of accumulating pollutants within their tissues (Viarengo et al., 1991), including microplastics (Ward. et al 2019). Various projects have studied microplastics in mussels, but very few have connected that to differences in store bought mussels as opposed to harvested.

## Hypothesis

We predict that locally harvested mussels will contain a higher amount of microplastics per mussel than store-bought mussels because harvested mussels may be exposed to more debris and may have a longer lifespan that allows more exposure.

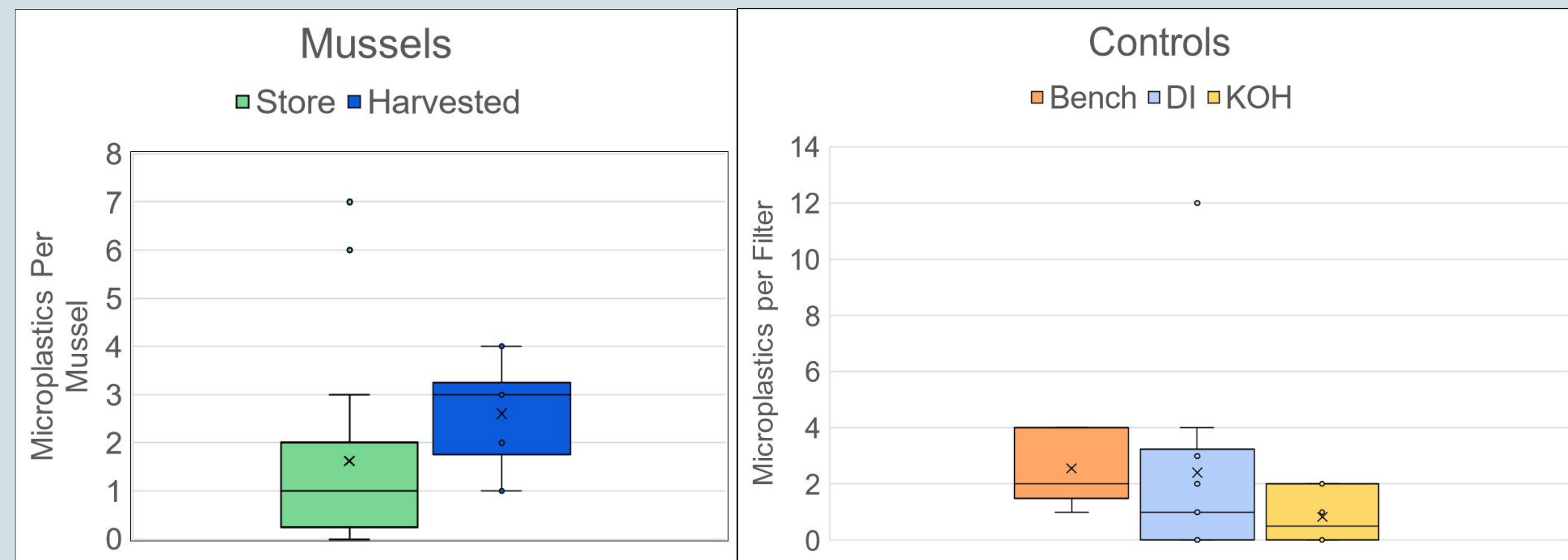
## Methods



- Store-bought greenshell mussels (*Perna canaliculus*) from a Sitka grocery store, were used in the experiment.
- The RASOR group collecting blue mussels (*Mytilus edulis*) at Starrigavan Beach to be analyzed 2/5/23
- Microplastic on filter

The samples, or the mussels, were first collected from rocks on 11/3/22 at Starrigavan Beach, in the intertidal zone. Twelve (12) mussels were harvested in total by the participants, and stored in aluminum foil to prevent plastic contamination. The greenshell mussels were purchased at a local grocery store. The blue mussel samples were frozen, and then defrosted 2/5/23. To prevent contamination, 100% cotton clothing was worn during the lab. Benchtop, DI, and KOH controls were also set-up to measure microplastics in the lab. Sample processing first began on 2/5/23 in the University of Alaska Southeast Lab where the mussels were weighed, measured, and then shucked. The shucked mussels were then placed into an Erlenmeyer flask and applied with a measured amount of potassium hydroxide determined by the mass of the mussel without the shell. The samples were then left under a fume hood, and agitated daily, for a week. After the week was up, the samples were applied to a filter that removed the liquid and preserved the solid matter. The filter was then analyzed under a dissecting microscope for microplastics. A hot needle test was done to determine if object curled and was truly a microplastic.

## Results



- Overall harvested mussels, on average, had more microplastics per mussel than store-bought mussels.
- A few select store-bought mussels contained more microplastics per mussel than any of the harvested mussels.
- The benchtop controls had a slightly higher average of microplastics per filter than DI and KOH controls.
- A few select DI control filters contained higher concentrations of microplastics than benchtop controls, KOH controls, or any of the mussel filters inspected.

## Discussion

Our original hypothesis that wild mussels would have higher amounts of microplastics was supported by our data. We expect that the reason wild mussels might have more microplastics may be because they are exposed to more debris and have a longer life span which allow them to accumulate more plastic. However, this is only a theory and further research would need to be conducted in order to find out why wild mussels have more microplastics. More research would also be needed to know if the amount of plastics in store bought mussels are different depending on which company you buy from. To test to see if our research is accurate, we would need to test blue and green mussel to see if one accumulates microplastics more easily than another. We also noticed that in our lab, a bench top control was found to have a high concentration of microplastics, possibly indicating that there was exposure to microplastics in the lab environment. This indication may possibly have precedent in our data and results.

### References:

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