Maniilaq Seal Oil Project

A Quest To Serve Safe Seal Oil to Elders

Presenters:

Alex Whiting, Native Village of Kotzebue

Cyrus Harris, Maniilaq Association/Native Village of Kotzebue

LCDR Chris Dankmeyer, Maniilaq Association

Seal Oil

Seal oil is the rendered oil from seal blubber that has been a staple for the Iñupiaq people since time immemorial. It provides valuable calories for dealing with the Arctic environment and is part of the identity of the Iñupiaq people. From babies to Elders it is eaten regularly throughout the year. It provides a sense of well-being, especially to the Elders that are living in the Maniilaq Association's Long-Term Care Facility. Until recently, the Elders at LTC did not have regular access to this treasured food product (beyond monthly potlucks).

Harvesting and Making Traditional Seal Oil

Hunting is carried out once the ice begins breaking up in May and boats can reach the ice floes with animals. Hunting continues into June until all the ice is gone from the Sound.

Once the ugruk is harvested, it is gutted immediately. The heart, liver and kidneys are saved and the intestines are cleaned out, rinsed, and braided for easy transport.

The ugruk carcass is attached to a line and the seal is dipped into the ice water to rinse off the blood and to cool down. It is then lifted back onto the ice to let the water and blood drain out.

Once brought to the camp, the ugruk is unloaded and put on a board. The skin and the blubber are taken off and the carcass is cut up into manageable sizes of meat chunks and meat strips.

The skin with blubber still attached is laid out overnight on plywood boards and any additional meat attached to the blubber is trimmed off.

The blanket of blubber is cut off of the skin in large sections using and ulu and wooden platform built specifically for the task.

The sheets of blubber are sliced into 1” x 3” strips. The strips are placed into a 30 gallon container and covered with a game bag (like cheesecloth) allowing it to breathe, while keeping bugs and foreign material out.

The container of blubber strips is stored in a protected area away from the dust and rain. The container is stirred twice a day, once in the morning and once in the afternoon - the warmer it is, the quicker the blubber will render into oil.

Opening of the Siġļuaq Maniilaq Traditional Foods Processing Center

The State of Alaska has long had provisions in their food code that allow for the donation of wild game meat, seafood, plants, and other traditional food to institutions. However, Federal food laws were more restrictive of wild foods; and both Federal and State nursing home regulations are complex and restrictive. Traditional Iñupiaq foods, the most unique of all Native American cuisines, conflicted with nursing home rules and expectations for nutrition and food safety. The **Utuqqanaat Inaat** Maniilaq Long-term Care Center in Kotzebue opened in 2011 and it was clear that the federal rules need to change to allow the Elders access to the wild food diet they had grown up on. In 2014, after years of advocacy from rural Alaska and with the assistance of Alaska leaders, the U.S. Congress passed the Farm Bill, with a traditional foods amendment that used language from the Alaska food code. The amendment, titled "Service of Traditional Foods in Public Facilities," was a major victory for Alaska, federally regulated institutions, and for natives throughout the country. The 2014 Farm Bill was the first time that the U.S. Congress officially recognized that the traditional foods of Native Americans are a real part of the American food system.

In July 2015, the Siġļuaq facility for processing wild foods in sanitary conditions was opened, and helped the Center clear the remaining legal hurdles posed by regulators by providing a ADEC permitted place to process the food. Cyrus Harris operates the Siġļuaq and harvests and processes traditional foods for use at the Maniilaq Long-term Care Center.

THE SIĠĻUAQ

The Seal Oil Task Force

In June 2015, a group was assembled to advocate for and discuss how to begin serving seal and seal products in hospital settings and understand better the regulatory challenges and nutritional components of seal products. The one major food item that was still blocked due to safety concerns was seal oil. To address whether there were any pathways forward on the issue of serving seal oil, the group decided to continue to meet and carry out specific tasks to make progress thus becoming the Seal Oil Task Force.

Seal Oil Task Force Participants

The participants represented a wide variety of Alaska institutions involved with providing, serving, regulating and understanding wild Alaska foods, They included: Melissa Chlupach and Amy Foote (NMS/ANMC); Val Kreil, Paul Hansen, Helen McGaw, Chris Dankmeyer, Cyrus Harris, Brittany Anderson, Erin Nelson, and Ryan Owens (Maniilaq); Katie Hubbard, Mellisa Heflin, Kay Branch, Desiree Jackson (ANTHC), Sarah Shimer and Nancy Furlow (UAA NRC-ANE), Sandrine Deglin (DHSS), Brian Himelbloom and Chris Sannito (Kodiak Marine Science Center), Lorinda Lhotka (ADEC), Donna Fearey (DHSS-SOE), Brehan Kohl (DEH-Food Safety/Sanitation), and Alex Whiting (Native Village of Kotzebue).

The Maniilaq Seal Oil Project

Serving Safe Seal Oil to Iñupiat Elders at Utuqqanaat Inaat Long-term Care Facility

The Maniilaq Seal Oil Project was created as an offshoot of the Seal Oil Task Force to understand the science and food safety risks of making traditionally processed seal oil. The main obstacle found to serving seal oil in hospital facilities was the association of seal oil with the bacterium *Clostridium botulinum* that produces toxins commonly referred to as botulism and the need to develop a hazard analysis and critical control point (HACCP) plan for destroying the bacterium or the related toxins. Due to the high number of foodborne botulism cases associated with the consumption of traditional Alaska Native foods, seal oil is a prohibited food item under the Alaska Department of Environmental Conservation (ADEC) Food Code.

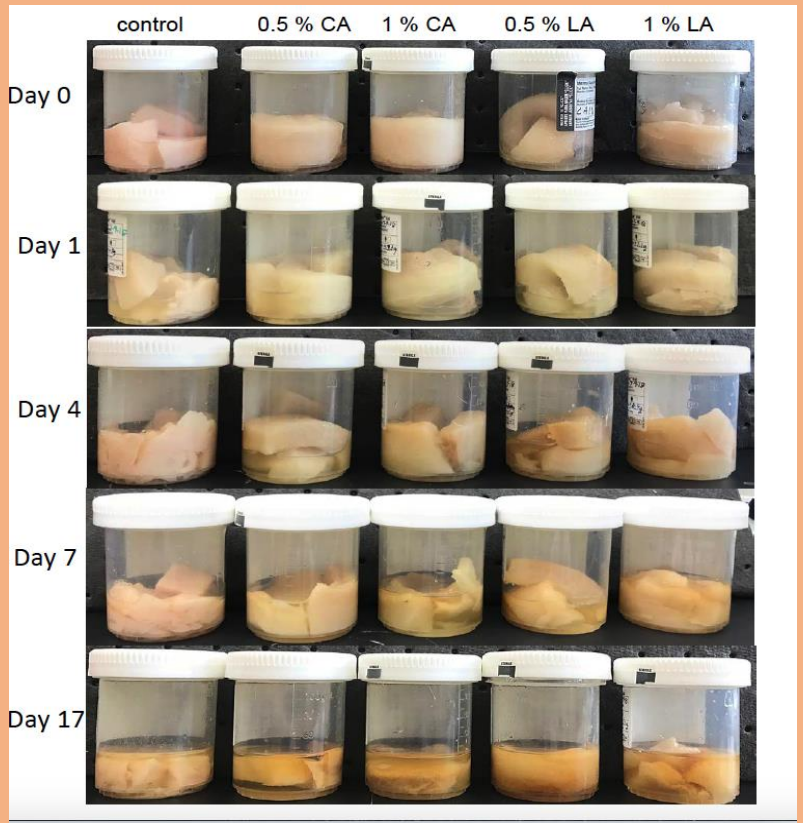
The Maniilaq Seal Oil Project participants are Cyrus Harris, Ryan Owens, Brittany Anderson, Joanna Barton, Erin Nelson, Chris Dankmeyer, Valdeko Kreil from Maniilaq; Alex Whiting with the Native Village of Kotzebue; Chris Sannito, Brian Himelbloom with the UAF Kodiak Seafood and Marine Science Center; and Sabine Pellett, William Tepp, Marite Bradshaw, Christina Pier, Heather Inzalaco, Eric Johnson with the Department of Bacteriology, University of Wisconsin-Madison.

Findings of Note from Seal Oil Research

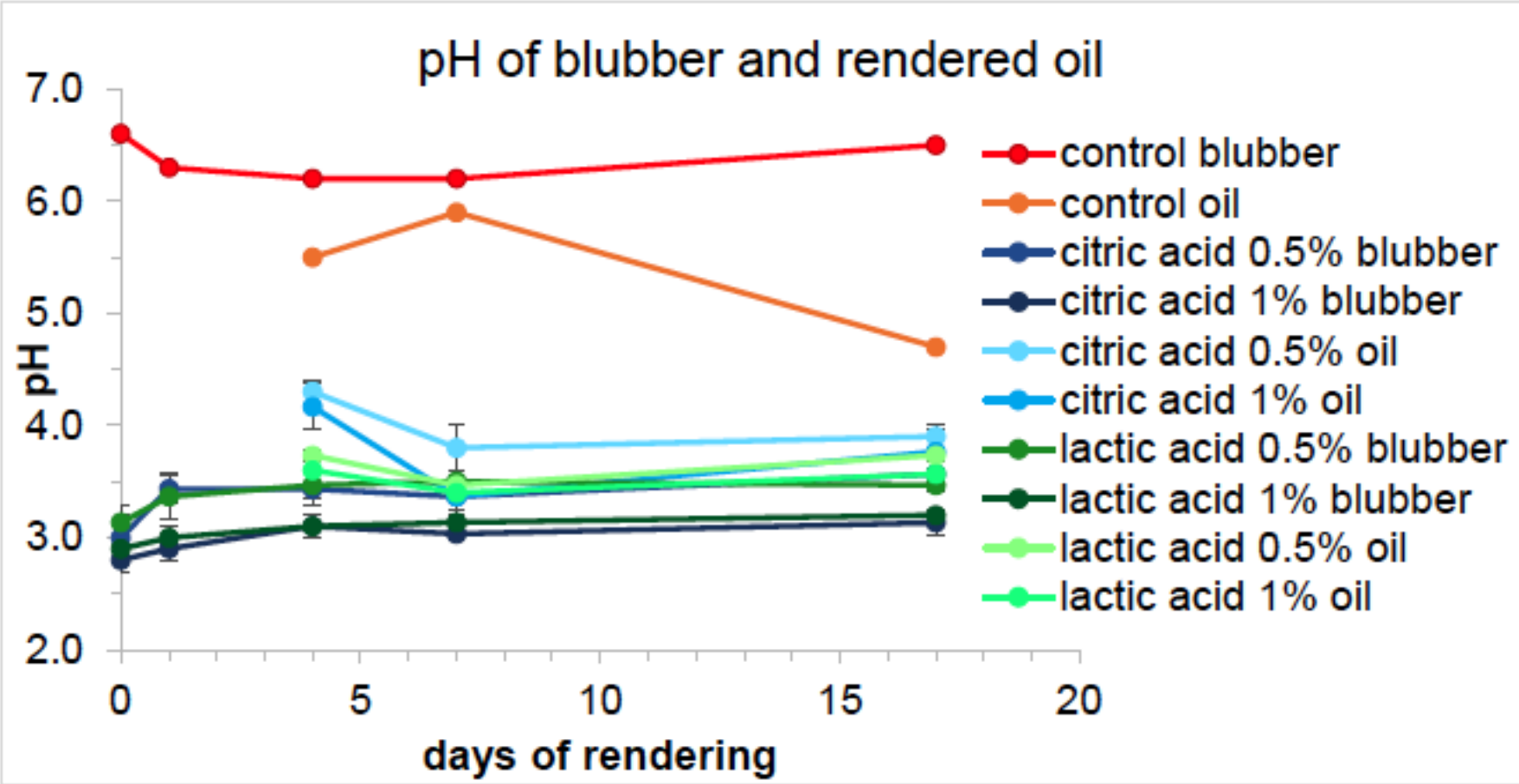
The first focus was understanding the environmental conditions that allowed for the growth of *C. bot* in seal oil. It is known that *C. bot* requires moist anaerobic lower acid conditions to thrive and reproduce. *C. bot* strains producing type E botulinum toxin do not germinate and grow at pH levels below 5.0, and proteolytic strains producing type A and B botulinum toxins do not germinate and grow at a pH below 4.6. Type E *C. bot* is the one most commonly indicated for botulism poisoning related to seal oil.

Seal blubber tested was found to be at a pH of 6.5-7 and drops to about 6 by the time most of the oil is rendered. The pH of traditional made seal oil was tested throughout the rendering process and was found to range around 4.5 by the time it was finished rendering. This was due to lactic acid concentration and only a very small amount is required for this change to occur. While no conclusive proof exists for the source of lactic acid, the most likely hypothesis is that the lactic acid is present in very small amounts in the blubber and this is released as the blubber turns to oil. Even though the pH drops throughout the rendering process, it still took a couple of weeks to for the oil to reach *safe* levels and the blubber mixed with the oil never reached *safe* pH levels in terms of *C. bot* growth potential.

Water activity is also important to understanding growth conditions for *C. bot.* Kodiak Seafood and Marine Science Center studied the blubber and seal oil and found a high level of water activity in the blubber which would allow for *C. bot* growth, but found that as the blubber turns to oil its water activity decrease over time creating poor water conditions for *C. bot* growth.



In order to create a HACCP using traditional made seal oil, it was decided to investigate whether fresh blubber if mixed with lactic acid or citric acid could immediately lower the pH of the blubber to levels considered safe due to the inability of *C. bot* to grow. The findings suggested that addition of acid or another growth inhibitor such as nitrates is essential to prevent growth of *C. bot* and toxin production during the seal oil rendering process. Since acid concentrations as low as 0.5% resulted in a pH of ~3.5 of the blubber, the concentration of acid can be lowered further. It was decided acidification of seal blubber with 0.05 % lactic acid or citric acid prevents botulinum neurotoxin production by *C. bot* Alaska E spores.

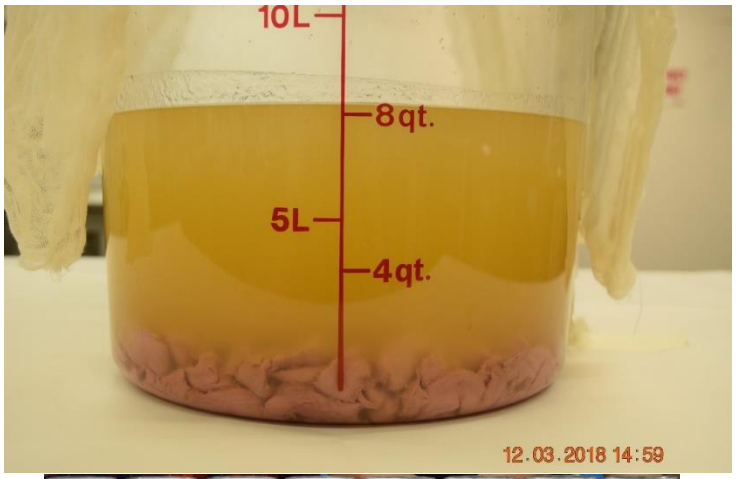


Traditional Seal Oil Processing and Acid

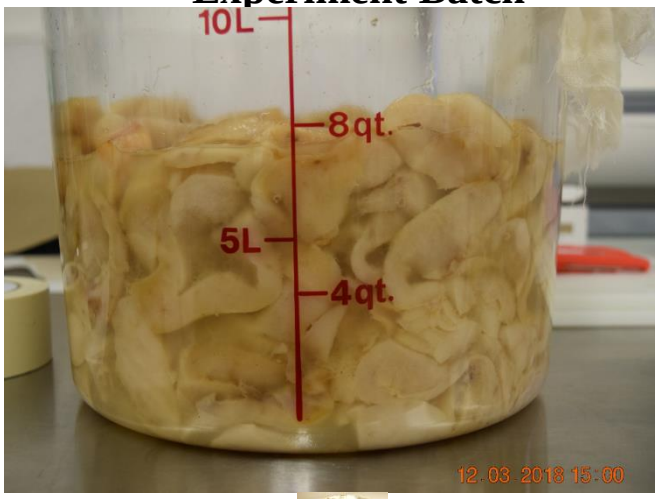
After the conclusion of the seal oil research on pH and *C. bot*, it was decided to attempt making traditional seal oil at the Siġļuaq and add 0.05% lactic acid to the blubber at the beginning of the rendering process to research the efficacy of this approach.

We placed 17 lbs of blubber strips into two poly buckets (a little over 8 quarts volume). We then added 7.7 mL of 88% lactic acid to one bucket of blubber (experiment) to create a 0.05% lactic acid concentration which acidified the blubber perfectly to a pH of 4.5. The other bucket of blubber had no additives and was left to render naturally (control). We then covered the buckets with cheese cloth and allowed the blubber to render into oil over 14 days, stirring it twice daily and taking a variety of pH and water activity measurements of blubber and of oil.

Control Batch



Experiment Batch

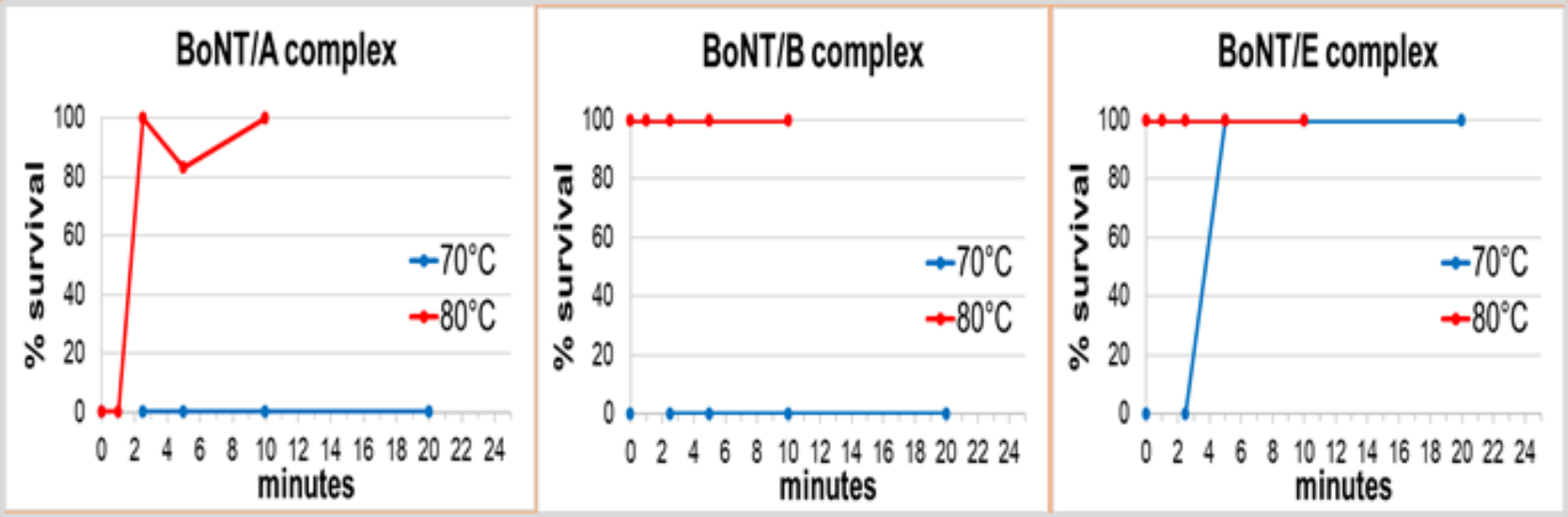


After the experiment was concluded we found that the blubber with the lactic acid added changed to an off-putting gray color, had an off-smell from what seal oil is supposed to smell like and did not render out much oil (an 8.82% blubber/oil rendering efficiency by weight vs 73.53% from the control batch). It was decided that lactic acid addition and pH as a critical control point was not going to result in a product that was useable.

Heating Traditional Seal Oil

After the acid additive experiments concluded, it was obvious due to the poor results in regard to oil rendering and the color and smell of the blubber that this was not going to be a pathway forward. So we decided to explore heating of traditional made seal oil. The first step was to ensure heat treated oil would be palatable for our Elders, as heating oil is not typically done in the region. So a blind taste test with experienced seal oil lovers using 3 samples of traditional rendered seal oil: Sample A (80°C for 2mins), Sample B (No heat, control), and Sample C (70°C for 10mins) using an electric wok. Amongst each of the 4 participants, both heated oils were preferred over traditionally processed seal oil. This was the "greenlight" for the UWM to initiate the heat inactivation experiment.

The science on using heat to destroy *C. bot* toxins is well developed, however to be definitive in regards to using heat to destroy toxins in seal oil, the University of Wisconsin team carried out research on the topic. Three 100 ml samples of traditionally rendered seal oil from Maniilaq's state permitted traditional foods processing facility was sent to the University of Wisconsin-Madison (UWM) for a heat inactivation experiment using *C. bot* toxins and live mice.



Results: Percent survival of mice injected with heat-treated seal oil sample extracts spiked with BoTN/A, BoTN/B, or BoNT/E complex.

- BoNT/A & /B complex were more heat resistant than BoNT/E complex.
- Both BoNT/A & BoNT/B were less efficiently inactivated at 70°C.
- The same amounts of BoNT/B and BoNT/E were completely inactivated in 1 min at 80°C.
- BoNT/E is also inactivated after 5 min at 70°C.
- BoNT/A required heating to 80°C at 2.5 min to completely inactivate the added ~ 105 U toxins (~ 5 log reduction in toxicity).

9-STEP SEAL OIL HACCP PLAN

1. Trimming, Blubber Stripping and Sorting in the Siġḷauq
2. 10-14 Day Ambient Temperature Blubber Rendering in Open Poly Buckets
3. Oil Filtering and Straining through Cheesecloth
4. **Oil Pasteurization to 176°F for 10 min**
5. Pre-cool oil to 70°F within 2 hrs
6. Oil Filling into Clean Mason Jars
7. **Labeling/Inspection**
8. Cooling of Jars to 38°F within 4 hrs
9. Frozen storage

SEAL OIL PASTEURIZATION

Heat seal oil to 176˚F for 10 min

NATCHIQ OIL NUTRITION

Nutrition Facts

64 servings per container

Serving size **1 Tbsp (14g)**

Amount per serving

Calories **130**

	% Daily Value*
Total Fat 14g	**18%**
Saturated Fat 2g	**10%**
Trans Fat 0g	
Polyunsaturated Fat 4g	
Monounsaturated Fat 8g	
Cholesterol 5mg	**2%**
Sodium 0mg	**0%**
Total Carbohydrate 0g	**0%**
Dietary Fiber 0g	**0%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 0g	
Vitamin A 125mcg	15%
Vitamin D 0mcg	0%
Vitamin E 1mg	7%
Calcium 0mg	0%
Iron 0mg	0%
Potassium 1mg	0%
Omega-3 fatty acids 4g	†
Omega-9 fatty acids 3g	†

*The Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

† Daily Value not established.

INGREDIENTS: RINGED SEAL BLUBBER

Seal oil is high in **heart-healthy Omega 3 and 9 fatty acids**, low in sodium and a good source of Vitamin A.

This product was proudly made at The Sigluaq in Kotzebue, Alaska, using indigenous knowledge and western science.

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VOL. 34, No. 12 | $1.00 thearcticsounder.com March 25, 2021

Native artists

Sitka band Ya Tseen signs with a major label, prepares to release album.

PAGE 6

Little climber

Scientist seeks to find out why the Alaska vole climbed the tree.

PAGE 14

TASTING TRADITION

Photo courtesy of Manuella Wilson/Utuqqanaat Inaat and Maniilaq Health Association

Minnie Savetilik is holding the one of the first servings of seal oil with Ernest Saqu Hawley in the background eating seal oil with his meal, Saqu was the first to try the seal presented to the Elders at lunchtime on March 17, in Kotzebue.

Elders enjoy a taste of home with seal oil on the menu

Elders at Utuqqanaat Inaat now have access to the traditional food

BY VICTORIA PETERSEN
For the Arctic Sounder

Seal oil is finally on the menu for Elders at Utuqqanaat Inaat, Maniilaq Health Association's long-term care facility in Kotzebue.

With help from a number of University of Alaska partners, Maniilaq has developed a process to safely produce and serve seal oil, something the Elders have been looking forward to for years.

In January, Alaska's Department of Environmental Conservation approved the oil for use in Elder homes, a first for seal oil in the country. At lunchtime on March 17, hunter support and natural resources advocate Cyrus Harris presented the seal oil to the Elders at Utuqqanaat Inaat.

Elder Richard Hensley is the president of the resident council at Utuqqanaat Inaat, and was

■ See page 7, SEAL OIL

Lady Huskies return to play

Kotzebue players ready to charge ahead after disrupted season

BY MICHAEL SCOTT
For the Arctic Sounder

The undefeated (8-0) Kotzebue High School Lady Huskies played some tough games against Nome the last games of the season and were excited to have qualified for the state 3A basketball tournament.

Those games were in the Winter of 2020, just weeks ahead of the Alaska School Athletic

■ See page 16, LADY HUSKIES

In your words

Students learn craft of niksiks

Chukchi campus opens to workshops

BY KATE ITEN
UAF Chukchi Campus

After months of closures due to the COVID-19 pandemic, the University of Alaska Fairbanks Chukchi Campus recently reopened its doors to the public for two indigenous craft workshops in Kotzebue and Noatak.

■ See page 10, NIKSIKS

Quyanaqpak!