the LODE STAR

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Alaska Fisheries Development Foundation, Inc. Volume IX No. 1, Spring 1991

Floundering for a new surimi:

Arrowtooth may be the answer

The world surimi market is screaming for more supply, and there are about 5.7 billion arrowtooth flounder off the coast of Alaska who are keeping pretty quiet.

Arrowtooth flounder (*Atheresthes stomias*) may be the next darling of the surimi production world, if strong gel strength, bright color and a huge biomass have anything to do with it. Right now, no one is fishing arrowtooth flounder — there's no market for it yet — so an estimated 660 million lbs. of them are laying pretty low along the continental shelf. But a report just finished by National Marine Fisheries Service (NMFS) confirms that arrowtooth with enzyme inhibitors added produces high-grade surimi with strong gel strength and bright white color and retains functionality in cold storage. Arrowtooth surimi, NMFS reports, is usable in analogs and possibly other high-value products, too.

The study was conducted by Dr. Diana Wasson of NMFS, with cooperation from All Alaska Seafoods and Alaska Pacific Seafoods. It was part of an AFDF project sponsored by the Alaska Science and Technology Foundation.

We've known for a year that arrowtooth flounder makes good surimi. What's news now is that we know arrowtooth surimi holds up in the freezer as well as its pollock counterpart, and that a blend of arrowtooth/pollock surimi makes excellent imitation crab sticks.

"There's been a huge amount of interest," said Dr. Wasson of the arrowtooth surimi project. "The question is, could we obtain even better results under more realistic processing times?"

Another question is: Will fishermen ever get a chance to harvest arrowtooth, with bycatch and other problems shutting down trawl fisheries?

What we know so far

Arrowtooth flounder brings to the surimi game an intriguing set of problems and peculiarities. Probably most peculiar is its characteristic myosin degradation, which makes arrowtooth muscle tissue get squishy when it's cooked. You have to add enzyme inhibitors to the gel to prevent that proteolytic activity. Dr. Wasson identified a blend of powdered beef plasma and egg white as a suitable inhibitor. She added this blend to the finished surimi, and also tried using different levels of each ingredient alone.

Another difference between pollock and arrowtooth surimi is that arrowtooth surimi produces globules of fat during washing. This can be skimmed off the top of the wash tank.

One significant difference between the two lies in yields. Arrowtooth flounder yields, measured,

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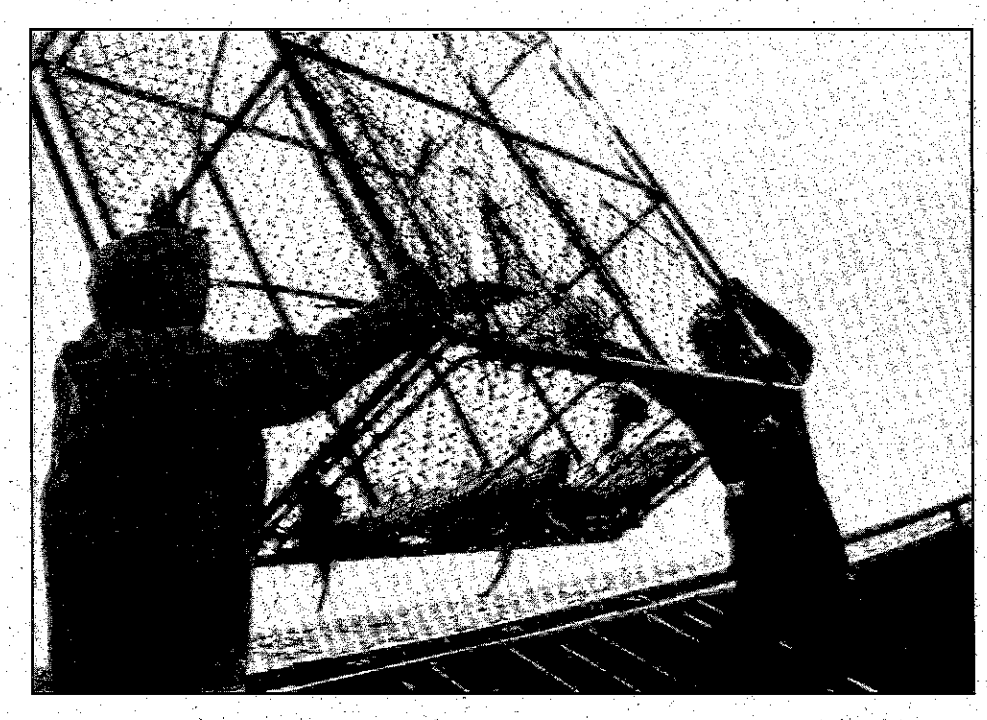

Pot fishing for cod in the Gulf of Alaska

Getting potted for cod

COD POT FISHING HAS BEEN CALLED ONE OF THE CLEANEST FISHERIES IN THE NORTH PACIFIC. NOW IT'S EVEN CLEANER: WITH A FEW SIMPLE POT MODIFICATIONS, FISHERMEN CAN BOOST COD HARVESTS AND STILL CATCH FEWER HALIBUT THAN A TEXAS TOURIST IN IZOD WEAR.

Final results from an Alaska Department of Fish & Game (ADFG) study show that, by adding fish retention devices to a traditional pot and dividing the pot opening into several small openings, fishermen can significantly increase cod catch while avoiding halibut. ADFG conducted the study for AFDF, under a project funded by the Alaska Science and Technology Foundation.

Pot cod fishing only started in Alaska in 1985. In 1988, pot fishermen caught more than 3 million lbs. of cod in the Gulf of Alaska. Harvests dropped to around 1 million lbs. in 1989, but shot up last year, when a small group of fishermen landed 13 million lbs. of pot-caught cod.

"With this project, we wanted to gain some ground truth about pot cod fishing," said AFDF executive director Mel Monsen. "Our primary goal was to see if halibut bycatch could be diminished using different kinds of gear modifications, without having a detrimental effect on cod harvests. Our secondary goal was to see if gear modifications could actually increase cod catches."

The ADFG team, led by biologist Tom Dinnocenzo, worked off a 78-foot crabber out of Kodiak with 24 Tanner crab pots measuring 6' x 6' x 3', each demonstrating a different design. The team studied three different fish retention devices—the Gotya, the Neptune cod trigger, and the Norsol cod sock—in combination with four sizes of tunnel eye openings and two different orientations of tunnel eyes. Reorientation of the tunnel eyes to a vertical angle from the pot itself, rather than the standard oblique angle, seemed to make it easier for cod to enter the pot; the retention devices, particularly the Gotya and the Neptune trigger, worked to keep them in once they were there.

The tunnel openings were also divided into two, three and five openings to see if smaller openings would discourage halibut from entering the pots. Each of the 24 different pots was soaked repeatedly in nine different locations in the Gulf of Alaska. Soak time was limited to less than 24 hours to reduce damage to the halibut from sand fleas or predation.

Results:

1. Pots with fish retention dividers and the 8 x 7" tunnel openings caught the most cod.
2. Pots using the Gotya and the Neptune trigger caught more cod than those using the Norsol cod sock. However, there are many possible variables for attaching the cod sock; it's not necessarily inferior.

By Krys Holmes

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Arrowtooth flounder surimi: Deepwater potential

between round weight and fillets, averaged 38.8%, compared to pollock yields of 28% round-to-fillet. The benefit of higher yields, though, may be outweighed by the disadvantage of the arrowtooth's size — many of them are too big to fit through the Baader 175 flatfish filleting machine.

Dr. Wasson charted changes in the material throughout three months of cold storage, and found some unexpected activity in the gel strength department. Arrowtooth surimi maintains a pretty good gel strength over time. (Gels mixed with plasma powder increased from 700-800 grams/cm.; surimi mixed with egg white stayed at about 720-740 gm/cm; surimi mixed with both dropped from about 930 to 750 gm/cm. after three months.) But gel strength is made up of two factors, punch force (rigidity) and punch deflection (elasticity). In three months, arrowtooth surimi lost elasticity but gained rigidity.

"All surimis tend to lose elasticity with time," Wasson said. "Most kamaboko makers know that. We were surprised, though, to find an increase in punch force — in rigidity."

Using results only from this test, Wasson is reluctant to predict how analog makers would receive arrowtooth surimi.

"I can say arrowtooth surimi does appear to be less elastic than pollock surimi," she said. "That could be a function of species or of processing time involved — we need to find out why. From what we produced, you couldn't make the top-grade kamaboko that's produced on a little wooden board. It's not elastic enough for that. But for crab analogs, for scallops, shrimp and lobster, it's certainly fine."

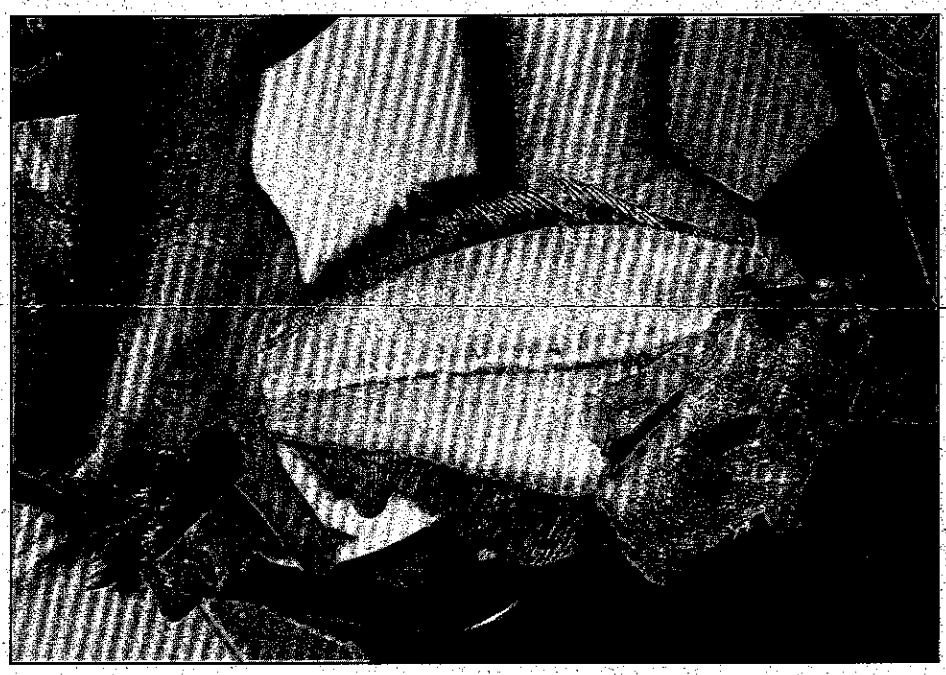
Arrowtooth surimi may not replace pollock surimi in the analog market. Wasson's results suggest it could work best as a blend with pollock surimi in analogs. When three-month-old arrowtooth surimi was compared to pollock surimi just a few weeks old, the arrowtooth surimi scored higher in punch force and lower in punch deflection than pollock surimi. However, when the two surimis were mixed (75% pollock surimi/25% arrowtooth surimi) the resulting gel strength scores matched those of all-pollock surimi.

"This would suggest that adding arrowtooth surimi at 25% of the total surimi in an analog formula would not appreciably affect the functionality of the batter," Wasson reported. "Since most analog formulas also include additional egg white and various starches, even the small differences observed would probably be obscured by the gel effects of the additional ingredients."

Adding 25% arrowtooth surimi to a batch of pollock surimi could be a good idea for producers in the future, Wasson speculated. Not only could arrowtooth increase the surimi supply and help balance pollock surimi's gel strength fluctuations, but it might help improve the whiteness of the overall surimi. Wasson discovered, conducting L*a*b* chromaticity tests, that uncooked arrowtooth surimi without additives was "distinctly whiter than uncooked pollock surimi."

There were other differences and similarities between arrowtooth and pollock surimi, which are outlined in Wasson's final project report to AFDF. Probably the most significant finding was that, when Wasson conducted an informal taste test of surimi-based crab analogs made from arrowtooth surimi, pollock surimi, and from a 75/25 blend of both, the results were very encouraging for arrowtooth.

"Most panelists couldn't distinguish any differences in odor, texture and flavor among the three different samples," Wasson reported.



High yields and a bountiful supply: will arrowtooth flounder be the next surimi source? Skinned fillet yields averaged 37% to 38% (above). At right, a white, high-quality surimi press cake made from Alaskan arrowtooth.

Where do we go from here?

"Of all the people I've talked to, no one seemed put off or reluctant to use arrowtooth surimi because it's a new and different species," Wasson said. "The big question most potential users have is, will this just be a flash in the pan? What are the potential bycatch problems? How much production can we depend on? How long would the fishing season last?"

For most flatfish fishermen, arrowtooth flounder is itself a bycatch. In the Gulf of Alaska, where the catch limit is 20,000 metric tons but up to 340,000 m. tons could be harvested without denting the resource, fishermen throw back the arrowtooth they catch — and in a lot of cases it's more than half their tow. No one knows what bycatch problems might attach themselves to a directed arrowtooth fishery, though; there's never been one.

Despite the potential new market for arrowtooth surimi, shore-based and at-sea processors might resist turning their attention to arrowtooth. They'd have to add flatfish filleting equipment to their lines and even if they did, about 15% of the arrowtooth harvested are too big for the Baader 175 filleters, and would have to be hand-cut.

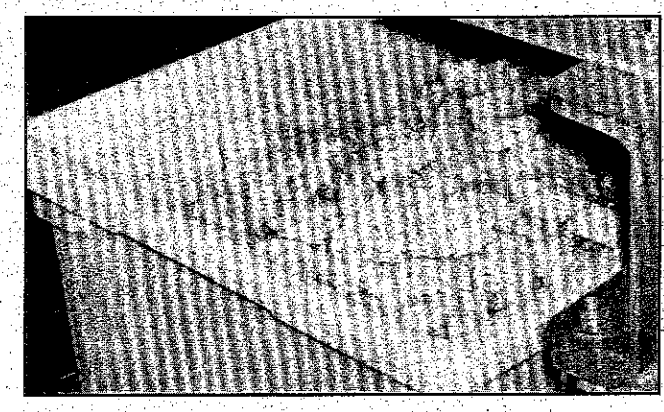
"The big bombers aren't that good for surimi anyway," said Wasson. "There's generally more protease activity in them. In fact, protease activity varies a great deal from fish to fish. We haven't had a chance to try to characterize it in the lab yet. It could be that you couldn't use the really big arrowtooth for surimi. But half the reason people want to make arrowtooth into surimi is to decrease the waste (of the big fish)," she said.

AFDF hopes to address at least a few of the unanswered arrowtooth questions in an upcoming project for which the Foundation has requested Saltonstall-Kennedy funding. If funded, efforts would begin in the fall to study bycatch rates affecting the arrowtooth fishery, size distribution and availability of the fish, fillet and surimi processing obstacles, and potential marketability of arrowtooth surimi.

For a copy of the arrowtooth flounder surimi project final report, send $7.00 ($12 foreign) to AFDF and request "Commercial Utilization of Arrowtooth Flounder: Final Report."

The Arrowtooth surimi project was funded by Alaska Science & Technology Foundation. Thanks for cooperation from All Alaskan Seafoods, Alaska Pacific Seafoods, the Alaska Draggers Association and the F/V Dusk.

Dr. Diana Wasson received a Fulbright Fellowship to study flathead sole and arrowtooth flounder in Japan for six months, beginning in March 1992. Congratulations are extended to Dr. Wasson on this prestigious award.



Cod pots

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3. Pots with fish retention devices and 7 x 8" tunnel eye openings caught slightly fewer halibut than those without.

4. Fish retention devices appeared to help reduce halibut catches in pots with openings smaller than 8 x 11.5". The team concluded that the fish retainers actually contributed to halibut avoidance in pots with smaller openings.

5. Without adding a fish retaining device, there appeared to be no benefit to reducing the size of the tunnel opening smaller than 8 x 11.5".

6. Nearly all halibut caught in the pots was in excellent condition when returned to the sea.

7. Few tanner crab were caught in the pots, so no crab bycatch information came out of this study. For Tanner bycatch information, the study would have to be repeated in another area or at a time when Tanners are around.

For copies of the pot cod study final report, contact AFDF and ask for "Modifying Crab Pots to Harvest Cod and Reduce Bycatch." Price: $7.00 ($12 foreign). For more information on the project, call Mel Monsen at AFDF, (907) 276-7315

The pot cod study was funded by the Alaska Science & Technology Foundation.

AFDF MEMBERS ONLY

Baader North America
Bringing out new filleters

Rumor on the waterfront is that Baader North America will introduce this year a Baader 212 pollock filleter that gives 5% higher yields than the 182, faster throughput at 150 fish/min., and it automatically removes pollock roe. Baader has tested the 212 in the Soviet Union for two years, and reports that it works well on shore and at sea. The 212 takes two people to operate, is about the same size as the 182 in the filleting section, and its heading section is 1.1 meter longer. Report has it the 212 will be available in December. Some rumors say the whole first production run has sold out already. No confirmation from Baader was available at press time.

Baader also has replaced the old 99 salmon filleter with a Baader 200, which can efficiently fillet cod as well as salmon. The 99 salmon filleter processed 20-22 fish/minute, but the new machine reportedly handles 27 fish/minute, is much easier to adjust, provides higher yeilds and takes an hour to convert from salmon to cod.

For information: Bob Slade, Baader North America, 1553 NW Ballard Way, Seattle, WA 98199. Phone (206) 783-9750; fax (206) 783-9775.

Lumetech Ltd.
Ventures west

Lumetech Ltd. of Denmark recently signed an agency contract with Carnitech US, Inc. of Seattle and Dutch Harbor, to introduce Lumetech products to the U.S. West Coast. Lumetech manufactures automated visioning equipment including automatic trimming machines for fish fillets and fish bone detectors. Lumetech participated in AFDF's parasite detection technology demonstration project.

Information: Claus Eskildsen, Carnitech U.S., Inc. (206) 781-1827. Or Gerner Hoppe, Lumetech Ltd., Strandvejen 50, DK-2900 Hellerup, Denmark.

Louis Kemp Seafoods
Take a lobster to lunch

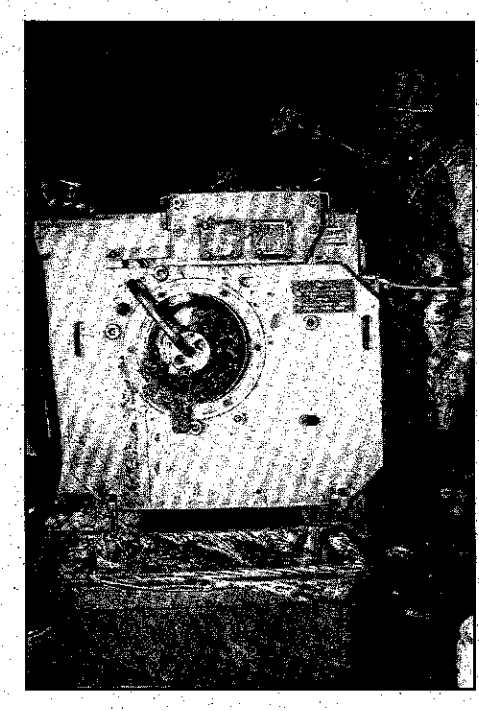
You can, with Louis Kemp's new 3-oz. single-serving refrigerated Lobster Delights and Crab Delights. They're small, microwaveable, and come with a fork and dipping sauce. They're part of the company's New Singles line that targets the convenience-for-lunch bunch.

Information: Roland Chambers, Louis Kemp Seafoods Co., Division of Oscar Mayer Foods, P.O. Box 16147, Duluth, MN 55816. Phone: (218) 728-4425.

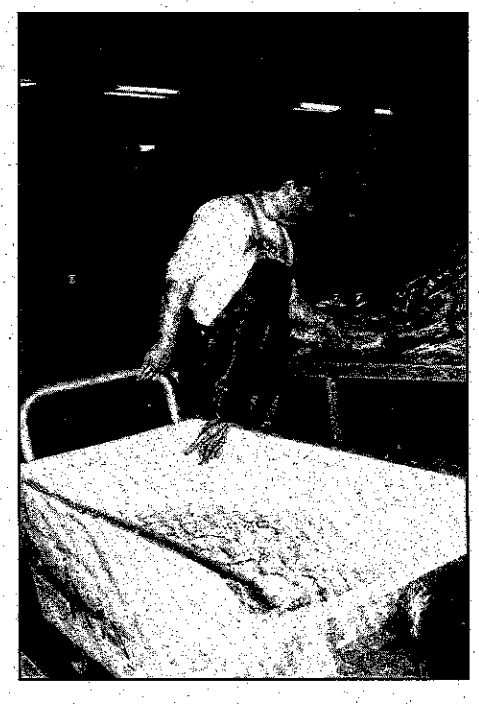
Sea Resources Engineering
New journal of aquatic foods

Dr. George Pigott — AFDF board member, director of the Institute for Food Science and Technology at University of Washington, and president of Sea Resources Engineering — is editor of the new Journal of Aquatic Food Product Technology, which will be launched this summer. The journal targets international scientific information on aquatic food products, and will publish research papers, short communications and reviews relating to all aspects of research, development, production and distribution of marine and aquatic foods.

Manuscripts welcome. Write for instructions: Dr. George Pigott, Journal of Aquatic Food Product Technology, Institute of Food Science & Technology, School of Fisheries, HF-10, College of Ocean & Fisheries Sciences, Univ. of Washington, Seattle WA 98195.



Can you make money from cod frames?



Cod have a lot more to offer than you might think. An AFDF project team went after a load of cod frames in April, and came up with a new raw material that might add profits to cod processing.

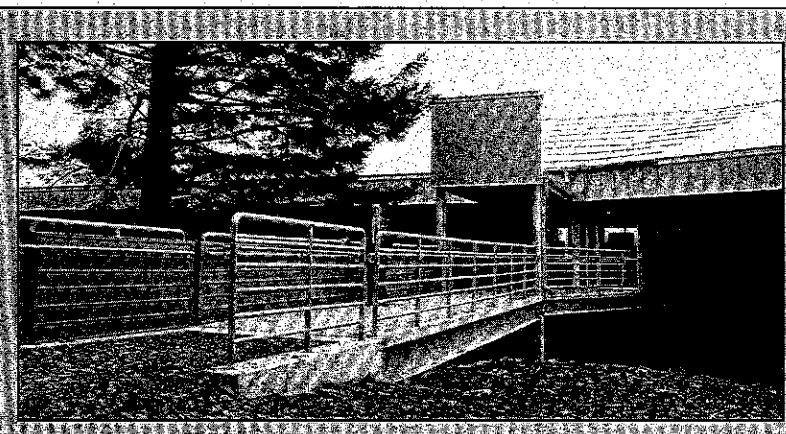
Cod frames off a commercial filleting line were washed by hand and deboned on a Baader 695 CTM. Above, Rae McFarland of Diamond Stainless operates the 695. The resulting frame mince was mixed and blended in a Diamond Stainless MFP mixer and four recipes of mince were set up for quality evaluation and a sampling program: cod trim mince, frame mince with and without antioxidant; a 90%/10% blend of cod trim and frame mince; and a 75%/25% blend.

The team minced 405 lbs. of frames, ranging between 11 and 18 oz. each, and recovered 47% to 50% of that weight in mince. The 100% frame mince showed a high number of minor blood and skin defects, but the product improved when blended with trim mince. Above right, Steve Clark of Network Seafoods compares a tote of trim mince to bagged samples of frame mince.

Initial results: Recovery of frame meat could increase cod processing yields 7-10% overall. Though frame meat alone may not be marketable, a blend of frame and trim mince may have some market appeal. Shelf life studies and quality evaluations continue this summer.

Similar non-fillet meat recovery was attempted on Dover sole, which first appeared a likely candidate for profitable mince recovery. However, in this test at least, the Dover sole mince was too watery and produced an inferior product.

This project was conducted with cooperation from All Alaskan Seafoods, Alaska Pacific Seafoods, Diamond Stainless, and Network Seafoods. For more information, contact T.J. Lukshin, AFDF project manager.

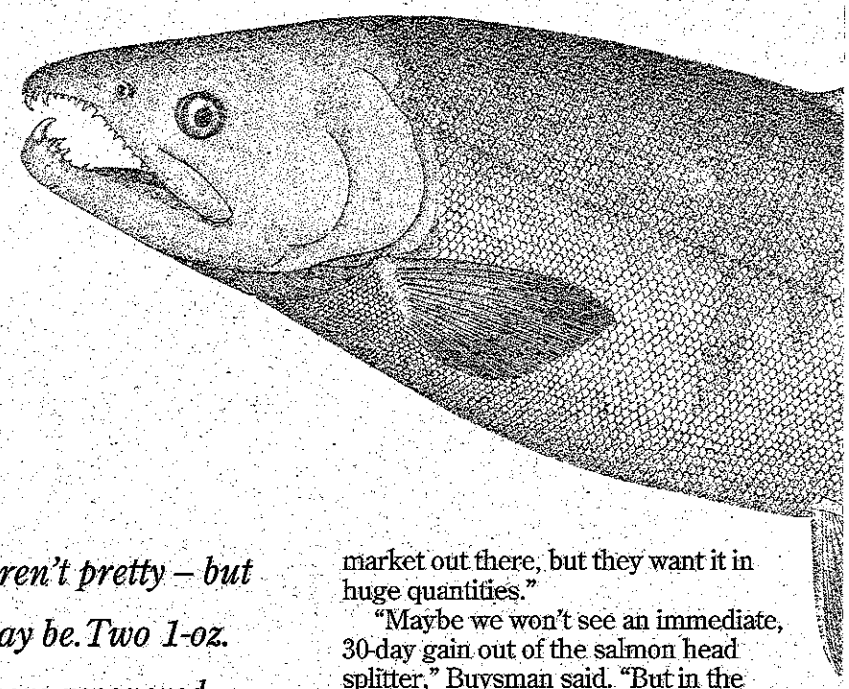


New labs and offices for FITC

Dr. Jong Lee stands before the new Alfred A. Owen Building, home of the University of Alaska Fisheries Industrial Technology Center. The new building offers the Alaska seafood industry food engineering, chemistry, biochemistry and microbiology labs, pilot plant, tasting kitchen, lecture and conference rooms. Some of the equipment at FITC was acquired during AFDF demonstration projects. FITC provides education and training, administrative support and R&D information to the seafood industry.

Get an edge in the salmon market:

Use your head



You think having all your relatives up for the summer is a strain? Rumor has it 148 million members of the pink and red salmon family are ganging up offshore, ready to jam the streams and estuaries of the North Pacific shoreline in the great salmon roundup of '91. Where can Alaska's salmon canners find high ground in the face of this tidal wave of fish? How can they gain an edge in an overstuffed market?

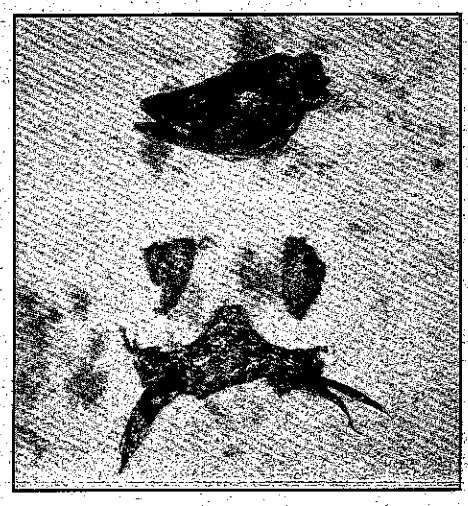
The way to get an edge is to increase yields, says Larus Asgeirsson of Icepro KVIKK. Reduce waste, cut processing costs, and get more profit from the fish you buy. Asgeirsson is offering Alaska's canneries a no-risk way to give his yield-booster a try.

Icepro's KVIKK 210 is a salmon head splitter modeled after the cod head splitter, which has been recovering an additional 10% - 13% of meat from cod fillet lines for the past five years. The salmon head splitter works in two phases: first, it cuts the neck meat from the back of the salmon head, which yields two 1-oz. chunks of high-quality meat. Next, it splits the head at the cheeks, recovering the collar meat left behind by the cutting machines Alaska's canners have been using since about 1910.

KVIKK estimates their head splitter can increase salmon processing yields by 1.5% to 3% and split 50 to 120 heads per minute. Even at a 2% yield increase, the head splitter could add 13 million lbs. of usable flesh to Alaska's salmon production — at little extra cost to the processor. (If 3% yields are reached, it could add 19 million lbs.) At $1.50/lb., widespread use of salmon head splitters could boostcanneries' income by $13 million to $27 million this year.

"The canneries are already paying for the fish," Asgeirsson said. "Our head splitter allows them to maximize the value of the fish they've purchased. Canneries would have less waste to ship off to the rendering plant, or out to sea for dumping."

In Kodiak, canneries pay $16/ton to haul salmon heads to the reduction plant. This year, 20 million pinks and sockeyes are expected to return to Kodiak; at that rate, local canners will pay about $26,000 to haul off 1,636 tons of salmon heads. A head splitter in each plant could save Kodiak's packers $3,000 in waste trucking costs alone.



Results aren't pretty – but profits may be. Two 1-oz. chunks were recovered off a split pollock head using the KVIKK 210 salmon head splitter. Could be processors can use the 210 for both salmon and pollock.

Incentives: higher profits, no risk

"This year isn't the best time to introduce this machine," Asgeirsson said. "Canneries are already wondering what they're going to do with the surplus of pink salmon. But people have to look ahead. In the lean years, like 1988 was, this machine will become very valuable."

Salmon canneries aren't known for their innovative changes. To encourage plant managers to try out the new machine this year, Icepro KVIKK is offering to install a salmon head splitter under a lease agreement, and to let the machine pay for itself in production.

"People asked us to come up with a salmon head splitter, after they saw the cod head splitting machine work so well," he said. "At that time we were seeing a decline in salmon production. We know the industry wants this machine — we just wish they would try it out this year. If it will give a plant that competitive edge during a high production year, just think of what it could mean in a low production year."

Using the meat

The skinless, boneless salmon meat recovered off the head splitting machine turns into free "patch material" added to underweight cans. It can also be minced and sold to secondary processors. The neck meat comes off in 1-oz. chunks usable in teriyaki, stir-fry or value-added products. At 13 million lbs., there should be enough salmon mince and chunk meat to serve the high-volume demands of U.S. secondary processors, according to Howard Buysman, who sells equipment for value-added processing.

"I think the best use for the salmon head meat would be to pack it in skinless, boneless cans, which sell for $2.60/lb. on an average year," Buysman said. As owner of Alaska Butcher Supply in Anchorage, Buysman has pioneered product development in minced salmon products including sausages, jerky and pizza toppings. He's also produced thousands of pounds of sausage combining beef, pork or reindeer meat with surimi or minced fish, much of it for AFDF projects or demonstrations.

"If you can pay 20 cents for a fish, which is what they're talking this year, and turn that neck and collar meat into a $2.60 product — while reducing your processing waste — in a way that isn't labor-intensive and doesn't cost much money, you're a winner," Buysman said. "If we can get every cannery in Alaska to utilize every ounce of fish, maybe we could get some big mince contracts. One large food company wants salmon mince in a second, but they want 3 million lbs. of it. It's a huge market out there, but they want it in huge quantities."

"Maybe we won't see an immediate, 30-day gain out of the salmon head splitter," Buysman said. "But in the long run, it's something we absolutely should be doing."

Splitting pollock heads

On April 19, Asgeirsson and the folks at North Pacific Processors in Cordova tested the KVIKK salmon head splitter on a short run of pollock heads. In their small-scale test, they recovered 0.4 lbs. of usable meat from each head. The day after testing the pollock heads, Asgeirsson was excited about the possibilities.

"With minor adjustments to the machine—just a replacement of parts—it's possible that a plant could use the head splitter on both salmon and pollock," he said. "We've only done one test. Now we have to wait until pollock fishing begins again in June to run another test.

"We cannot say for sure that it will work," he said. "I can only say that from our initial tests it looks like the salmon head splitter will recover a significant amount of meat from pollock heads, and we hope to prove that it's so when pollock fishing resumes again in June."

For more information about the KVIKK salmon head splitter call:

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Icepro KVIKK
Pittsburgh, PA
(412) 825-0335
Fax (412) 825-4336

or

Howard Buysman
Alaska Butcher Supply
Icepro KVIKK dealer
Anchorage, Alaska
(907) 258-7502
Fax (907) 258-7503

Chinooks eat like kings on new feed made of salmon heads

For the past month or so, twenty thousand chinook salmon have dined like kings on a special diet made of hydrolyzed pink salmon heads.

They're just the latest in a parade of people, pigs and fish to discover the potential wonders of hydrolyzed fish protein.

The chinook salmon feed trials are part of AFDF's hydrolyzer project, which investigated production, product development and market development for hydrolyzed fish protein and oil. The project will help processors reduce waste and expand their marketable product forms.

So far, feed trials have been conducted on weanling pigs, chinook salmon and pink salmon. The piglet feed trial results were published earlier in The Lodestar. Tutka Bay Hatchery in Kachemak Bay conducted the pink salmon feed trial, and will compile their results by the end of June.

The chinook feed trial, conducted at the University of Washington using feed samples custom-made by Moore Clark, compared growth rates of chinook fry fed hydrolyzer-based protein to the growth of 20,000 salmon fry fed a standard OMP IV diet. So far, results show two trends: First, the chinook go after the new feed like puppies after chow. This is good. Second, the chinook fed on hydrolyzed salmon head protein did not grow as fast as those fed traditional feed.

"I wouldn't exactly classify this as bad news," said Dr. William Hershberger, professor at the University of Washington School of Fisheries. "The differences in growth between the two diets are not statistically significant. Getting the fish to grow is a lot easier problem to solve than getting the fish to eat the food if they don't like it."

Results suggested the feed made from hydrolyzed salmon heads was not as protein-efficient as traditional feed. Over the first month, fish in the first two raceways (on the standard diet) clocked a food efficiency ratio of 0.93 and 0.90, respectively; the third and fourth raceways (hydrolyzer diet) realized a 0.84 and 0.79 food efficiency ratio.

"I would like to see the food efficiency ratio higher (for the hydrolyzer formula)," Hershberger said. "But we're only talking about a difference of a few hundredths of grams per fish. You multiply that over several million fish and it's a lot. But the average difference per fish is very small."

The hydrolyzed material was produced under less than ideal conditions. AFDF project manager Loretta Lure maintains that the tests were intended show the potential of hydrolysis applications more than the actual nutritive value of the fish feed.

"So many variables influenced the hydrolysis project that we can't take too seriously the specific results of the feed trials as an indicator of product potential," said Lure. "The important thing is that we have demonstrated hydrolyzing technology, appropriate for small plants, that produces a high-quality product usable in many applications."

One attribute of fish feed made from hydrolyzed fish protein is that it's rich in fish oil. Feeds traditionally are made from meal, from which the oil has been separated. Oil is later added during pelleting, but usually it's not the high-quality oil naturally present in the fish.

"It could be that one of the reasons the fish really liked this hydrolyzer diet was the presence of oils," Lure said. "The hydrolyzer product contains very high-quality oils."

If hydrolysis produces an environmentally safe feed formula and could be made available to hatcheries for processing the carcasses of their returning spawners, it might help hatcheries as well. If so, hydrolyzed protein and refined fish oils could enhance the hatcheries' incomes in low-run years, and also help deal with increasingly restrictive Environmental Protection Agency rules against dumping carcasses.

No answers, plenty of leads

AFDF's hydrolysis project took on a lot of unanswered questions when it began two years ago. AFDF studied various species as raw materials for hydrolysis processing, limped through the equipment setup process with AHS, developer of the hydrolyzer, then analyzed and refined various finished materials, investigated the problems involved in turning the product into fish and animal feeds, and now faces the task of interpreting feed trial results.

"The problem is that there are so many variables that could affect the product by the time it gets to feed trials," Lure said. "The performance of those feed samples is not as important as the fact that we've demonstrated that hydrolyzed fish protein is usable in this area. What fish processors are asking us to figure out is, what equipment is available? What products can be made? Are there markets for them?"

Hydrolysis, Lure said, could open many doors for small and large fish processors, for hatcheries, for feed manufacturers and buyers of fish oil.

"The markets seem very ready for a product like hydrolyzed protein," she said. "You have to know your product. The better you can describe what you have (to potential buyers), the more business you'll get. And believe me, there's plenty of business out there to be had."

For more information:

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AFDF
(907) 276-3319

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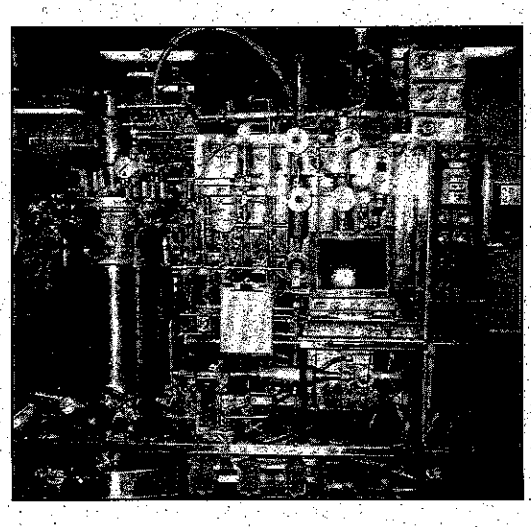
Hydrolyzer Demonstration Project Final Report ($10 U.S./$15 foreign)

Feeding Salmon Protein Hydrolysate to Weaning Pigs ($5 U.S./$7 foreign)

Hatcheries could benefit twice from fish hydrolysis: as a source for new feeds, and as technology develops, a potential processing option for salmon carcasses. Photo by Bart Watson, taken at DIPAC in Juneau.

Waste turns to wampum at International Seafoods



International Seafoods of Alaska, in Kodiak, will host and test a fish by-product processing system as part of AFDF's current by-product utilization project.

The system, supplied by the Bio-Proteus Corporation of Reading, Pennsylvania, uses hydrolysis and other processing techniques to reduce any type of fish waste into valuable products — including soluble protein (powder) and oil. Bio-Proteus will install the equipment this summer and International Seafoods will operate it. Then AFDF will test the product as an ingredient in fish and other animal feeds; samples will also be available to interested users. Information: Call Loretta Lure at AFDF.

Director's Log

The North Pacific in 2000: The making of a bad dream?

By Mel Monsen
AFDF Executive Director

The year is 2000. The commercial fishing industry of Alaska lies in shambles. Billions of dollars in investments and loans for shore-based processing, harvesting and factory trawlers have been lost or sacrificed to the banks. Buyers scramble for product in a super-competitive world market. Major international firms with substantive holdings in the North Pacific seafood industry have collapsed as a result of losing seafood supplies. Prices for cod, pollock, surimi, halibut and sablefish are skyrocketing, supplies are sporadic, and consumers are switching to chicken, beef and pork in droves.

Here's how this nightmare scenario happened:

First, the cod fishery shut down due to a declining biomass and high halibut bycatches. Then the pollock fishery collapsed after the biomass was overharvested by unrestricted fishing in the non-regulated Donut Hole in the Central Bering Sea. Halibut and sablefish fisheries were severely cut because of drastically low recruitment of young fish into the fishery. Many believed the depletion was caused by high bycatches. In the target fisheries, the biomass was substantially reduced from discards of undersized fish, which made up increasing percentages of the harvest.

Some blamed the stock crashes on the lack of accurate and detailed survey information of Alaska's fish stocks—which led to the overestimates of fish populations. Processors who were still able to manage with reduced production were shut down anyway because of new, tougher waste disposal regulations and—here's something new—actual constant monitoring and enforcement of those regulations.

Other fisheries were closed because of declining marine mammal populations, and the concern that declining food fish populations would threaten sensitive marine mammal species. Finally, no options were left for the industry, and it died a painful death.

What was amiss? Why did this happen?

The truth is, this scenario is all too realistic. This can happen in the next decade. What can we do now to ensure it doesn't? Not much ... just make some investments in the future. In my view, the industry should focus its energy and financial support toward four crucial areas:

1. We must upgrade our basic biological and ecosystem dynamics information to gain a working knowledge of our fish stocks and the influences that affect them. If the fisheries management programs in any other area of the U.S. pivoted on the shallow data base we now use in Alaska, the public would not stand for it. We now conduct comprehensive groundfish surveys in the Gulf of Alaska and the Bering Sea every three years (some limited species-specific surveys are conducted annually). Can you imagine the outcry if the entire East Coast and Gulf of Mexico fisheries were managed according to one 90-day trawl survey conducted every three years? Our lack of knowledge seems even more acute when you consider that Alaska produces almost 50% of the entire U.S. seafood production by weight.

2. We must increase our research and development efforts to improve existing harvesting technology. With vessel-specific penalties for high bycatch rates on the horizon, we have the opportunity to develop direct incentives for cleaning up our fisheries. Unfortunately, we lack any actual data on how to target better and avoid bycatch in real Alaskan conditions. We must also come to understand the impact of harvesting high volume species on pre-recruit and non-target species. We must also research gear options that will address harvesting problems.

3. The industry must commit to improving our processing methods to reduce waste flow. Many of our groundfish resources now are filleted—with a 20% recovery. The remaining 80% either gets ground up and discharged or sent to the traditional meal and oil plant. This means that some Alaska seafood processing plants dispose of more than 600,000 pounds of seafood waste per day during pollock season.

Developing methods to improve recoveries—by improving effectiveness of our technology and by making valuable products from current waste materials—could significantly boost yields of food-grade product from our current harvest. In addition, we should pursue possible improvements in production of animal-grade products from materials now wasted. Eventually, the waste from the seafood industry could be nearly eliminated.

4. We must direct research and development toward expanding the seafood industry's opportunities beyond the traditional species. Vast resources of squid, arrowtooth flounder, capelin and snails inhabit the waters off Alaska. These resources have been harvested in the past, but are not currently in the marketing system, either because other opportunities are more profitable or because of some unsolved problem with the species itself (consider the arrowtooth flounder before its enzyme inhibitor was identified). Once the traditional species are limited, and the industry has time and desperation on its hands, we'll be in dire need of the basic research and development information to initiate these fisheries. If the information is not available when the need arises, the opportunity will be lost. Just ten years ago, the Alaska king crab industry wrung its hands and the fleet stood idle until a pollock surimi industry could blossom up to take its place. But no pollock surimi industry could start in the U.S. until several critical steps were taken, including production of basic research and development information.

Biological information and industry-supported research and development are the industry's most crucial tools for surviving and thriving in the future. For the North Pacific seafood industry there will be no future without substantial financial and philosophical commitments toward research and development.

"Once the traditional species are limited, and the industry has time and desperation on its hands, we'll be in dire need of the basic research and development information to initiate new fisheries."

Get involved in your future

The Board of Directors of AFDF and its 91 members encourage every business and organization in the North Pacific to take a more aggressive role in shaping the industry's future. Invest intelligently in the future of our fisheries by contributing to the Alaska Fisheries Development Foundation's endowment fund. With a target endowment of $25 million, AFDF can fund industry directed research and development that will help turn future problems into profitable opportunities.

The seafood industry can't depend on federal programs for fund development research — or to keep up with the industry's quickly changing needs.

For information about AFDF's endowment fund, and about how you can take an active role in guiding its focus in the future, please call Executive Director Mel Monsen at (907) 276-7315.

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Off the Cuff

"Perhaps it is only because we come from fish that we are able to fly."
– Brian Curtis "The Life Story of the Fish"

By Krys Holmes
Lodestar Editor

Brian Curtis, an upstanding biologist of the 1940s, believed humans inherited their sense of equilibrium from the utriculus and inner ear canal of our ancestors, the fish. Biologists since Curtis have not fallen all over themselves attempting to prove him wrong.

I've been thinking about equilibrium, about maintaining balance in the North Pacific fisheries while all our landmarks are shifting and visibility is dim. About IFQs for sablefish and bycatch caps for halibut and restrictions on rockfish fishing to preserve king salmon. About how we don't have the mechanical sophistication to target one fish we really want — arrowtooth flounder, just for example — without incidentally catching another species we don't want — say, halibut. So we sit on shore scratching our heads over 148 million salmon headed our way, which we can fish, and we do want, but we don't know what to do with them all.

In April, the North Pacific Fishery Management Council voted to encourage National Marine Fisheries Service to consider establishing a moratorium for entry into all groundfish fisheries — with an eye toward a comprehensive IFQ program. This is the strongest statement the Council has ever made in support of IFQs.

It's clear why some fishermen and processors in Alaska oppose any limited entry system. The Gulf of Alaska is a food web, not a shopping center. Fishermen want to be able to take their boats out fishing, sell what they bring back, and give their kids an opportunity to do the same thing when their day comes.

I'm not going to settle any arguments for or against IFQs here. But something I read recently caught my eye, and I outline it here because it suggests the possibility that the fishing industry can approach its problems wrought by overcapitalization, gear conflicts, bycatch and resource depletion with some creativity. I read that in Iceland, the International Salmon Quota Committee has purchased the entire Faroese salmon IFQ of 550 tons/year. The $2.1 million price tag will be paid by the Norwegians and Icelanders over a period of three years — and the Norwegians and Icelanders are not going to use a pound of the IFQ. They purchased the right to fish those salmon for the purpose of not fishing them, to help increase the Atlantic salmon runs into Icelandic and Norwegian rivers.

This is an example of the free market giving rise to creative solutions that benefit both sides of the table. If Alaska had IFQ systems for every one of its fisheries, including salmon, the sportfishing interests could buy up a certain amount of the commercial-catch IFQs and not fish them, effectively adding that much more salmon to the run that hits their shores.

A closer look at the asking price for those 550 tons of salmon reveals that the Faroese sold their salmon fishing rights for about $1.73/lb. Basically, they were selling off future profits from the fishery, not the ex-vessel value, and presumably the $2.1 million will be turned into some vessel buy-back program that will benefit the 26 fishing vessel owners, and their crew, who will no longer be fishing high seas Atlantic salmon. This move benefits Iceland and Norway enough that they're willing to split the cost themselves. Imagine coming up with a program to decrease Alaska's trawl or longline fleet by 26 boats. The only way we could do so, under the Olympic system, would be to put a lot of people out of business. Looks like the Icelanders came up with a better way.

I'm not here to re-hash the IFQ vs. the free-for-all debate. I simply bring this example forward to illustrate that a sensible fishery management system could allow our fishermen flexibility, an opportunity to operate in the free market system, and some measure of control over their own destiny.

The 24-hour May halibut opening killed three people in the Western Gulf of Alaska. We like to think our Olympic system of fishery management gives fishermen freedom and flexibility to make their own decisions about what they catch. But I don't believe it does. I don't believe that, given a choice, most people would have been out in rough water working 24 hours straight, trying to load their entire season's worth of halibut into their boat at once. Given flexibility and a hand in a portion of the free market, given an IFQ that holds value on the market and that represents a fisherman's vested interest in the fishery resource, I think the owners of Alaska's noble longliners and stalwart trawlers could create for themselves a more sensible future than any possible under the current system.

Cut the utriculus on a fish and he'll learn to maintain his equilibrium in the water using vision alone. I believe the North Pacific seafood industry is out of balance — tipped one way by overcapitalization, another by a technological backwardness that results in appalling waste in our fisheries. We need to rely on our vision, on our ability to see beyond this season's pink run, or next month's P&L statement. Right now the whole industry is like one of those overloaded halibut skiffs racing through a giant fish competition in the dark. We need, at least, to have a clear view of shore.

From the fish's point of view, the water is a big bubbled lense through which he sees an expanded view of the shoreline around him, in a 360° circle. As we make decisions about our future, about how we will relate to each other and to the ocean from which we suck our living, we need to have a vision at least as broad as the fish have.

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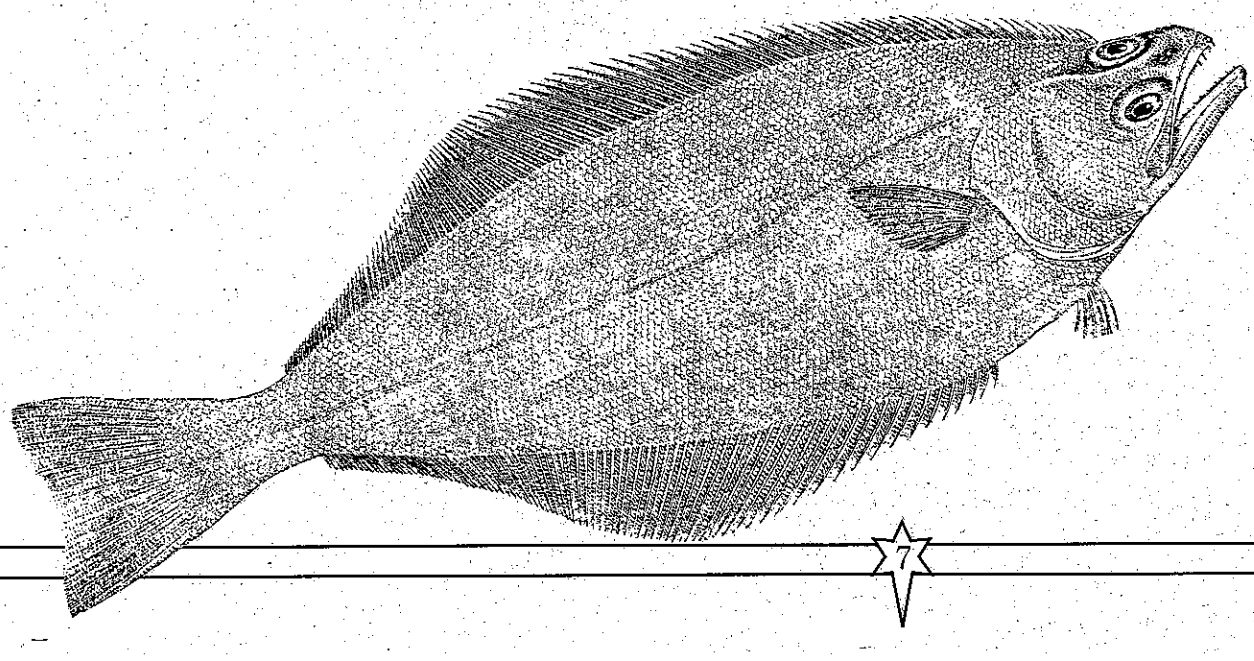

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INDUSTRY News

Surimi made from beef: hard to get the red out

University of Illinois researchers have made surimi from ground beef which, they say, makes a stronger gel, is more temperature stable and can be frozen without cryoprotectants. They didn't try making finished products, but researcher Jan Novakofski said he bet beef surimi would make a better crab leg than fish surimi. An interesting note: in working with beef surimi, the research team noted some myosin degradation due to enzyme activity during cooking, as is also seen in arrowtooth flounder.

Real surimi: ground beef of the seafood case

On the other hand, Supermarket News recently called surimi the ground beef of the seafood case, citing three main reasons consumers love surimi-based products: attractive pricing, versatility of the product, and convenience. One food chain alone moves more than 7,000 lbs. a week of surimi products.

Dutch Harbor largest US port

Dutch Harbor, Alaska was the largest U.S. fishing port in 1990 in fish landings (total: 509.9 million lbs.) The port of Dutch Harbor sees an average of 139 vessels per day, 96 of them fishing vessels. Crabbers make up 52.1% of their fishing traffic; local trawlers 20.8%, factory trawlers 11.5%, longliners 10.4% and catcher/processors 5.2%.

Microbial hazards of seafood consumption

You'd better learn about them before your customers do. For a start, read an article with that title in the December 1990 issue of Food Technology, written by John Liston of the University of Washington, Institute for Food Science and Technology, HF-10, 3707 Brooklyn Ave NE, Seattle WA 98195.

Another good Food Tech read is "Carbohydrates as Cryoprotectants for Meats and Surimi," written by surimi guru Dr. Tyre Lanier and Grant A. MacDonald, both of the Food Science Dept., North Carolina State University, Raleigh, NC 27695. Their article appeared in Food Technology in March 1991.

Donut Hole running dry?

Pollock catches were so low in the international waters of the Donut Hole last winter most of the Japanese boats went home. The fishery, which peaks between October and March, normally provides 100 tons/day to the Japanese fleet. But daily catches averaged only 15 tons last winter, and by mid-December most of the boats had returned to port. According to the Minato Shinbun, Japanese fishing companies are concerned that vessels from other countries may be contributing to depletion of the Donut Hole resource. The Fisheries Agency of Japan encouraged rapid formulation of an international resource management regime.

Western Alaska should unite to save Bering Sea

Bering Sea costal communities should work together to protect the bering Sea ecosystem, according to Larry Merculieff, city manager of St. Paul. Merculieff called on Bering Sea communities in April encouraging residents to "use our knowledge to redirect how everything we depend on is being managed by overspecialized scientific systems." Merculieff hopes to form a coalition of Bering Sea communities to share information on seals, sea lions, birds and marine life.

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New publications from AFDF.

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Modifying Crab Pots to Harvest Cod - by David Carlile, Tom Dinnocenzo, and Leslie Watson, ADFG. Crab pot modifications that aid cod harvests and decrease halibut bycatch. A concise report with 15 illustrations and graphs. (See story, Page 1.) $7 ($12 foreign)

Hydrolyzer Demonstration Project Final Report - Narrative of AFDF's hydrolyzer project, including experimental production at North Pacific Processors and at Ketchikan Seafoods. $10 ($15 foreign)

Making Profits out of Seafood Wastes - Proceedings from the April 1990 International Byproducts Conference, Anchorage, Alaska, sponsored by AFDF. Proceedings published by Alaska Sea Grant. $10 ($20 foreign)

Commercial Utilization of Arrowtooth Flounder - by Dr. Diana Wasson, NMFS. Results from the year-long study of arrowtooth flounder surimi, its production, analysis and comparison with pollock surimi. (See story, Page 1.) $7 ($12 foreign)

Reflagging judgement may cut boats from factory fleet

A federal district court ruling that tightened some loopholes in the 1987 Anti-Reflagging Act has sent some two dozen factory trawler vessels scuttling for cover. Judge John Garrett Penn's April 30 decision struck down the Coast Guard's interpretation of the Act that had allowed fishing vessels rebuilt in foreign shipyards before July 1987 to be reflagged as U.S. ships, even if ownership transferred to foreign hands. Penn's decision stated, "It is clear Congress never intended to permit the grandfather clauses to attach to the vessels themselves because it would permit the transfer of the grandfathered vessels to non-citizen-controlled owners. Permitting such a result effectively obliterates the primary purpose of the Anti-Reflagging Act, circumvents the plain meaning of the statute, and thwarts Congress' intent."

Between 15 and 35 factory ships now operating in the U.S. EEZ might lose their fishing permits if the decision stands. The Anti-Reflagging Act was designed to restrict foreign ownership of U.S. fishing and processing vessels, to make sure it's the fishery — not the fleet — that became "Americanized" during the 1980s, and to encourage business for U.S. shipyards during the North Pacific's bottomfish boom.

the LODESTAR
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Alaska Fisheries Development Foundation, Inc.
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"What we lack, really, isn't science but poetry that reveals what the heart is ready to recognize."
– Joseph Campbell

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