



UNIVERSITY OF NORTH CAROLINA SEA GRANT PROGRAM NEWSLETTER

MAY, 1976

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Making the most of our bounty from the sea



Mrs. Emma Avery makes no bones about it. In her work she deliberately fools people and she's proud of it.

Mrs. Avery is tricky. You have to watch her or the first thing you know, you'll be munching away on some nice stuffed clams or pizza or meatloaf or sausage, only to find out that she's tricked you into eating something that's more "fish flakes" than clam or meat.

"We fool people in our work," she says. "We mix different seafoods together and kind of camouflage the one that we're using the most of." Like "crab cakes" are more fish flake than expensive crab. "We think we're eating all-crab cakes."

(See "Seafood Lab," page 2)

Seafood Lab looks at glazing, flakin

(Continued from page 1)

And Mrs. Avery isn't the only person to watch out for. There's a bunch of them—called Nutrition Leaders—who meet every month at the UNC Sea Grant Seafood Laboratory in Morehead City to come up with more and better ways to use often unpopular, wasted and cheaper fish as well as stretch more expensive seafoods. The fish flakes are something the group cooks up to get more mileage out of fish.

"We're always experimenting," says Mrs. Avery. As a result, she's learned "that I could eat fish in many different ways." She's passed that information on to the club she represents.

Problem is, while North Carolina fishermen bring in about 3 percent of the nation's catch, they get about 1 percent of the national value. And besides, a lot of fish is wasted in culling and processing.

So, part of the Seafood Lab's work is to boost the market and help industry as well as the consumer. The idea is to help fish processors market a better product and put unpopular, wasted seafoods to work.

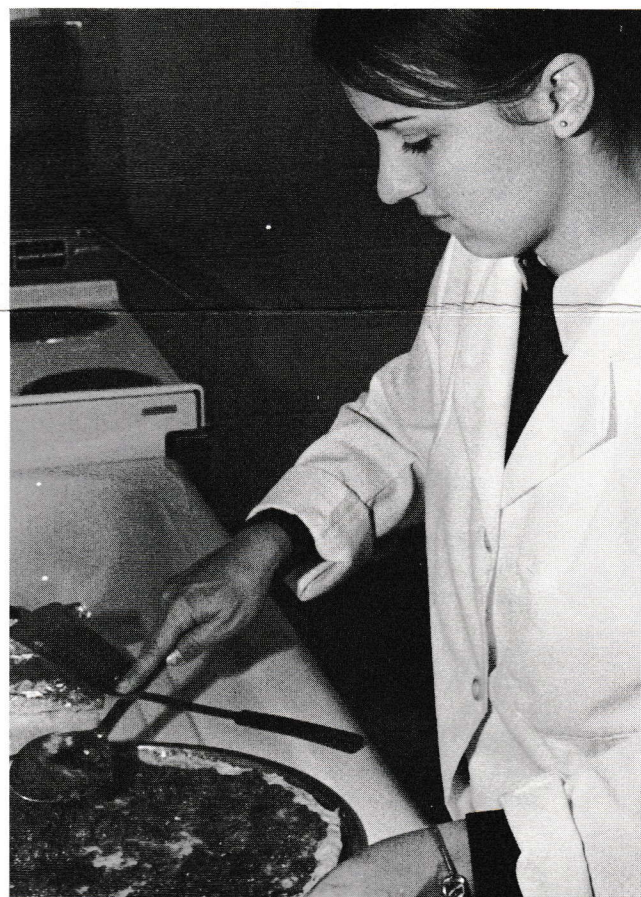
The folks at the lab are always coming up with things that make for better seafood, whether it's a method of glazing to lock in flavors or smoking to add more flavor or a recipe to use a new product—such as the fish flakes.

But their work has to start long before that at the crucial point when the fish is taken from the water where deterioration can set in. To help fishermen and handlers take better care of fish, Ted Miller, Food Science Extension Specialist at the Seafood Lab, will be looking into improved ways to get the fish iced as quickly as possible.

That's because Seafood Lab studies show that proper handling extends shelf-life markedly. And that's also why the folks at the Seafood Lab have worked extensively with processors to streamline and speed up their operations. The idea, Miller explains, is "to keep it clean, keep it cool and keep it moving."

And to get the product from dock to market, the Seafood Lab is working with the Cryovac Division, W.R. Grace and Company, in cooperative tests of packaging. The tests involve using a shrinkable bag that molds itself to the contour of the fish and locks out air.

The University of North Carolina Sea Grant Program Newsletter is published monthly by the University of North Carolina Sea Grant Program, 1235 Burlington Laboratories, Yarborough Drive, North Carolina State University, Raleigh, N.C. 27607. Vol. 3, No. 5, May, 1976. Dr. B. J. Copeland, director. Karen Jurgensen, editor. Second-class postage paid at Raleigh, N.C. 27611.



Pizza topped with a seafood sauce promises to offer a good way to use "trash" fish.

The lab is also studying processes and new products. Like Mrs. Avery and her home-cooked flaked fish, extensive work has also been done with mechanical deboning of fish for commercial use.

And, so far, studies on the effects of freezing on seafood indicate that consumers are as happy with properly handled frozen fish as with fresh. Recently, with Sea Grant's help North Carolina processors have been branching out into more frozen fish, Miller says.

The work in handling, freezing and packaging is part of an attempt to help processors take advantage of potential products and extend seasonal variety—to enable them to handle and sell croaker when there is no flounder, for example.

The Seafood Lab is looking for ways to use the variety of fish readily available in North Carolina waters, but not welcome on Tar Heel tables.

One study involves examining the physical properties of the relatively unpopular croaker during freezing. The study is also intended to establish

g, icing, and more

uniform standards for measuring consumer preferences.

But croaker is getting more of a workout than that. The Nutrition Leaders—Mrs. Avery and 11 other women who represent various Carteret County clubs and serve as the Seafood Lab's link between scientists and consumers—have snuck croaker into a nutritious pizza using the flaking method. The process is to steam just about any bony, unpopular fish (head and all) to get just about all the meat off the bones and then use it in anything from the pizza sauce to meatloaf to salad. The idea is to camouflage the fish, as Mrs. Avery says, but also to make fish more manageable, stretch more expensive seafoods and meats and get more protein per food dollar.

The same principle applies to similar work the women have done with such species as shad, a once popular bony fish that's fallen into disrepute; and such unknowns as cobia and amberjack, which are frequently discarded by sportfishermen (who are, by the way, estimated to get more than 25 percent of the state's catch).

Some hints from the Seafood Lab on getting the most out of that fish:

—It isn't necessary to gut small- to medium-sized fish before freezing in plastic wrap. In fact, fish frozen "in the round" and then partially thawed is much easier to dress.

—Whenever possible, use the glaze recipe on page 5 to lock in flavors and lock out air.

—And quick chill and superchill (p. 5) to protect your catch from deterioration.

—To thaw small- to medium-sized fish frozen whole and enhance the flavor, soak it in a solution of 5 Tsp. of salt and one quart of water for about 30 minutes. Thaw fillets the same way in about 15 minutes. In either case, no further salting is necessary.

—In deciding how to cook a fish that's been frozen, remember that freezing doesn't seem to affect taste but it does affect texture.

—If you use a microwave oven, remember that fish will require less liquid and butter. Also, a uniform thickness helps. The microwave is good for sauce dishes and thawing, the Seafood Lab has found, but won't give crispness.

Waste Not, Want Not

Waste not, want not, the saying goes. And whoever first said it could have been thinking of flaked fish. The UNC Sea Grant Seafood Lab's method of steaming and flaking can be used on just about any fish. And when it's done, there isn't much left for the trash except the bones.

To flake fish and make fish broth:

1. Get a fish that's been scaled, headed and gutted. Keep the heads, removing only the gills. Be sure the body cavity has been completely cleared of membrane and blood streak.

2. In a large pot, melt $\frac{1}{4}$ stick of butter and saute for 10 minutes pieces of carrot, onion, celery tops, a bay leaf, garlic and spices to taste.

3. Then add fish and heads on top of vegetables. Add enough water to half submerge the fish, cover and boil for about 40 minutes. Then remove the fish.

4. Allow fish to cool, scrape off skin, shake meat from backbone.

5. Fish flakes, now ready to use in pizza sauce, meatloaf, salad, crab cakes or what-have-you, should be checked for small bones.

6. To finish the broth for chowder, sauces and other dishes, return backbones and skin to pot. Cover and continue cooking for $\frac{1}{2}$ hour. Use a potato masher to squeeze broth from solids. Discard the solids and pour liquid into a saucepan. Reduce volume from $\frac{1}{2}$ to $\frac{1}{3}$, cool in refrigerator until broth congeals.

7. Remove solid fat layer from top and unsightly material from bottom. And the broth is ready for use or storage.

NOTE: For flakes in a hurry and no fancy broth, steam fish in water only.

Try some of these fish flake and broth recipes:

Chowder

- 1½ cups fish flakes
- 1½ cups clams chopped
- 6 medium white potatoes, diced
- 5 cups water
- 6 Tbsp. melted margarine
- 1 medium onion, diced
- salt and pepper to taste
- 1 cup fish broth

Combine fish flakes, clams, potatoes, water, margarine and onion. Bring to boiling point. Add salt, pepper and fish broth. Cook until potatoes are done. (Clams will get tough if over-cooked.)



Crab-Fish Imperial

- 2 cups toasted bread crumbs
(prepared from sliced white bread
toasted dark)
- 2 eggs
- 3 Tbsp. mayonnaise
- 2 Tbsp. Worcestershire sauce
- 1 small onion, minced
- juice of ½ lemon with scraping from
rind
- 1 stick margarine, melted
- ½ Tsp. parsley
- salt and pepper to taste
- 1 cup fish flakes
- 1 cup crab meat
- paprika
- 1 cup fish broth
- 20 crab cases

Wash and boil the crab cases. Toast bread and place in blender until ground fine. Mix, in a large bowl, bread crumbs, eggs, mayonnaise, Worcestershire sauce, grated onion, lemon juice, margarine, parsley, salt and pepper. Mix in crab meat, fish flakes and fish broth. Stuff mixture into crab cases. Sprinkle with paprika and bake in 250° oven for 25-30 minutes or until slightly browned on top.



Stuffed Clam

- 2 cups toasted bread crumbs
- 2 eggs
- 3 Tbsp. mayonnaise
- 2 Tbsp. Worcestershire sauce
- 1 small onion, grated
- juice of ½ lemon with scraping from
rind
- 1½ cups of fish flakes
- 1 cup fish broth
- 1 stick margarine, melted
- ½ Tsp. parsley
- salt and pepper to taste
- paprika
- 10 ounces of minced clams (reserve
liquid)
- 20 hard clam shells—about 4" in
diameter

Wash and boil 20 hard clam shells. Toast bread and place in blender until ground fine. Mix, in a large bowl, bread crumbs, eggs, mayonnaise, Worcestershire sauce, grated onion, lemon juice, margarine, parsley and pepper. Add clams, fish flakes and fish broth to mixture. Use liquid drained from clams to adjust the consistency to something resembling bread dough. Stuff mixture into clam shells. Sprinkle with paprika. Bake in 350° oven for 25-30 minutes or until slightly browned on top.



To keep that fish tasting good, keep it c-c-cold . . .

Sea Grant researchers have found that proper chilling and icing can allow a fisherman to hold his catch up to seven days without loss of quality.

First, quick chill that fish the moment it's caught:

- Take along a tub and some crushed ice.
- In the tub, pour sea water over the ice, creating a slush.
- Drop fish into the slush for about one-half hour.
- Remove fish from slush and smother in crushed ice until the end of the day. Fish may be whole or gutted when iced.

Then, at day's end, superchill fish:

- Line the bottom of an insulated ice chest with about 4 inches of crushed ice. Leave the bottom drain open.
- In another container, make a salt-ice mixture, using 1 pound of coarse ice cream salt with each 20 pounds of crushed ice.
- Arrange the fish in layers in the ice chest, generously covering each layer of fish with a salt-ice mixture.
- Always keep the lid securely on cooler.

If salt is not available, crushed ice alone will do, but fish will maintain quality for only two or three days.

Whole fish may be superchilled in direct contact with salt-ice mixture. But if you plan to superchill fillets, steaks or dressed fish, first protect them by wrapping in a clear, plastic film before arranging in layers in the chest.

. . . and glaze it to lock in flavors

The UNC Sea Grant folks at the Seafood Lab and the Nutrition Leaders have found that dipping fish in a glaze before freezing makes the fish last longer and protects the flavor.

Nutrition Leader Emma Avery explains, "It forms a seal over the meat so the air doesn't get to the meat . . . that's what causes the frozen foods (to), we call it, get strong."

Sea Grant scientists recommend applying a dip solution to whole, dressed or filleted fish before wrapping for freezing. They say the solution helps keep fish tasting, smelling and looking fresh because it slows the interaction of oxygen with fish fats.

To make the solution, you'll need:

- 2 Tbsp. unflavored gelatin
- ½ cup lemon juice
- 3½ cups water

Stir gelatin into 1 cup cold water. Heat remaining water and lemon juice to near boiling. Stir cold gelatin mixture into hot liquid until it is almost clear. Cool the dip solution to about room temperature before use.

Dip and drain fish. Then wrap in Saran Wrap.* To wrap, tear off 12 to 18 inches of plastic. Lap plastic over sides, then ends.

Whole fish, if fairly small, may be arranged "sardine style." Fillets should be packed with meat side away from folds. If freezing on a small scale, researchers recommend placing packages, folds down, on a metal tray.

*This does not imply endorsement of a product on the part of the Seafood Lab.



Off the presses

Following is a list of new UNC Sea Grant publications. North Carolina residents may order one free copy of each publication by contacting the Sea Grant office.

Ecological determinants of coastal area management: Vol. I—An overview; Vol. II—Appendices. Brower, David. UNC-SG-76-05.

Estuarine shoreline erosion in the Albemarle-Pamlico region of N.C. Bellis, V., M.P. O'Connor and S. R. Riggs. UNC-SG-75-29.

Don't waste that fish: tips on taking care of your catch. Berg, D. R., T. M. Miller and F. B. Thomas. UNC-SG-75-23.

Aerial photography for planning and development in eastern North Carolina: a handbook and directory. Baker, Simon. UNC-SG-76-03.

Chemical control of *Lagenidium*, a fungal pathogen of marine crustacea. Bland, C. E. and D. G. Ruch. UNC-SG-76-02.



Septic tanks in crowded beach developments are posing problems for some coastal towns.

About all those fish stories . . .

The gettin' places for more seafood info:

For tips on taking care of your catch and a book on commercial packaging and glazing write UNC Sea Grant, Box 5001, Raleigh, North Carolina, 27607.

For fish flaking facts and recipes, pointers on shad deboning and mechanical deboning, write UNC Sea Grant Seafood Laboratory, P. O. Box 51, Morehead City, North Carolina, 28557.

Update: septic tanks

Last month we reported that the septic tank situation in coastal North Carolina is causing citizens as well as the Coastal Resources Commission concern.

The problem is that the soils and high water table along the coast make septic tanks a tricky business. More and more, septic tanks are becoming health hazards.

In response to the problem, UNC Sea Grant Director Dr. B.J. Copeland has announced a new research project.

Initially, researchers will look at alternatives to backyard septic tanks; septic tanks and other alternatives in different types of coastal soils; and assess the current situation on the barrier islands.

It's hoped that the work will spell out what is and isn't viable in the way of backyard sewage disposal.

Collaborating on the project are: Dr. Bobby Carlile and Dr. Larry D. King (NCSU- Soil Science) and Dr. Mark Sobsey (UNC-CH- Environmental Science and Engineering).

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