

# Proximate Composition and Fatty Acid and Cholesterol Content of 22 Species of Northwest Atlantic Finfish

Judith Krzynowek  
Jenny Murphy  
Richard S. Maney  
Laurie J. Panunzio

---

## NOAA TECHNICAL REPORT NMFS

The major responsibilities of the National Marine Fisheries Service (NMFS) are to monitor and assess the abundance and geographic distribution of fishery resources, to understand and predict fluctuations in the quantity and distribution of these resources, and to establish levels for their optimum use. NMFS is also charged with the development and implementation of policies for managing national fishing grounds, development and enforcement of domestic fisheries regulations, surveillance of foreign fishing off United States coastal waters, and the development and enforcement of international fishery agreements and policies. NMFS also assists the fishing industry through marketing service and economic analysis programs, and mortgage insurance and vessel construction subsidies. It collects, analyzes, and publishes statistics on various phases of the industry.

The NOAA Technical Report NMFS series was established in 1983 to replace two subcategories of the Technical Reports series: "Special Scientific Report—Fisheries" and "Circular." The series contains the following types of reports: Scientific investigations that document long-term continuing programs of NMFS; intensive scientific reports on studies of restricted scope; papers on applied fishery problems; technical reports of general interest intended to aid conservation and management; reports that review in considerable detail and at a high technical level certain broad areas of research; and technical papers originating in economics studies and from management investigations. Since this is a formal series, all submitted papers receive peer review and those accepted receive professional editing before publication.

Copies of NOAA Technical Reports NMFS are available free in limited numbers to governmental agencies, both Federal and State. They are also available in exchange for other scientific and technical publications in the marine sciences. Individual copies may be obtained from: U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. Although the contents have not been copyrighted and may be reprinted entirely, reference to source is appreciated.

34. Additions to a revision of the shark genus *Carcharhinus*: Synonymy of *Aprionodon* and *Hypoprion*, and description of a new species of *Carcharhinus* (Carcharhinidae), by J. A. F. Garrick. November 1985, 26 p.
35. Synoptic review of the literature on the Southern oyster drill *Thais haemastoma floridana*, by Philip A. Butler. November 1985, 9 p.
36. An egg production method for estimating spawning biomass of pelagic fish: Application to the northern anchovy, *Engraulis mordax*, by Reuben Lasker (editor). December 1985, 99 p.
37. A histopathologic evaluation of gross lesions excised from commercially important North Atlantic marine fishes, by Robert A. Murchelano, Linda Despres-Patanjo, and John Ziskowski. March 1986, 14 p.
38. Fishery atlas of the northwestern Hawaiian Islands, by Richard N. Uchida and James H. Uchiyama (editors). September 1986, 142 p.
39. Survey of fish protective facilities at water withdrawal sites on the Snake and Columbia Rivers, by George A. Swan, Tommy G. Withrow, and Donn L. Park. April 1986, 34 p.
40. Potential impact of ocean thermal energy conversion (OTEC) on fisheries, by Edward P. Myers, Donald E. Hoss, Walter M. Matsumoto, David S. Peters, Michael P. Seki, Richard N. Uchida, John D. Ditmars, and Robert A. Paddock. June 1986, 33 p.
41. A stationary visual census technique for quantitatively assessing community structure of coral reef fishes, by James A. Bohnsack and Scott P. Bannerot. July 1986, 15 p.
42. Effects of temperature on the biology of the northern shrimp, *Pandalus borealis*, in the Gulf of Maine, by Spencer Apollonio, David K. Stevenson, and Earl E. Dunton, Jr. September 1986, 22 p.
43. Environment and resources of seamounts in the North Pacific, by Richard N. Uchida, Sigeiti Hayasi, and George W. Boehlert (editors). September 1986, 105 p.
44. Synopsis of biological data on the porgies, *Calamus arctifrons* and *C. proridens* (Pisces: Sparidae), by George H. Darcy. September 1986, 19 p.
45. Meristic variation in *Sebastes* (Scorpaenidae), with an analysis of character association and bilateral pattern and their significance in species separation, by Lo-chai Chen. September 1986, 17 p.
46. Distribution and relative abundance of pelagic nonsalmonid nekton off Oregon and Washington 1979-84, by Richard D. Brodeur and William G. Pearcy. December 1986, 85 p.
47. Reproduction, maturation, and seed production of cultured species: Proceedings of the twelfth U.S.-Japan meeting on aquaculture, Baton Rouge, Louisiana, October 25-29, 1983, by Carl J. Sindermann (editor). February 1987, 73 p.
48. Widow rockfish: Proceedings of a workshop, Tiburon, California, December 11-12, 1980, by William H. Lenarz and Donald R. Gunderson (editors). January 1987, 57 p.
49. Reproduction, movements, and population dynamics of the southern kingfish, *Menticirrhus americanus*, in the northwestern Gulf of Mexico, by Stephen M. Harding and Mark E. Chittenden, Jr. March 1987, 21 p.
50. Preparation of acetate peels of valves from the ocean quahog, *Arctica islandica*, for age determinations, by John W. Ropes. March 1987, 5 p.
51. Status, biology, and ecology of fur seals: Proceedings of an international workshop, Cambridge, England, 23-27 April 1984, by John P. Croxall and Roger L. Gentry (editors). June 1987, 212 p.
52. Limited access alternatives for the Pacific groundfish fishery, by Daniel D. Huppert (editor). May 1987, 45 p.
53. Ecology of east Florida sea turtles: Proceedings of the Cape Canaveral, Florida, sea turtle workshop, Miami, Florida, February 26-27, 1985, by Wayne N. Witzell (convener and editor). May 1987, 80 p.
54. Proximate and fatty acid composition of 40 southeastern U.S. finfish species, by Janet A. Gooch, Malcolm B. Hale, Thomas Brown, Jr., James C. Bonnet, Cheryl G. Brand, and Lloyd W. Reiger. June 1987, 23 p.
55. Proximate composition, energy, fatty acid, sodium, and cholesterol content of finfish, shellfish, and their products, by Judith Krzynowek and Jenny Murphy. July 1987, 53 p.
56. Some aspects of the ecology of the leatherback turtle *Dermochelys coriacea* at Laguna Jolova, Costa Rica, by Harold F. Hirth and Larry H. Ogren. July 1987, 14 p.
57. Food habits and dietary variability of pelagic nekton off Oregon and Washington, 1979-1984, by Richard D. Brodeur, Harriet V. Lorz, and William G. Pearcy. July 1987, 32 p.
58. Stock assessment of the Gulf menhaden, *Brevoortia patronus*, fishery, by Douglas S. Vaughan. September 1987, 18 p.
59. Atlantic menhaden, *Brevoortia tyrannus*, purse seine fishery, 1972-84, with a brief discussion of age and size composition of the landings, by Joseph W. Smith, William R. Nicholson, Douglas S. Vaughan, Donnie L. Dudley, and Ethel A. Hall. September 1987, 23 p.
60. Gulf menhaden, *Brevoortia patronus*, purse seine fishery, 1974-85, with a brief discussion of age and size composition of the landings, by Joseph W. Smith, Eldon J. Levi, Douglas S. Vaughan, and Ethen A. Hall. December 1987, 8 p.
61. Manual for starch gel electrophoresis: A method for the detection of genetic variation, by Paul B. Aebersold, Gary A. Winans, David J. Teel, George B. Milner, and Fred M. Utter. December 1987, 19 p.
62. Fishery publication index, 1980-85; Technical memorandum index, 1972-85, by Cynthia S. Martin, Shelley E. Arenas, Jacki A. Guffey, and Joni M. Packard. December 1987, 149 p.
63. Stock assessment of the Atlantic menhaden, *Brevoortia tyrannus*, fishery, by Douglas S. Vaughan and Joseph W. Smith. January 1988, 18 p.
64. Illustrated key to penaeoid shrimps of commerce in the Americas, by Isabel Pérez Farfante. April 1988, 32 p.
65. History of whaling in and near North Carolina, by Randall R. Reeves and Edward Mitchell. March 1988, 28 p.
66. Atlas and zoogeography of common fishes in the Bering Sea and northeastern Pacific, by M. James Allen and Gary B. Smith. April 1988, 151 p.

NOAA Technical Report NMFS 74

**Proximate Composition and Fatty  
Acid and Cholesterol Content of  
22 Species of Northwest  
Atlantic Finfish**

Judith Krzynowek  
Jenny Murphy  
Richard S. Maney  
Laurie J. Panunzio

May 1989



**U.S. DEPARTMENT OF COMMERCE**

Robert Mosbacher, Secretary

**National Oceanic and Atmospheric Administration**

William E. Evans, Under Secretary for Oceans and Atmosphere

**National Marine Fisheries Service**

James Brennan, Assistant Administrator for Fisheries

The National Marine Fisheries Service (NMFS) does not approve, recommend or endorse any proprietary product or proprietary material mentioned in this publication. No reference shall be made to NMFS, or to this publication furnished by NMFS, in any advertising or sales promotion which would indicate or imply that NMFS approves, recommends or endorses any proprietary product or proprietary material mentioned herein, or which has as its purpose an intent to cause directly or indirectly the advertised product to be used or purchased because of this NMFS publication.

# CONTENTS

---

Introduction	1
Materials and methods	2
Results and discussion	2
Citations	4
Appendix tables:	
American Plaice	9
Butterfish	10
Cod, Atlantic	11
Cusk	13
Flounder, Winter	14
Flounder, Yellowtail	15
Haddock	17
Hake, Red	18
Hake, Silver	20
Hake, White	22
Herring, Atlantic	23
Mackerel, Atlantic	25
Monkfish	26
Ocean Perch	27
Ocean Pout	28
Pollock	29
Skate, Thorny	30
Skate, Winter	31
Sole, Gray	32
Tuna, Bluefin	34
Tuna, Yellowfin	34
Wolffish, Atlantic	35



# Proximate Composition and Fatty Acid and Cholesterol Content of 22 Species of Northwest Atlantic Finfish

JUDITH KRZYNOWEK  
JENNY MURPHY  
RICHARD S. MANEY  
LAURIE J. PANUNZIO

Gloucester Laboratory  
Northeast Fisheries Center  
National Marine Fisheries Service, NOAA  
30 Emerson Avenue  
Gloucester, MA 01930

## ABSTRACT

The moisture, fat, ash, fatty acid profile, and cholesterol content are reported for cooked and raw fillets from 22 species of finfish found in the Northwest Atlantic. All but nine species had 1% or less fat. Ocean perch and a spring sampling of mackerel and wolffish had about 2% fat, followed by yellowfin tuna, whiting, silver hake, butterfish, and a summer sampling of mackerel and wolffish with a range of 3-7% fat. Herring had a range of 5-12% fat representing a winter sampling on the low end and summer sampling on the high end of the range. Bluefin tuna (a summer sampling) contained the most fat with a high of 23% fat. Omega-3 fatty acids were present in excess of omega-6 fatty acids. The fattier fish supplied the most omega-3 fatty acids per gram of tissue. The mean cholesterol content for all species was  $57 \pm 16$  mg/100 g raw tissue. Finfish from the Northwest Atlantic would appear to fit into the regime for a healthy heart, being low in fat and cholesterol and rich in omega-3 fatty acids.

## Introduction

The seafood industry has benefited from the increased emphasis on the role of human diet in the prevention and amelioration of certain diseases and the recent recommendation to substitute fish for meat twice weekly in the American diet (Proceedings of a Conference on Health Effects of Polyunsaturated Fatty Acids in Seafoods, June 1985, Wash., D.C.), and with good justification. Firstly, finfish are low in cholesterol. Two reports, "Cholesterol Treatment Recommendations for Adults" and "Expert Panel Report on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults" (available from National Cholesterol Education Program, National Heart, Lung and Blood Institute, C-200, Bethesda, MD 20892) state that modification in dietary cholesterol intake can, in many individuals, reduce blood cholesterol levels. Secondly, finfish "fat" is about 40% polyunsaturated, a factor which is also beneficial in the lowering of serum cholesterol levels. Thirdly, seafood is one of the richest sources of a group of polyunsaturated fatty acids called omega-3 ( $\omega$ 3) fatty acids. The principle omega-3 fatty acids found in seafood are eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Credit has been tentatively given to this group of omega-3 fatty acids for the low incidence of cardiovascular disease among populations of people that consume large amounts of seafood (Dyerberg 1982, Hirai et al. 1980, Kobayashi et al. 1981). Simopoulos et al. (1986), Lands, (1986), Kinsella (1987), and Nettleton (1985, 1987) have authored very readable books on the topic of seafood and its role in human health.

Concomitant with the heightened publicity concerning the health benefits derived from consumption of seafood is the responsibility of the health care community to provide dietary guidance for those people requiring special dietary needs. It is sometimes a difficult task to find sufficient dietary information about seafood, although the amount of reference information is becoming more extensive (Sidwell 1981, Exler 1987, Krzynowek and Murphy 1987, Gooch et al. 1987). Some of the species contained in this report have been cited in these references. Monkfish (*Lophius americanus*) was the only species duplicated both by the Gloucester and Charleston laboratories (Gooch et al. 1987) of the National Marine Fisheries Service. The species *L. americanus* has not been mentioned in the reference literature. Of the remaining 21 species, four have had no previous data given in the literature. They are white hake, thorny and winter skates, and grey sole. There are proximate composition data for American plaice (Sidwell 1981). There are also proximate composition data for blackback flounder, and fatty acid and proximate composition data for yellowtail flounder, and proximates and cholesterol for cusk (Krzynowek and Murphy 1987), but the last three species lack some of the information contained herein. Data on all the parameters are available for ocean pout (Exler 1987); however, EPA and DHA are conspicuous by their absence in the list of fatty acids.

This report, as does one by Gooch et al. (1987), stems from a national program, the Edibility Profile Study, which was primarily designed to define edibility (flavor and texture) characteristics of the finfish found within the regional waters of three of the National Marine Fisheries Service laboratories: Gloucester, MA; Charleston, SC; and Seattle, WA. Twenty-two species of finfish found in the Northwest Atlantic were included in the Edibility Profile Study for the Gloucester Laboratory. Five species were sampled only once during the year. Seventeen species were sampled twice or more, providing a broader seasonal representation. All samples collected for the Edibility Profile Study were analyzed raw and cooked for moisture, fat, ash, cholesterol, and fatty acids. It is this nutritional data that is contained in this report.

## Materials and methods

---

All fish were landed locally off "day boats" in Gloucester, MA, and were held on ice during transport to the laboratory. Therefore, all samples were provided not more than 24 hours after capture. All samples were identified as to species using taxonomic codes, and scientific names (American Fisheries Society 1980) were assigned. Enough fish to provide 24 taste test portions, approximately 5 × 5 cm, comprised the sampling. Therefore, the number of fish sampled for any one capture date ranged from two to ten. The fish were immediately skinned and filleted, a portion being retained as the raw sample. The fillets were placed in laminated Dazey Seal-A-Meal bags, Model 6007. Three slits, 1 cm in length, were sliced through the bottom of the bags to allow the cooking juices to drain. These bags were placed within Dazey Micro Seal bags, Model 6008, to insure that the fillets did not come in contact with the cooking water and to keep the drip from fouling the cooking water. The bags were placed in mesh metallic baskets and submersed in an agitated water bath maintained at 77°C. Thermocouples were placed in the centers of several fillets, and cooking was complete when the internal temperature registered 71°C. A taste test portion, one from each fish, of both the raw and cooked fillets was frozen at -20°C to await chemical analyses. Thawed portions were composited and homogenized in a Robot Coupe commercial food processor.

Moisture content was determined by drying approximately 10 g of sample to constant weight at 100°C. Total ash was determined by heating the dried moisture samples to constant weight at 525°C (AOAC 1980). Lipids were extracted by the method of Bligh and Dyer (1959). A portion of the chloroform (fat) layer was evaporated to dryness under nitrogen, and the residue was weighed to determine fat content. All the above determinations were made in duplicate. A rough estimate of protein content can be calculated by assuming percent carbohydrates to be negligible and subtracting the percentages of fat, moisture, and ash from 100%.

Cholesterol was determined in triplicate by direct saponification as described in Method C by Kovac et al. (1979).

Sterols were analyzed on a Hewlett Packard 5880A gas chromatograph equipped with a flame ionization detector. Sterols were separated on a glass column, 1.8 m × 2 mm (i.d.) packed with Gas Chrom Q, 80-100 mesh, coated with 3% SE-30. The column, injector, and detector temperatures were 245°C, 270°C, and 300°C, respectively. The carrier gas was helium flowing at 30 mL/min. Cholesterol was identified by comparison with retention times of an authenticated standard. Quantitative analyses were done by adding 5- $\alpha$  cholestane to each sample as an internal standard. The samples were run against a standard cholesterol curve, plotting the amount of cholesterol against peak area. Sample variation for cholesterol and lipid content in the raw product was tested for significance at  $p \leq 0.01$  using analysis of variance, and points of difference were detected by Duncan's (1955) multiple range test.

A second portion of the chloroform (fat-containing) layer from the Bligh and Dyer (1959) fat extraction procedure was evaporated to dryness under nitrogen, and the lipids were transesterified to their methyl esters by the method of Metcalfe and Schmitz (1961) and later modified by Metcalfe et al. (1966) using boron trifluoride in methanol. Separation of the fatty acid methyl esters (FAME) was done by capillary column gas chromatography. The wall coated open-tubular fused silica column measured 50 m × 0.22 mm (i.d.) and was coated with Carbowax 20M liquid phase. The Hewlett-Packard 5880A gas chromatograph was equipped with a flame ionization detector. Detector and injection port temperatures were 300°C and 270°C, respectively. The oven temperature was held constant at 195°C for 35 minutes and then was ramped to 210°C at 1°/min. The carrier and make-up gases were helium, operated at 2 cc/min and 30 cc/min, respectively. The split ratio was 1:100. Identification of the esters was made by comparison of retention times to those of available authentic standards.

## Results and discussion

---

Where possible, the format of the data presentation will follow that of its sister document from the Charleston Laboratory (Gooch et al. 1987) to facilitate species comparisons. The species are listed alphabetically by their common name, and both common and scientific names are included in Table 1. If there is more than one common name for any given species, the other names are included so that people may relate to those names most familiar to them. Data on cooked samples are provided for ease of menu planning, but the discussion section deals exclusively with the raw fish. Differences between the raw and cooked data can be accounted for by moisture loss.

Table 2 summarizes fat, moisture, ash, and cholesterol data for the 22 species. The "No. of Samples" column indicates the number of times the particular fish species was sampled over the course of one or two years of the Edibility Study. For species sampled once, the range is not applicable (NA).



Cholesterol ranged from 40 (silver hake) to 98 (ocean pout) mg/100 g raw tissue, with a mean of  $57 \pm 16$  mg/100 g at one standard deviation. The mean value of the standard deviations for all the samples was 2.6, guaranteeing more analytical precision than is called for considering the variability among fish (Dudek et al. 1981) and with seasonality. It has been our experience with the analyses of many species of finfish over many years that  $\pm 20\%$  of the mean for all the cholesterol values reported in the literature would give quite reliable dietary amounts for any given species. A quick check through the 22 species, even with the small seasonal sampling, shows that this observation holds true. For instance, ocean pout has a range of 63-98 mg/100 g with a mean of 80. Adding or subtracting 20% gives the range reported. This rule is invalid for mackerel which has a mean of 72 and a range of 49-95, but with the cholesterol values being so disparate throughout the literature, this observation and simple calculation (only for finfish) might prove helpful for dietary considerations.

A total of 50 samples were analyzed representing 22 species and their seasonal sampling. Table 3 arranges the 50 samples, raw data only, from lowest to highest in fat content, with the lower case letters denoting significant differences. It was felt that this table would enable rapid perusal for dietary decisions. Those samples with the same lower case letters are not significantly different from each other at  $p \leq 0.01$ . The standard deviation for each sample was omitted from the table to reduce confusion. The mean of the standard deviations of all the 50 samples was 0.17, and the standard error of this mean was 0.075.

All but nine species had 1% or less of fat, and all the samples less than 2% fat were not significantly different from each other in fat content. Lean fish, such as the 13 species at less than 2% fat, store fat in their livers and maintain fairly constant fat levels in the muscle tissue as basic cellular lipids. These lipids are primarily polar lipids (Ackman 1980). These species will not show marked seasonal variation in their fat content. For example, cod (0.6% fat) and haddock (0.5% fat) were sampled three times throughout the year—winter, spring, and fall—with no significant difference in their fat content.

The fattier fish, such as herring and mackerel, store excess fat in their muscle, mostly as triglycerides. Changes in food habits, as happens seasonally, are reflected in changes in their fat content. Herring had a fat content of 5% when caught in January when food is scarce, and 12% in July when food is plentiful. Mackerel were sampled in June (1.8% fat) and July (7.1% fat) and never reached the mean of 13.9% reported by Exler (1987). In an earlier paper, Exler et al. (1975) noted that the lowest fat content for mackerel (3.2%) occurred in early summer, and a high fat content (18.8%) was observed in late fall. Ackman and Eaton (1971) reported a spring low of about 2% fat for mackerel light meat and an October sample of about 10% fat. Unfortunately, there is only one sampling (August) of the finfish with the highest fat content (23%), bluefin tuna. Sidwell (1981) cites ranges of 0.5-25.0% fat for bluefin tuna.

The appendix pages following Table 3 contain the nutritional information and are arranged alphabetically by common name for the fish. For those species with multiple sampling dates, the earliest date of capture is listed first. The data for each raw sample are aligned down the left-hand side of the page, with the data from its cooked counterpart aligned down the right. Fat, moisture, ash, and cholesterol contents are listed at the top of the tables. Fatty acid data make up the bulk of the appendix.

The fatty acid shorthand used in the appendix tables denotes number of carbon atoms: number of double bonds, and  $\omega$  (omega) indicates placement of the first double bond from the methyl end of the fatty acid molecule. Eicosapentaenoic acid (EPA) is 20 carbons long with 5 double bonds, the first double bond occurring at the third carbon from the methyl end, thus giving it the shorthand notation of 20:5 $\omega$ 3. Docosahexaenoic acid (DHA) is 22:6 $\omega$ 3.

Fatty acids are reported both as percent of total fatty acid methyl esters (FAME) and as g/100 g of sample. The latter were calculated by the lipid conversion factor method described by Exler et al. (1975) and later revised and expanded by Weihrauch et al. (1977), substituting in the equation the actual amounts of sterols as analyzed in this laboratory for the default value of 0.05 g/100 g tissue. Phospholipids were assumed to be present at 0.6 g/100 g tissue.

The distinction made earlier (in the discussion of fat content) between polar lipids (lean fish) and triglycerides (fatty fish) becomes more important when we compare the two reporting methods for fatty acid content. Polar lipids are available at about 0.6 g/100 g of muscle in all finfish; in lean fish, this accounts for almost all the total lipids. The polar lipids contain proportionately greater amounts of EPA and DHA than do the triglycerides. Therefore, when we read down the column under “% FAME” for cod, for example, we see that EPA and DHA account for about 50% of all the fatty acids. The EPA and DHA in herring (12% fat) account for only 17% of total fatty acids. At first glance, it would appear that cod would provide more of the beneficial omega-3's than herring. However, per serving size of 100 g (about 3½ ounces), herring provides 2 g of EPA and DHA, as compared with 0.2 g available in cod muscle. The fatty acids available per 100 g of fish muscle is of greater value for health care professionals, since it can be related directly to serving size.

Stansby (1973) noted that bluefin tuna canned in brine contained six times more polyunsaturated fats than yellowfin tuna similarly canned, giving respective values of 1.2% polyunsaturates in the flesh versus 0.19%. Our data for the two species, cooked, also shows more polyunsaturated fats in bluefin tuna, at 4.1%, than in yellowfin, at 1.9%. The lower values reported by Stansby may be due to loss of oil in the discarded brine solution and/or to seasonal differences in fat content between his sample and ours. Also, recalling the discussion about the two reporting methods, bluefin tuna, as the fattier fish, would provide more polyunsaturates.

Bluefin, however, with its additional amount of polyunsaturates, accounts for less than 1% of the tuna canned as "light" tuna for the U.S. market (Pers. comm., Natl. Mar. Fish. Serv., Southwest Region, Statistics and Market News, Terminal Is., CA 90731). Yellowfin and skipjack tuna (0.27% polyunsaturates, Stansby 1973) make up the bulk of the "light" tuna that is canned for U.S. consumption.

Total amounts of omega-3 and omega-6 fatty acids have been calculated in anticipation of dietary guidelines for the optimal ratio for the ingestion of these two principal classes of fatty acids. The latter ( $\omega_6$ ) are primarily available from vegetable sources. It has been suggested (Lands 1986, Kinsella 1987, Kinsella et al. 1987) that the efficiency of  $\omega_3$  fatty acids in the prevention and amelioration of several diseases is dependent on the balance between  $\omega_3$  and  $\omega_6$  polyunsaturated fatty acids. Casual observation of the ratio of  $\omega_3:\omega_6$  (Table 3) in raw finfish showed that the ratio was fairly constant when correlated with species, but not with fat content. For example, in wolffish the ratios were 6.3:1 and 7.2:1 for fat contents of 2.1% and 5.3%, respectively. In herring, the ratios were 10.9:1 and 7.2:1 for fat contents of 12.2% and 5.2%, respectively, and the ratios for mackerel were 13.7:1 and 12.7:1 for fat contents of 7.0% and 1.8%, respectively. Pollock offered the highest ratio of  $\omega_3:\omega_6$  at about 18:1.

The large amounts of 22:1 $\omega_{13}$  + 22:1 $\omega_{11}$  (written 22:1 $\omega_{13}$  +  $\omega_{11}$  in the tables) found in herring (avg. 24%), mackerel (avg. 19%), and, to some extent, in butterfish (7%) may be explained by their feeding preference for copepods. Copepods contain fatty alcohols rich in 22:1 $\omega_{11}$  (Ackman 1980). The silver hake contains relatively large quantities of 22:1 $\omega_{13}$  +  $\omega_{11}$  (avg. 10%). Silver hake feed voraciously on herring, young mackerel, and butterfish, and probably deposit these fatty acids with their depot fats. Their close relative, the cod, has the same eating habits, but, as mentioned previously, does not store excess fat in its muscle. The phospholipids of fish generally do not contain more than trace amounts of these monoenes, and, since cod muscle fat is almost solely phospholipids, cod has only about 1% total of these monoenes. Other close cousins, the red and white hakes, also have only trace amounts of 22:1, but they have a marked preference for small crustacea, which do not provide large amounts of 22:1.

The information contained in this report is intended for use in menu planning by those individuals concerned with their overall health. Most fish are low in fat and have very little cholesterol. The fattier fish are still low in cholesterol and are an excellent source of omega-3 fatty acids. All finfish provide more of the omega-3 fatty acids than the omega-6 fatty acids and can help to bring the diet into a healthier balance of these two fatty acid groups. Work will be expanded to include more species, processing effects, seasonality, and vitamins and minerals.

## Citations

- Ackman, R.G.**  
1980 Fish Lipids, Part 1. *In* Connell, J. (ed.), *Advances in fish science and technology*, p. 86-103. Fishing News Book Ltd., London.
- Ackman, R.G., and C.A. Eaton**  
1971 Mackerel lipids and fatty acids. *Can. Inst. Food Technol. J.* 4(4):169-174.
- American Fisheries Society**  
1980 A list of common and scientific names of fishes, 4th ed. Spec. Publ. 12, Am. Fish. Soc., Bethesda, MD 20014.
- AOAC**  
1975 Official methods of analysis. Horowitz, W. (ed.), Assoc. Official Analytical Chemists, Wash., DC.
- Bligh, E.G., and W.J. Dyer**  
1959 A rapid method of total lipid extraction and purification. *Can. J. Biochem. Physiol.* 37:911-917.
- Dudek, J.A., S.C. Berman, B.A. Behl, E.R. Elkins, H.B. Chin, and R.P. Farrow**  
1981 Determination of effects of processing and cooking on the nutrient composition of selected seafoods. Final Report prepared for U.S. Dept. of Commerce, NOAA, Natl. Mar. Fish. Serv., 588 p.
- Duncan, D.B.**  
1955 New multiple range and multiple F tests. *Biometrics* 11:1-20.
- Dyerberg, J.**  
1982 Observations on populations in Greenland and Denmark. *In* Barlow, S.M., and M.E. Stansby (eds.), *Nutritional evaluation of long chain fatty acids in fish oils*, p. 245-261. Academic Press, London.
- Exler, J.**  
1987 Composition of foods: Finfish and shellfish products. *Agric. handbook* 8-15., U.S. Dep. Agric., Wash., D.C., 192 p.
- Exler, J., J.E. Kinsella, and B.K. Watt**  
1975 Lipids and fatty acids of important finfish: New data for nutrient tables. *J. Am. Oil Chem. Soc.* 52:154-159.
- Gooch, J.A. M.B. Hale, T. Brown, Jr., J.C. Bonnet, C.G. Brand, and L.W. Regier**  
1987 Proximate and fatty acid composition of 40 Southeastern U.S. finfish species. NOAA Tech. Rep. NMFS 54. Natl. Oceanic Atmos. Adm., Natl. Mar. Fish. Serv., Seattle, WA 98115, 23 p.
- Hirai, A., T. Hamazaki, T. Tenano, T. Nishikawa, Y. Yamura, A. Kumagai, and J. Sajiki**  
1980 Eicosapentaenoic acid and platelet function in Japanese. *Lancet* ii:1141
- Joseph, J.D.**  
1982. Lipid composition of marine and estuarine invertebrates. Part II: Mollusca. *Prog. Lipid Res.* 21:109-153.
- Kinsella, J.E.**  
1987 Seafoods and fish oils in human health and disease. Marcel Dekker, Inc., NY, 317 p.
- Kinsella, J.E., B. Lokesh, B. German, and J. Swanson**  
1987 Eicosanoid synthesis and membrane enzymes are affected by dietary fat level and ratio of polyunsaturated fatty acids. *In* Lands, W. (ed.), *Polyunsaturated fatty acids and eicosanoids*, p. 416-421. Am. Oil Chem. Soc., Champaign, IL. p. 416-421.
- Kobayashi, S., A. Hirai, T. Tenano, T. Hamazaki, Y. Tamura, and A. Kumagai**  
1981 Reduction in blood viscosity by eicosapentaenoic acid. *Lancet* ii:197.
- Kovak, M.P., W.E. Anderson, and R.G. Ackman**  
1979 A simple method for the determination of cholesterol and some plant sterols in fishery-based food products. *J. Food Sci.* 44:1299-1305.

**Krzynowek, J., and J. Murphy**

1987. Proximate composition, energy, fatty acid, sodium, and cholesterol content of finfish, shellfish, and their products. NOAA Tech. Rep. NMFS 55. Natl. Oceanic Atmos. Adm., Natl. Mar. Fish. Serv., Seattle, WA 98115, 53 p.

**Lands, W.E.M.**

1986 Fish and human health. Academic Press, NY, 170 p.

**Metcalfe, L.D., and A.A. Schmitz**

1961 The rapid preparation of fatty acid esters for gas chromatographic analysis. Anal. Chem. 33:363-364.

**Metcalfe, L.D., A.A. Schmitz, and J.R. Pelka**

1966 Rapid preparation of fatty acid esters from lipids for gas chromatographic analysis. Anal. Chem. 38:514-515.

**Nettleton, J.A.**

1985 Seafood nutrition. Osprey Books, NY, 280 p.

1987 Seafood and health. Osprey Books, NY, 234 p.

**Sidwell, V.D.**

1981 Chemical and nutritional composition of finfishes, whales, crustaceans, mollusks, and their products. NOAA Tech. Memo. NMFS F/SEC-11. Southeast Fish. Cent., Natl. Mar. Fish. Serv., NOAA, 75 Virginia Beach Dr., Miami, FL 33149, 432 p.

**Simopoulos, A.P., R.R. Kifer, and R.E. Martin**

1986 Health effects of polyunsaturated fatty acids in seafoods. Academic Press, NY, 473 p.

**Stansby, M.E.**

1973 Polyunsaturates and fat in fish flesh. J. Am. Diet. Assoc. 63:625-630.

**Weihrauch, J.L., L.P. Posati, B.A. Anderson, and J. Exler**

1977 Lipid conversion factors for calculating fatty acid contents of foods. J. Am. Oil Chem. Soc. 54:36-40.

**Table 1**

**Twenty-two species of finfish from the Northwest Atlantic. Nomenclature from American Fisheries Society (1980).**

American plaice (Dab)	<i>Hippoglossoides platessoides</i>
Butterfish	<i>Peprilus triacanthus</i>
Cod	<i>Gadus morhua</i>
Cusk	<i>Brosme brosme</i>
Flounder, Winter (Blackback)	<i>Pseudopleuronectes americanus</i>
Flounder, Yellowtail	<i>Limanda ferruginea</i>
Haddock	<i>Melanogrammus aeglefinus</i>
Hake, Red	<i>Urophycis chuss</i>
Hake, Silver (Whiting)	<i>Merluccius bilinearis</i>
Hake, White	<i>Urophycis tenuis</i>
Herring, Atlantic	<i>Clupea harengus harengus</i>
Mackerel, Atlantic	<i>Scomber scombrus</i>
Monkfish (Goosefish)	<i>Lophius americanus</i>
Perch, Ocean (Redfish)	<i>Sebastes fasciatus</i>
Pollock	<i>Pollachius virens</i>
Pout, Ocean	<i>Macrozoarces americanus</i>
Skate, Thorny	<i>Raja radiata</i>
Skate, Winter	<i>Raja ocellata</i>
Sole, Gray (Witch Flounder)	<i>Glyptocephalus cynoglossus</i>
Tuna, Bluefin	<i>Thunnus thynnus</i>
Tuna, Yellowfin	<i>Thunnus albacares</i>
Wolffish, Atlantic	<i>Anarhichas lupus</i>

**Table 2**

**Averages and ranges of seasonal sampling for cholesterol, ash, fat, and moisture for 22 species of finfish. NA = not applicable; n.d. = no data.**

Species	No. of samples <sup>1</sup>	Cholesterol (mg%) <sup>2</sup>	Ash	Fat (%)	Moisture
<b>American plaice (Dab)</b>					
Raw	3	45	1.3	0.8	81.3
		38-58	1.0-1.9	0.8-1.0	80.8-81.9
Cooked	3	49	1.3	1.0	78.6
		39-66	1.1-1.8	0.9-1.1	77.7-79.2
<b>Butterfish</b>					
Raw	1	69	0.85	3.6	77.2
		NA			
Cooked	1	73	0.60	8.0	72.2
		NA			
<b>Cod, Atlantic</b>					
Raw	3	57	1.5	0.58	80.3
		53-61	1.0-2.4	0.54-0.61	79.2-80.9
Cooked	3	60	1.6	0.7	77.3
		51-73	0.8-2.2	0.7-0.8	76.4-77.6
<b>Cusk</b>					
Raw	2	49	1.2	0.6	78.4
		43-56	1.0-1.5	0.5-0.6	77.6-79.3
Cooked	2	61	1.3	0.8	72.8
		57-64	1.2-1.5	0.7-0.9	71.5-74.2
<b>Flounder, Winter (Blackback)</b>					
Raw	3	62	1.4	0.9	79.4
		56-65	1.3-1.4	0.1-1.7	79.1-79.6
Cooked	3	71	1.5	1.1	75.2
		65-74	1.3-1.6	1.0-1.2	74.7-75.9

**Table 2—Continued**

Species	No. of samples <sup>1</sup>	Cholesterol (mg%) <sup>2</sup>	Ash	Fat (%)	Moisture
<b>Flounder, Yellowtail</b>					
Raw	3	62	1.2	0.8	80.0
		55-68	1.0-1.4	0.7-1.0	79.7-80.4
Cooked	3	72	1.3	1.3	74.7
		60-78	1.1-1.4	1.1-1.4	73.2-75.5
<b>Haddock</b>					
Raw	3	57	1.1	0.5	80.6
		45-74	0.9-1.1	0.4-0.7	78.5-82.3
Cooked	3	65	1.0	0.9	76.9
		57-77	0.8-1.2	0.7-0.9	72.8-81.4
<b>Hake, Red</b>					
Raw	3	43	1.1	0.5	82.5
		39-47	1.0-1.3	0.5-0.7	82.2-82.9
Cooked	3	54	1.3	0.8	78.2
		45-65	1.1-1.2	0.6-0.8	77.4-79.0
<b>Hake, Silver (Whiting)</b>					
Raw	4	45	1.3	3.8	78.2
		37-45	1.1-1.5	2.6-5.5	76.0-79.5
Cooked	4	48	1.5	4.9	75.2
		41-57	1.2-1.8	3.2-6.8	73.2-77.5
<b>Hake, White</b>					
Raw	1	49	1.2	0.8	82.3
		NA			
Cooked	1	49	1.4	0.9	78.8
		NA			
<b>Herring, Atlantic</b>					
Raw	4	65	1.9	8.7	71.3
		39-93	1.1-2.5	5.2-12.2	67.4-75.2
Cooked	4	72	2.1	9.4	68.0
		43-113	0.9-3.1	3.5-13.4	65.7-74.9
<b>Mackerel, Atlantic</b>					
Raw	2	72	1.3	4.4	71.6
		49-95	1.1-1.5	1.8-7.1	67.3-75.9
Cooked	2	79	1.1	4.6	71.0
		55-102	0.8-1.5	1.9-7.3	67.3-74.7
<b>Monkfish (Goosefish)</b>					
Raw	2	48	1.0	0.4	83.2
		42-53	1.0-1.1	0.3-0.6	84.9-81.6
Cooked	2	78	1.0	0.8	75.3)
		75-81	1.0-1.0	0.8-0.9	73.9-76.8
<b>Ocean Perch (Redfish)</b>					
Raw	2	56	1.3	1.4	78.5
		53-59	1.2-1.5	1.0-1.8	78.4-78.6
Cooked	2	63	1.0	1.5	75.0
		60-65	0.8-1.2	1.0-2.1	74.3-75.8
<b>Ocean Pout</b>					
Raw	2	80	0.9	0.8	80.8
		63-98	0.8-1.1	0.6-1.0	79.6-82.0
Cooked	2	120	0.9	1.3	73.7
		94-147	0.9-1.0	1.1-1.6	73.0-74.3
<b>Pollock</b>					
Raw	2	56	1.4	0.4	76.9
		54-58	1.3-1.5	0.4-0.5	75.5-78.2
Cooked	2	62	1.5	0.9	75.1
		60-63	1.4-1.6	0.8-1.0	74.8-75.5
<b>Skate, Thorny</b>					
Raw	1	55	1.2	0.7	79.5
		NA			
Cooked	1	n.d.	n.d.	n.d.	n.d.

**Table 2—Continued**

Species	No. of samples <sup>1</sup>	Cholesterol (mg%) <sup>2</sup>	Ash	Fat (%)	Moisture
<b>Skate, Winter</b>					
Raw	2	56	1.0	0.7	78.3
		52-60	0.9-1.1	0.7-0.7	77.7-78.9
Cooked	2	66	1.0	0.9	74.8
		64-68	1.0-1.1	0.8-1.0	74.0-75.6
<b>Sole, Gray (Winter flounder)</b>					
Raw	3	49	1.2	0.7	81.2
		46-53	1.0-1.4	0.7-0.8	79.7-82.5
Cooked	3	61	1.1	0.9	77.2
		57-68	0.9-1.2	0.8-1.0	76.5-78.5
<b>Tuna, Bluefin (tail section)</b>					
Raw	1	53	0.9	23.0	59.5
		NA			
Cooked	1	42	1.5	24.4	52.3
		NA			
<b>Tuna, Yellowfin</b>					
Raw	1	44	2.4	4.1	69.2
		NA			
Cooked	1	37	0.9	6.5	65.0
		NA			
<b>Wolfish, Atlantic</b>					
Raw	2	48	0.9	3.7	77.7
		47-50	0.8-1.0	2.1-5.2	76.1-79.2
Cooked	2	53	1.2	2.2	75.6
		52-54	1.1-1.3	1.4-3.1	74.9-76.3

<sup>1</sup>Number of times sampled over the course of 1-2 years.

<sup>2</sup>Mean value of the standard deviations of all samples was 2.60.

**Table 3**  
**Finfish arranged in order of increasing fat content for raw samples and ratio of omega-3 fatty acids to omega-6 fatty acids.**

Species	Date of capture	% Fat <sup>1</sup>	<sup>2</sup> Significant difference ( $P \leq 0.01$ )	Ratio of $\omega 3/\omega 6$ fatty acids	Species	Date of capture	% Fat <sup>1</sup>	<sup>2</sup> Significant difference ( $P \leq 0.01$ )	Ratio of $\omega 3/\omega 6$ fatty acids
Monkfish	11/85	0.3	a	4.4	Flounder, Winter	1/87	0.8	a,b	13.7
Haddock	5/87	0.4	a	8.2	Sole, Gray	11/86	0.7	a,b	9.5
Pollock	9/85	0.4	a	19.1	Sole, Gray	3/87	0.8	a,b	6.8
Hake, Red	10/85	0.4	a	16.2	Hake, White	10/86	0.8	a,b	12.9
Hake, Red	4/86	0.5	a	17.8	Flounder, Yellowtail	5/86	1.0	a,b,c	—
Cod, Atlantic	10/85	0.5	a	14.6	American plaice	4/86	1.0	a,b,c	—
Cusk	1/87	0.5	a	12.0	Ocean Pout	5/87	1.1	a,b,c	6.3
Haddock	3/86	0.6	a	11.5	Ocean Perch	7/85	1.1	a,b,c	—
Monkfish	7/86	0.6	a	8.9	Flounder, Winter	10/86	1.2	a,b,c	11.0
Cod, Atlantic	1/86	0.6	a	11.2	Mackerel	6/87	1.8	a,b,c	12.7
Pollock	1/86	0.6	a	17.3	Ocean Perch	9/86	1.9	a,b,c	10.9
Cod, Atlantic	5/85	0.6	a	16.3	Wolffish	3/86	2.1	a,b,c,d	6.3
Hake, Red	1/87	0.6	a	14.3	Hake, Silver	6/85	2.7	b,c,d,e	9.8
Ocean Pout	1/87	0.6	a	9.7	Hake, Silver	9/86	2.8	c,d,e	11.5
Cusk	11/86	0.6	a	9.0	Butterfish	4/87	3.7	d,e,f	6.8
Skate, Winter	2/87	0.7	a	8.5	Tuna, Yellowtail	6/86	4.4	e,f,g	11.3
Skate, Winter	3/87	0.7	a	8.9	Hake, Silver	12/87	4.4	e,f,g	10.2
Skate, Thorny	2/86	0.7	a	7.7	Herring	1/86	5.2	f,g	7.2
American plaice	12/86	0.7	a	10.8	Wolffish	6/85	5.3	f,g	7.2
Sole, Gray	5/86	0.7	a	6.1	Hake, Silver	4/86	5.6	g,h	9.5
Haddock	9/86	0.7	a	13.2	Herring	11/86	6.9	h	13.5
Flounder, Yellowtail	4/87	0.7	a	13.6	Mackerel	7/86	7.0	h	13.7
American plaice	6/87	0.8	a,b	5.0	Herring	9/86	10.7	i	15.8
Flounder, Yellowtail	10/86	0.8	a,b	15.1	Herring	7/85	12.2	j	10.9
Flounder, Winter	5/86	0.8	a,b	12.0	Tuna, Bluefin	8/85	23.0	k	—

<sup>1</sup>Mean of the standard deviations of all 50 samples was 0.17, and the standard error of this mean was 0.075.

<sup>2</sup>Samples with the same lower case letters are not significantly different from each other in fat content at  $p \leq 0.01$ .

## Appendix

The following charts contain nutritional information on 22 species of finfish arranged in alphabetical order by common name. Information for each sampling date for those species with multiple sampling dates is listed separately with the earliest date of capture listed first. FAME = Fatty acid methyl esters. The fatty acid shorthand notation denotes number of carbon atoms: number of double bonds, and "ω" (omega) indicates placement of the first double bond from the methyl end of the fatty acid molecule. The notation "N.D." designates no data.

<b>American Plaice</b> <i>Hippoglossoides platessoides</i>											
Date of capture		RAW 04/09/86		COOKED 04/09/86		Date of capture		RAW 06/24/87		COOKED 06/24/87	
% Fat		1.05		1.13		% Fat		0.76		1.03	
% Moisture		81.94		79.23		% Moisture		81.26		78.98	
% Ash		1.08		1.14		% Ash		1.90		1.83	
mg% Cholesterol		39.07		39.83		mg% Cholesterol		38.17		42.85	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	N.D.	N.D.	6.6	0.059	14:0	5.0	0.027	6.2	0.049		
15:0	N.D.	N.D.	0.8	0.007	15:0	0.6	0.003		0.000		
16:0	N.D.	N.D.	15.4	0.139	16:0	12.5	0.068	15.1	0.120		
17:0	N.D.	N.D.	0.5	0.004	17:0	0.4	0.002	0.4	0.004		
18:0	N.D.	N.D.	4.0	0.036	18:0	3.5	0.019	3.6	0.029		
20:0	N.D.	N.D.	0.2	0.002	20:0		0.000		0.000		
22:0	N.D.	N.D.		0.000	22:0		0.000		0.000		
16:1ω7	N.D.	N.D.	3.1	0.027	16:1ω7	0.8	0.004	2.7	0.021		
16:1ω5	N.D.	N.D.	0.3	0.003	16:1ω5	2.5	0.014		0.000		
18:1ω9	N.D.	N.D.	8.6	0.077	18:1ω9	8.1	0.044	8.1	0.065		
18:1ω7	N.D.	N.D.	2.6	0.024	18:1ω7	1.9	0.010	2.2	0.018		
18:1ω5	N.D.	N.D.	0.3	0.003	18:1ω5	0.2	0.001	0.2	0.002		
20:1ω11	N.D.	N.D.	4.1	0.037	20:1ω11	3.3	0.018	3.1	0.025		
20:1ω9	N.D.	N.D.	3.8	0.035	20:1ω9	3.3	0.018	3.8	0.031		
20:1ω7	N.D.	N.D.	0.4	0.004	20:1ω7	0.4	0.002	0.4	0.003		
Sum 20:1's	N.D.	N.D.	8.4	0.076	Sum 20:1's	6.9	0.038	7.3	0.058		
22:1ω13+11	N.D.	N.D.	5.3	0.048	22:1ω13+11	5.1	0.028	5.3	0.042		
22:1ω9	N.D.	N.D.	0.7	0.007	22:1ω9	0.8	0.005	0.9	0.007		
22:1ω7	N.D.	N.D.		0.000	22:1ω7		0.000		0.000		
Sum 22:1's	N.D.	N.D.	6.1	0.055	Sum 22:1's	5.9	0.032	6.2	0.049		
18:2ω6	N.D.	N.D.	0.7	0.007	18:2ω6	0.9	0.005	1.0	0.008		
20:2ω6	N.D.	N.D.	0.2	0.002	20:2ω6	1.0	0.005	1.9	0.015		
18:3ω3	N.D.	N.D.	0.3	0.003	18:3ω3	0.3	0.002	0.3	0.003		
20:3ω3	N.D.	N.D.		0.000	20:3ω3		0.000		0.000		
20:3ω6	N.D.	N.D.		0.000	20:3ω6		0.000		0.000		
18:4ω3	N.D.	N.D.	0.3	0.003	18:4ω3	0.2	0.001	0.3	0.002		
20:4ω6	N.D.	N.D.	4.2	0.038	20:4ω6	4.1	0.023	4.5	0.036		
20:5ω3	N.D.	N.D.	16.3	0.147	20:5ω3	14.1	0.077	14.6	0.116		
22:5ω3	N.D.	N.D.	1.8	0.016	22:5ω3	1.7	0.009	1.7	0.014		
22:6ω3	N.D.	N.D.	10.6	0.095	22:6ω3	13.6	0.075	14.6	0.116		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates			27.4	0.247	Saturates			22.0	0.121	25.3	0.202
Monounsaturates			29.4	0.265	Monounsaturates			20.4	0.144	20.8	0.215
Polyunsaturates			34.5	0.311	Polyunsaturates			35.9	0.197	38.8	0.309
Omega-3's			29.3	0.264	Omega-3's			29.9	0.164	31.5	0.251
Omega-6's			5.2	0.047	Omega-6's			6.0	0.033	7.3	0.058

**American Plaice (cont.)**  
*Hippoglossoides platessoides*

	RAW		COOKED	
Date of capture	12/18/86		12/18/86	
% Fat	0.70		0.91	
% Moisture	80.81		77.77	
% Ash	1.14		1.10	
mg% Cholesterol	58.89		66.16	
FAME	% FAME	g/100g	% FAME	g/100g
14:0	2.7	0.013	3.4	0.023
15:0	0.5	0.002	0.3	0.002
16:0	16.2	0.076	15.0	0.099
17:0	0.3	0.002	0.3	0.002
18:0	3.5	0.016	3.3	0.022
20:0		0.000		0.000
22:0		0.000		0.000
16:1 $\omega$ 7	2.6	0.012	2.1	0.014
16:1 $\omega$ 5	0.4	0.002	0.4	0.002
18:1 $\omega$ 9	6.6	0.031	7.1	0.047
18:1 $\omega$ 7	3.0	0.014	2.6	0.017
18:1 $\omega$ 5	0.2	0.001	0.2	0.001
20:1 $\omega$ 11	0.9	0.004	1.3	0.009
20:1 $\omega$ 9	1.3	0.006	1.6	0.011
20:1 $\omega$ 7	0.5	0.002	0.4	0.003
Sum 20:1's	2.7	0.013	3.3	0.022
22:1 $\omega$ 13+11		0.000		0.000
22:1 $\omega$ 9		0.000		0.000
22:1 $\omega$ 7		0.000		0.000
Sum 22:1's	0.0	0.000	0.0	0.000
18:2 $\omega$ 6	0.7	0.003	0.8	0.005
20:2 $\omega$ 6	0.2	0.001	0.2	0.001
18:3 $\omega$ 3	0.2	0.001	0.2	0.001
20:3 $\omega$ 3		0.000	0.1	0.001
20:3 $\omega$ 6		0.000		0.000
18:4 $\omega$ 3	0.6	0.003	0.4	0.003
20:4 $\omega$ 6	3.6	0.017	3.6	0.024
20:5 $\omega$ 3	17.0	0.079	17.6	0.116
22:5 $\omega$ 3	3.2	0.015	2.7	0.018
22:6 $\omega$ 3	27.3	0.128	22.8	0.151
<b>TOTALS:</b>				
Saturates	23.2	0.108	22.4	0.148
Monounsaturates	15.6	0.073	15.7	0.104
Polyunsaturates	52.8	0.246	48.3	0.319
Omega-3's	48.4	0.226	43.8	0.289
Omega-6's	4.5	0.021	4.5	0.030

**Butterfish**  
*Peprilus triacanthus*

	RAW		COOKED	
Date of capture	04/29/87		04/29/87	
% Fat	3.68		8.03	
% Moisture	77.27		72.25	
% Ash	0.85		0.60	
mg% Cholesterol	69.56		73.85	
FAME	% FAME	g/100g	% FAME	g/100g
14:0		7.0	7.9	0.586
15:0		0.6	0.7	0.049
16:0		15.4	17.4	1.302
17:0		1.5	1.4	0.106
18:0		4.2	3.6	0.265
20:0		0.000		0.000
22:0		0.000		0.000
24:0		0.000		0.000
16:1 $\omega$ 7		3.0	4.2	0.313
16:1 $\omega$ 5		0.000	0.2	0.013
18:1 $\omega$ 9	20.4	0.673	21.2	1.581
18:1 $\omega$ 7	1.5	0.048	1.5	0.114
18:1 $\omega$ 5	0.3	0.010	0.3	0.026
20:1 $\omega$ 11	0.5	0.017	0.4	0.027
20:1 $\omega$ 9	5.3	0.176	4.8	0.355
20:1 $\omega$ 7	1.4	0.045	1.2	0.091
Sum 20:1's	7.2	0.237	6.3	0.472
22:1 $\omega$ 13+11	7.1	0.234	5.2	0.391
22:1 $\omega$ 9	4.4	0.146	3.1	0.233
22:1 $\omega$ 7	0.2	0.008	0.2	0.015
Sum 22:1's	11.7	0.388	8.6	0.640
18:2 $\omega$ 6	1.2	0.039	1.2	0.089
20:2 $\omega$ 6	0.4	0.012	0.3	0.023
18:3 $\omega$ 3	0.8	0.027	1.0	0.075
20:3 $\omega$ 3		0.000		0.000
20:3 $\omega$ 6		0.000		0.000
18:4 $\omega$ 3	1.0	0.035	1.6	0.119
20:4 $\omega$ 6	1.0	0.032	1.0	0.076
20:5 $\omega$ 3	3.3	0.111	4.3	0.321
22:5 $\omega$ 3	1.5	0.049	1.7	0.123
22:6 $\omega$ 3	10.3	0.341	9.1	0.677
<b>TOTALS:</b>				
Saturates	28.8	0.952	30.9	2.308
Monounsaturates	44.1	1.457	42.3	3.159
Polyunsaturates	19.5	0.646	20.1	1.503
Omega-3's	17.0	0.563	17.6	1.315
Omega-6's	2.5	0.083	2.5	0.188



**Cod, Atlantic  
scrod  
*Gadus morhua***

		RAW		COOKED				RAW		COOKED	
Date of capture		05/03/85		05/03/85		Date of capture		10/18/85		10/18/85	
% Fat		0.61		0.84		% Fat		0.54		0.72	
% Moisture		80.91		77.95		% Moisture		79.21		76.43	
% Ash		1.03		0.83		% Ash		2.39		2.23	
mg% Cholesterol		61.17		73.03		mg% Cholesterol		53.77		56.72	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	1.3	0.005	1.4	0.008	14:0	0.7	0.003	0.7	0.003		
15:0	0.3	0.001	0.3	0.002	15:0	0.2	0.001	0.2	0.001		
16:0	17.0	0.067	16.5	0.098	16:0	18.1	0.063	17.3	0.085		
17:0	0.2	0.001	0.2	0.001	17:0	0.2	0.001	0.2	0.001		
18:0	3.1	0.012	2.9	0.017	18:0	4.2	0.015	4.3	0.021		
20:0		0.000		0.000	20:0		0.000		0.000		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1 $\omega$ 7	1.3	0.005	1.3	0.008	16:1 $\omega$ 7	1.1	0.004	1.0	0.005		
16:1 $\omega$ 5	0.2	0.001	0.3	0.001	16:1 $\omega$ 5	0.3	0.001	0.3	0.001		
18:1 $\omega$ 9	7.0	0.028	6.9	0.041	18:1 $\omega$ 9	6.9	0.024	7.1	0.035		
18:1 $\omega$ 7	2.6	0.010	2.6	0.015	18:1 $\omega$ 7	2.9	0.010	3.0	0.015		
18:1 $\omega$ 5		0.000	0.3	0.001	18:1 $\omega$ 5		0.000	0.2	0.001		
20:1 $\omega$ 11		0.000		0.000	20:1 $\omega$ 11		0.000	0.3	0.001		
20:1 $\omega$ 9	1.3	0.005	1.3	0.007	20:1 $\omega$ 9	1.0	0.003	0.9	0.004		
20:1 $\omega$ 7		0.000		0.000	20:1 $\omega$ 7		0.000	0.2	0.001		
Sum 20:1's	1.3	0.005	1.3	0.007	Sum 20:1's	1.0	0.003	1.4	0.007		
22:1 $\omega$ 13+11		0.000	0.5	0.003	22:1 $\omega$ 13+11		0.000		0.000		
22:1 $\omega$ 9		0.000		0.000	22:1 $\omega$ 9		0.000		0.000		
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	0.0	0.000	0.5	0.003	Sum 22:1's	0.0	0.000	0.0	0.000		
18:2 $\omega$ 6	0.7	0.003	0.8	0.004	18:2 $\omega$ 6	0.5	0.002	0.6	0.003		
20:2 $\omega$ 6		0.000		0.000	20:2 $\omega$ 6		0.000	0.2	0.001		
18:3 $\omega$ 3		0.000		0.000	18:3 $\omega$ 3		0.000	0.2	0.001		
20:3 $\omega$ 3		0.000		0.000	20:3 $\omega$ 3		0.000		0.000		
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3	0.7	0.003	0.7	0.004	18:4 $\omega$ 3	0.5	0.002	0.5	0.002		
20:4 $\omega$ 6	2.4	0.010	2.5	0.015	20:4 $\omega$ 6	3.4	0.012	3.4	0.017		
20:5 $\omega$ 3	14.9	0.059	16.2	0.096	20:5 $\omega$ 3	14.9	0.052	15.0	0.074		
22:5 $\omega$ 3	1.7	0.007	1.8	0.011	22:5 $\omega$ 3	2.1	0.007	2.2	0.011		
22:6 $\omega$ 3	34.2	0.135	35.8	0.212	22:6 $\omega$ 3	39.6	0.139	37.7	0.186		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates	21.9	0.086	21.3	0.126	Saturates	23.5	0.082	22.8	0.112		
Monounsaturates	12.5	0.049	13.0	0.077	Monounsaturates	12.2	0.043	13.0	0.064		
Polyunsaturates	54.6	0.216	57.9	0.342	Polyunsaturates	61.0	0.214	59.7	0.294		
Omega-3's	51.5	0.203	54.6	0.323	Omega-3's	57.1	0.200	55.6	0.274		
Omega-6's	3.2	0.012	3.3	0.019	Omega-6's	3.9	0.014	4.1	0.020		

**Cod, Atlantic (cont.)**  
**scrod**  
*Gadus morhua*

	RAW		COOKED	
Date of capture	01/23/86		01/23/86	
% Fat	0.59		0.77	
% Moisture	80.89		77.62	
% Ash	1.22		1.63	
mg% Cholesterol	55.22		51.97	
FAME	% FAME	g/100g	% FAME	g/100g
14:0	0.7	0.003	0.7	0.004
15:0	0.3	0.001	0.3	0.002
16:0	18.5	0.071	18.6	0.101
17:0	0.4	0.002	0.4	0.002
18:0	4.8	0.019	4.8	0.026
20:0		0.000		0.000
22:0		0.000		0.000
16:1 $\omega$ 7	1.6	0.006	1.6	0.009
16:1 $\omega$ 5	0.3	0.001	0.3	0.002
18:1 $\omega$ 9	7.4	0.029	6.9	0.038
18:1 $\omega$ 7	4.3	0.016	4.2	0.023
18:1 $\omega$ 5		0.000	0.3	0.002
20:1 $\omega$ 11		0.000	0.2	0.001
20:1 $\omega$ 9	0.5	0.002	0.5	0.003
20:1 $\omega$ 7		0.000	0.2	0.001
Sum 20:1's	0.5	0.002	0.9	0.005
22:1 $\omega$ 13+11		0.000		0.000
22:1 $\omega$ 9		0.000		0.000
22:1 $\omega$ 7		0.000		0.000
Sum 22:1's	0.0	0.000	0.0	0.000
18:2 $\omega$ 6	0.5	0.002	0.5	0.003
20:2 $\omega$ 6		0.000	0.2	0.001
18:3 $\omega$ 3		0.000	0.1	0.001
20:3 $\omega$ 3		0.000		0.000
20:3 $\omega$ 6		0.000		0.000
18:4 $\omega$ 3		0.000	0.3	0.001
20:4 $\omega$ 6	4.2	0.016	4.2	0.023
20:5 $\omega$ 3	17.0	0.065	17.1	0.093
22:5 $\omega$ 3	2.1	0.008	1.9	0.011
22:6 $\omega$ 3	33.4	0.129	30.7	0.167
<b>TOTALS:</b>				
Saturates	24.8	0.096	24.8	0.135
Monounsaturates	14.1	0.054	14.2	0.077
Polyunsaturates	57.2	0.220	55.2	0.301
Omega-3's	52.5	0.202	50.2	0.274
Omega-6's	4.7	0.018	5.0	0.027

**Cusk**  
*Brosme brosme*

		RAW		COOKED				RAW		COOKED	
Date of capture		11/12/86		11/12/86		Date of capture		01/29/87		01/29/87	
% Fat		0.64		0.865		% Fat		0.55		0.77	
% Moisture		77.64		71.52		% Moisture		79.35		74.23	
% Ash		1.51		1.55		% Ash		1.05		1.22	
mg% Cholesterol		43.19		57.71		mg% Cholesterol		56.70		64.29	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	0.9	0.004	0.8	0.005	14:0	0.5	0.002	0.5	0.003		
15:0	0.2	0.001	0.2	0.001	15:0	0.2	0.001	0.2	0.001		
16:0	21.2	0.091	19.5	0.124	16:0	16.9	0.060	16.9	0.089		
17:0		0.000	0.2	0.001	17:0	0.2	0.001	0.2	0.001		
18:0	4.7	0.020	4.1	0.026	18:0	4.2	0.015	3.9	0.020		
20:0		0.000		0.000	20:0		0.000		0.000		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1 $\omega$ 7	1.6	0.007	1.4	0.009	16:1 $\omega$ 7	1.0	0.004	0.9	0.005		
16:1 $\omega$ 5		0.000	0.3	0.002	16:1 $\omega$ 5	0.2	0.001	0.2	0.001		
18:1 $\omega$ 9	11.0	0.047	9.7	0.062	18:1 $\omega$ 9	9.1	0.032	8.6	0.046		
18:1 $\omega$ 7	3.2	0.014	2.7	0.017	18:1 $\omega$ 7	2.9	0.010	2.6	0.014		
18:1 $\omega$ 5		0.000	0.2	0.002	18:1 $\omega$ 5	0.2	0.001	0.2	0.001		
20:1 $\omega$ 11		0.000		0.000	20:1 $\omega$ 11	0.4	0.001	0.3	0.002		
20:1 $\omega$ 9	1.1	0.005	0.9	0.006	20:1 $\omega$ 9	1.0	0.003	0.9	0.004		
20:1 $\omega$ 7		0.000		0.000	20:1 $\omega$ 7		0.000		0.000		
Sum 20:1's	1.1	0.005	0.9	0.006	Sum 20:1's	1.3	0.005	1.2	0.006		
22:1 $\omega$ 13+11		0.000		0.000	22:1 $\omega$ 13+11		0.000		0.000		
22:1 $\omega$ 9		0.000		0.000	22:1 $\omega$ 9		0.000		0.000		
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	0.0	0.000	0.0	0.000	Sum 22:1's	0.0	0.000	0.0	0.000		
18:2 $\omega$ 6	0.8	0.003	0.8	0.005	18:2 $\omega$ 6	0.6	0.002	0.7	0.003		
20:2 $\omega$ 6		0.000		0.000	20:2 $\omega$ 6	0.2	0.001	0.2	0.001		
18:3 $\omega$ 3		0.000		0.000	18:3 $\omega$ 3	0.2	0.001	0.2	0.001		
20:3 $\omega$ 3		0.000		0.000	20:3 $\omega$ 3		0.000		0.000		
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3		0.000		0.000	18:4 $\omega$ 3	0.2	0.001	0.2	0.001		
20:4 $\omega$ 6	4.6	0.020	4.6	0.029	20:4 $\omega$ 6	3.6	0.013	3.6	0.019		
20:5 $\omega$ 3	12.0	0.052	12.0	0.077	20:5 $\omega$ 3	9.2	0.032	9.2	0.048		
22:5 $\omega$ 3	2.4	0.010	2.6	0.016	22:5 $\omega$ 3	2.7	0.010	2.6	0.014		
22:6 $\omega$ 3	33.7	0.145	36.4	0.231	22:6 $\omega$ 3	41.3	0.145	42.8	0.226		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates	27.0	0.116	24.7	0.157	Saturates	22.0	0.077	21.6	0.114		
Monounsaturates	16.9	0.073	15.3	0.097	Monounsaturates	14.7	0.052	13.8	0.073		
Polyunsaturates	53.5	0.230	56.3	0.358	Polyunsaturates	58.0	0.204	59.3	0.313		
Omega-3's	48.1	0.207	51.0	0.324	Omega-3's	53.6	0.188	54.8	0.290		
Omega-6's	5.3	0.023	5.3	0.034	Omega-6's	4.5	0.016	4.4	0.023		

**Flounder, Winter**  
*Pseudopleuronectes americanus*

		RAW		COOKED				RAW		COOKED	
Date of capture		05/07/86		05/07/86		Date of capture		10/02/86		10/02/86	
% Fat		0.80		1.08		% Fat		1.17		1.26	
% Moisture		79.62		75.12		% Moisture		79.19		74.79	
% Ash		1.46		1.69		% Ash		1.49		1.54	
mg% Cholesterol		56.97		65.72		mg% Cholesterol		65.82		72.49	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	1.5	0.009	1.3	0.011	14:0	2.7	0.024	1.9	0.019		
15:0	0.5	0.003	0.4	0.004	15:0	0.6	0.005	0.5	0.005		
16:0	15.7	0.089	14.8	0.123	16:0	15.3	0.139	16.5	0.164		
17:0	0.4	0.002	0.4	0.003	17:0	0.4	0.003		0.004		
18:0	4.8	0.027	4.8	0.039	18:0	3.5	0.032	4.1	0.041		
20:0		0.000		0.000	20:0		0.000		0.000		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1 $\omega$ 7	3.4	0.019	3.2	0.027	16:1 $\omega$ 7	5.0	0.046	3.2	0.032		
16:1 $\omega$ 5	0.4	0.002	0.4	0.003	16:1 $\omega$ 5	0.4	0.004	0.4	0.004		
18:1 $\omega$ 9	4.9	0.028	4.5	0.037	18:1 $\omega$ 9	6.7	0.061	5.8	0.058		
18:1 $\omega$ 7	3.1	0.018	3.0	0.025	18:1 $\omega$ 7	3.5	0.032	3.2	0.031		
18:1 $\omega$ 5	0.5	0.003	0.5	0.004	18:1 $\omega$ 5	0.6	0.005	0.4	0.004		
20:1 $\omega$ 11		0.000		0.000	20:1 $\omega$ 11	1.0	0.009	0.6	0.006		
20:1 $\omega$ 9	0.7	0.004	0.8	0.006	20:1 $\omega$ 9	1.0	0.009	0.8	0.008		
20:1 $\omega$ 7		0.000		0.000	20:1 $\omega$ 7	1.7	0.015	1.0	0.010		
Sum 20:1's	0.7	0.004	0.8	0.006	Sum 20:1's	3.7	0.033	2.3	0.023		
22:1 $\omega$ 13+11		0.000		0.000	22:1 $\omega$ 13+11		0.000		0.000		
22:1 $\omega$ 9		0.000		0.000	22:1 $\omega$ 9		0.000		0.000		
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	0.0	0.000	0.0	0.000	Sum 22:1's	0.0	0.000	0.0	0.000		
18:2 $\omega$ 6	0.7	0.004	0.5	0.004	18:2 $\omega$ 6	1.0	0.009	0.9	0.009		
20:2 $\omega$ 6	0.4	0.002	0.4	0.003	20:2 $\omega$ 6	0.5	0.004	0.3	0.003		
18:3 $\omega$ 3		0.000	0.2	0.002	18:3 $\omega$ 3	0.4	0.003	0.3	0.003		
20:3 $\omega$ 3		0.000		0.000	20:3 $\omega$ 3	0.2	0.002		0.000		
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3	0.7	0.004	0.7	0.006	18:4 $\omega$ 3	1.0	0.009	0.4	0.004		
20:4 $\omega$ 6	3.2	0.018	2.8	0.023	20:4 $\omega$ 6	2.6	0.024	3.6	0.036		
20:5 $\omega$ 3	19.9	0.113	20.8	0.173	20:5 $\omega$ 3	18.1	0.166	19.3	0.191		
22:5 $\omega$ 3	4.6	0.026	4.5	0.037	22:5 $\omega$ 3	4.1	0.038	3.9	0.039		
22:6 $\omega$ 3	26.4	0.150	25.8	0.214	22:6 $\omega$ 3	20.8	0.190	25.6	0.255		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates	22.9	0.130	21.7	0.180	Saturates	22.4	0.204	23.4	0.233		
Monounsaturates	12.9	0.074	12.4	0.103	Monounsaturates	19.9	0.182	15.4	0.153		
Polyunsaturates	55.9	0.318	55.7	0.462	Polyunsaturates	48.7	0.445	54.3	0.539		
Omega-3's	51.6	0.293	52.1	0.431	Omega-3's	44.6	0.408	49.4	0.491		
Omega-6's	4.3	0.024	3.7	0.030	Omega-6's	4.1	0.037	4.8	0.048		

**Flounder, Winter (cont.)**  
*Pseudopleuronectes americanus*

	RAW	COOKED
Date of capture	01/15/87	01/15/87
% Fat	0.80	1.20
% Moisture	79.60	75.97
% Ash	1.34	1.30
mg% Cholesterol	65.83	74.96

FAME	% FAME	g/100g	% FAME	g/100g
14:0	1.8	0.010	1.3	0.012
15:0	0.6	0.004	0.6	0.006
16:0	14.9	0.083	15.1	0.141
17:0	0.5	0.003	0.5	0.005
18:0	3.7	0.021	4.5	0.042
20:0		0.000		0.000
22:0	0.4	0.002		0.000
16:1 $\omega$ 7	3.0	0.017	2.5	0.023
16:1 $\omega$ 5	0.5	0.003	0.5	0.004
18:1 $\omega$ 9	4.8	0.027	4.9	0.045
18:1 $\omega$ 7	3.4	0.019	3.6	0.034
18:1 $\omega$ 5	0.5	0.003	0.4	0.004
20:1 $\omega$ 11	0.8	0.005	1.0	0.010
20:1 $\omega$ 9	0.6	0.004	0.7	0.007
20:1 $\omega$ 7	1.3	0.007	1.5	0.014
Sum 20:1's	2.8	0.015	3.2	0.030
22:1 $\omega$ 13+11		0.000		0.000
22:1 $\omega$ 9		0.000		0.000
22:1 $\omega$ 7		0.000		0.000
Sum 22:1's		0.000	0.0	0.000
18:2 $\omega$ 6	0.5	0.003	0.5	0.005
20:2 $\omega$ 6	0.4	0.002	0.4	0.004
18:3 $\omega$ 3	0.2	0.001	0.2	0.002
20:3 $\omega$ 3		0.000	0.1	0.001
20:3 $\omega$ 6		0.000		0.000
18:4 $\omega$ 3	0.5	0.003	0.3	0.003
20:4 $\omega$ 6	2.9	0.016	3.0	0.028
20:5 $\omega$ 3	24.3	0.136	21.8	0.204
22:5 $\omega$ 3	5.7	0.032	6.4	0.060
22:6 $\omega$ 3	21.7	0.120	21.0	0.196
TOTALS:				
Saturates	21.8	0.121	22.1	0.206
Monounsaturates	15.1	0.084	15.0	0.140
Polyunsaturates	56.2	0.315	53.7	0.501
Omega-3's	52.3	0.293	49.8	0.465
Omega-6's	3.8	0.021	3.9	0.036

**Flounder, Yellowtail**  
*Limanda ferruginea*

	RAW	COOKED
Date of capture	05/22/86	05/22/86
% Fat	1.02	1.47
% Moisture	80.41	73.23
% Ash	1.40	1.40
mg% Cholesterol	61.59	78.65

FAME	% FAME	g/100g	% FAME	g/100g
14:0	N.D.	N.D.	N.D.	N.D.
15:0	N.D.	N.D.	N.D.	N.D.
16:0	N.D.	N.D.	N.D.	N.D.
17:0	N.D.	N.D.	N.D.	N.D.
18:0	N.D.	N.D.	N.D.	N.D.
20:0	N.D.	N.D.	N.D.	N.D.
22:0	N.D.	N.D.	N.D.	N.D.
24:0	N.D.	N.D.	N.D.	N.D.
16:1 $\omega$ 7	N.D.	N.D.	N.D.	N.D.
16:1 $\omega$ 5	N.D.	N.D.	N.D.	N.D.
18:1 $\omega$ 9	N.D.	N.D.	N.D.	N.D.
18:1 $\omega$ 7	N.D.	N.D.	N.D.	N.D.
18:1 $\omega$ 5	N.D.	N.D.	N.D.	N.D.
20:1 $\omega$ 11	N.D.	N.D.	N.D.	N.D.
20:1 $\omega$ 9	N.D.	N.D.	N.D.	N.D.
20:1 $\omega$ 7	N.D.	N.D.	N.D.	N.D.
Sum 20:1's	N.D.	N.D.	N.D.	N.D.
22:1 $\omega$ 13+11	N.D.	N.D.	N.D.	N.D.
22:1 $\omega$ 9	N.D.	N.D.	N.D.	N.D.
22:1 $\omega$ 7	N.D.	N.D.	N.D.	N.D.
Sum 22:1's	N.D.	N.D.	N.D.	N.D.
24:1	N.D.	N.D.	N.D.	N.D.
18:2 $\omega$ 6	N.D.	N.D.	N.D.	N.D.
20:2 $\omega$ 6	N.D.	N.D.	N.D.	N.D.
18:3 $\omega$ 3	N.D.	N.D.	N.D.	N.D.
20:3 $\omega$ 3	N.D.	N.D.	N.D.	N.D.
20:3 $\omega$ 6	N.D.	N.D.	N.D.	N.D.
18:4 $\omega$ 3	N.D.	N.D.	N.D.	N.D.
20:4 $\omega$ 6	N.D.	N.D.	N.D.	N.D.
20:5 $\omega$ 3	N.D.	N.D.	N.D.	N.D.
22:5 $\omega$ 3	N.D.	N.D.	N.D.	N.D.
22:6 $\omega$ 3	N.D.	N.D.	N.D.	N.D.

**Flounder, Yellowtail (cont.)**  
*Limanda ferruginea*

	RAW		COOKED			RAW		COOKED	
Date of capture	10/23/86		10/23/86		Date of capture	04/09/87		04/09/87	
% Fat	0.78		1.13		% Fat	0.74		1.30	
% Moisture	80.08		75.43		% Moisture	79.74		75.53	
% Ash	1.08		1.37		% Ash	1.15		1.16	
mg% Cholesterol	68.65		76.92		mg% Cholesterol	55.95		60.16	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g
14:0	1.8	0.009	1.5	0.013	14:0	1.9	0.019	1.9	0.039
15:0	0.5	0.003	0.4	0.004	15:0	0.6	0.006	0.6	0.013
16:0	16.0	0.086	15.3	0.132	16:0	15.4	0.157	17.4	0.363
17:0	0.5	0.003	0.5	0.004	17:0		0.000		0.000
18:0	5.0	0.027	5.0	0.044	18:0	4.3	0.022	5.2	0.055
20:0		0.000		0.000	20:0		0.000		0.000
22:0		0.000		0.000	22:0		0.000		0.000
16:1 $\omega$ 7	4.3	0.023	3.5	0.030	16:1 $\omega$ 7	3.0	0.015	3.1	0.032
16:1 $\omega$ 5	0.3	0.002	0.4	0.003	16:1 $\omega$ 5		0.000		0.000
18:1 $\omega$ 9	5.4	0.029	5.3	0.045	18:1 $\omega$ 9	6.1	0.031	6.9	0.072
18:1 $\omega$ 7	4.0	0.022	3.8	0.033	18:1 $\omega$ 7	3.8	0.019	4.0	0.042
18:1 $\omega$ 5	0.4	0.002	0.4	0.003	18:1 $\omega$ 5	0.5	0.003	0.5	0.005
20:1 $\omega$ 11	1.3	0.007	0.8	0.007	20:1 $\omega$ 11	1.3	0.007	1.2	0.012
20:1 $\omega$ 9	0.6	0.003	0.5	0.005	20:1 $\omega$ 9	0.8	0.004	1.0	0.010
20:1 $\omega$ 7	2.0	0.011	1.8	0.015	20:1 $\omega$ 7	2.4	0.012	2.2	0.023
Sum 20:1's	3.9	0.021	3.1	0.026	Sum 20:1's	4.5	0.023	4.4	0.046
22:1 $\omega$ 13+11	3.8	0.020	3.4	0.029	22:1 $\omega$ 13+11		0.000		0.000
22:1 $\omega$ 9		0.000		0.000	22:1 $\omega$ 9		0.000		0.000
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000
Sum 22:1's	3.8	0.020	3.4	0.029	Sum 22:1's	0.0	0.000	0.0	0.000
18:2 $\omega$ 6	0.5	0.003	0.5	0.004	18:2 $\omega$ 6	0.6	0.003	0.6	0.006
20:2 $\omega$ 6		0.000	0.3	0.002	20:2 $\omega$ 6	0.4	0.002	0.4	0.004
18:3 $\omega$ 3		0.000		0.000	18:3 $\omega$ 3	0.3	0.002	0.4	0.004
20:3 $\omega$ 3		0.000		0.000	20:3 $\omega$ 3		0.000		0.000
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000
18:4 $\omega$ 3	0.6	0.003	0.4	0.003	18:4 $\omega$ 3	0.4	0.002	0.4	0.004
20:4 $\omega$ 6	2.5	0.013	2.6	0.023	20:4 $\omega$ 6	2.5	0.013	2.6	0.028
20:5 $\omega$ 3	21.7	0.117	21.9	0.190	20:5 $\omega$ 3	20.2	0.103	18.5	0.193
22:5 $\omega$ 3	3.4	0.018	3.4	0.029	22:5 $\omega$ 3	3.9	0.020	3.6	0.038
22:6 $\omega$ 3	19.6	0.106	21.1	0.182	22:6 $\omega$ 3	22.1	0.112	20.7	0.216
<b>TOTALS:</b>					<b>TOTALS:</b>				
Saturates	23.7	0.128	22.7	0.197	Saturates	22.2	0.204	25.1	0.470
Monounsaturates	22.1	0.119	19.8	0.171	Monounsaturates	18.3	0.093	19.3	0.202
Polyunsaturates	48.3	0.260	50.1	0.433	Polyunsaturates	50.5	0.256	47.3	0.493
Omega-3's	45.3	0.244	46.7	0.404	Omega-3's	47.0	0.239	43.6	0.455
Omega-6's	3.0	0.016	3.4	0.029	Omega-6's	3.5	0.018	3.6	0.038

**Haddock**  
*Melanogrammus aeglefinus*

		RAW		COOKED				RAW		COOKED	
Date of capture		03/06/86		03/06/86		Date of capture		09/04/86		09/04/86	
% Fat		0.58		0.96		% Fat		0.73		0.97	
% Moisture		80.96		81.44		% Moisture		78.53		72.89	
% Ash		1.13		1.01		% Ash		1.19		1.23	
mg% Cholesterol		52.35		60.68		mg% Cholesterol		74.68		77.46	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	0.8	0.003	1.3	0.009	14:0	1.1	0.005	0.9	0.006		
15:0	0.4	0.001	0.6	0.005	15:0	0.4	0.002	0.3	0.002		
16:0	17.1	0.065	31.0	0.222	16:0	18.2	0.088	15.7	0.112		
17:0	0.3	0.001	0.7	0.005	17:0	0.4	0.002	0.3	0.002		
18:0	4.6	0.018	9.6	0.069	18:0	3.7	0.018	3.2	0.023		
20:0		0.000		0.000	20:0		0.000		0.000		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1 $\omega$ 7	1.1	0.004	1.1	0.008	16:1 $\omega$ 7	1.0	0.005	0.9	0.006		
16:1 $\omega$ 5	0.3	0.001		0.000	16:1 $\omega$ 5	0.3	0.002	0.4	0.003		
18:1 $\omega$ 9	5.6	0.021	10.0	0.072	18:1 $\omega$ 9	5.7	0.028	4.8	0.034		
18:1 $\omega$ 7	3.4	0.013	6.3	0.045	18:1 $\omega$ 7	3.7	0.018	3.3	0.024		
18:1 $\omega$ 5	0.4	0.001	0.7	0.005	18:1 $\omega$ 5	0.3	0.002	0.3	0.002		
20:1 $\omega$ 11	0.6	0.002	1.2	0.008	20:1 $\omega$ 11	0.5	0.003	0.3	0.002		
20:1 $\omega$ 9	0.7	0.003	1.2	0.009	20:1 $\omega$ 9	0.7	0.003	0.5	0.004		
20:1 $\omega$ 7	0.2	0.001	0.5	0.003	20:1 $\omega$ 7		0.000		0.000		
Sum 20:1's	1.4	0.005	2.8	0.020	Sum 20:1's	1.2	0.006	0.8	0.006		
22:1 $\omega$ 13+11		0.000		0.000	22:1 $\omega$ 13+11		0.000	0.5	0.003		
22:1 $\omega$ 9		0.000		0.000	22:1 $\omega$ 9		0.000		0.000		
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	0.0	0.000	0.0	0.000	Sum 22:1's	0.0	0.000	0.5	0.003		
18:2 $\omega$ 6	0.6	0.002	0.8	0.006	18:2 $\omega$ 6	0.6	0.003	0.6	0.004		
20:2 $\omega$ 6		0.000	0.3	0.002	20:2 $\omega$ 6		0.000	0.2	0.001		
18:3 $\omega$ 3	0.2	0.001	0.2	0.002	18:3 $\omega$ 3		0.000		0.000		
20:3 $\omega$ 3		0.000		0.000	20:3 $\omega$ 3		0.000	0.1	0.001		
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3	0.6	0.002	0.4	0.003	18:4 $\omega$ 3	0.8	0.004	0.6	0.004		
20:4 $\omega$ 6	3.9	0.015	3.1	0.022	20:4 $\omega$ 6	3.3	0.016	3.1	0.022		
20:5 $\omega$ 3	18.6	0.071	10.1	0.072	20:5 $\omega$ 3	17.7	0.086	17.4	0.124		
22:5 $\omega$ 3	2.0	0.008	1.2	0.009	22:5 $\omega$ 3	2.3	0.011	2.1	0.015		
22:6 $\omega$ 3	31.3	0.119	13.9	0.100	22:6 $\omega$ 3	31.1	0.151	30.8	0.219		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates	23.3	0.088	43.2	0.310	Saturates	23.8	0.115	20.4	0.145		
Monounsaturates	12.1	0.046	20.9	0.150	Monounsaturates	12.3	0.060	10.9	0.078		
Polyunsaturates	57.2	0.217	30.0	0.215	Polyunsaturates	55.7	0.270	54.8	0.390		
Omega-3's	52.6	0.200	25.8	0.185	Omega-3's	51.8	0.251	50.9	0.362		
Omega-6's	4.6	0.017	4.2	0.030	Omega-6's	3.9	0.019	3.9	0.028		

**Haddock (cont.)**  
*Melanogrammus aeglefinus*

	RAW	COOKED
Date of capture	05/22/87	05/22/87
% Fat	0.37	0.75
% Moisture	82.34	76.42
% Ash	0.95	0.85
mg% Cholesterol	45.17	57.28

FAME	% FAME	g/100g	% FAME	g/100g
14:0	1.2	0.005	1.1	0.012
15:0		0.000	0.3	0.003
16:0	16.7	0.088	18.2	0.189
17:0		0.000		0.000
18:0	3.6	0.010	4.8	0.025
20:0		0.000		0.000
22:0		0.000		0.000
16:1 $\omega$ 7	1.1	0.003	1.1	0.006
16:1 $\omega$ 5	0.4	0.001	0.4	0.002
18:1 $\omega$ 9	6.7	0.018	7.1	0.037
18:1 $\omega$ 7	2.5	0.007	2.8	0.015
18:1 $\omega$ 5	0.3	0.001	0.3	0.002
20:1 $\omega$ 11	0.4	0.001	0.4	0.002
20:1 $\omega$ 9	1.7	0.004	1.9	0.010
20:1 $\omega$ 7	0.2	0.001	0.1	0.001
Sum 20:1's	2.3	0.006	2.5	0.013
22:1 $\omega$ 13+11		0.000		0.000
22:1 $\omega$ 9		0.000	0.4	0.002
22:1 $\omega$ 7		0.000		0.000
Sum 22:1's	0.0	0.000	0.4	0.002
18:2 $\omega$ 6	1.3	0.003	1.3	0.007
20:2 $\omega$ 6	0.2	0.001	0.2	0.001
18:3 $\omega$ 3	0.4	0.001	0.4	0.002
20:3 $\omega$ 3		0.000		0.000
20:3 $\omega$ 6		0.000		0.000
18:4 $\omega$ 3	0.5	0.001	0.4	0.002
20:4 $\omega$ 6	5.0	0.013	4.8	0.025
20:5 $\omega$ 3	16.4	0.043	14.6	0.076
22:5 $\omega$ 3	2.1	0.006	2.0	0.010
22:6 $\omega$ 3	33.8	0.089	31.9	0.166
<b>TOTALS:</b>				
Saturates	21.5	0.103	24.4	0.229
Monounsaturates	13.6	0.036	15.3	0.080
Polyunsaturates	59.7	0.157	55.6	0.289
Omega-3's	53.2	0.140	49.2	0.256
Omega-6's	6.5	0.017	6.4	0.033

**Hake, Red**  
*Urophycis chuss*

	RAW	COOKED
Date of capture	10/03/85	10/03/85
% Fat	0.45	0.73
% Moisture	82.25	79.08
% Ash	1.36	1.19
mg% Cholesterol	39.52	45.53

FAME	% FAME	g/100g	% FAME	g/100g
14:0	1.1	0.003	0.8	0.004
15:0	0.3	0.001	0.2	0.001
16:0	21.8	0.065	18.7	0.096
17:0		0.000	0.2	0.001
18:0	6.0	0.018	5.1	0.026
20:0		0.000		0.000
22:0		0.000		0.000
16:1 $\omega$ 7	1.1	0.003	1.3	0.007
16:1 $\omega$ 5		0.000	0.2	0.001
18:1 $\omega$ 9	8.1	0.024	7.1	0.036
18:1 $\omega$ 7	2.6	0.008	2.4	0.012
18:1 $\omega$ 5		0.000	0.2	0.001
20:1 $\omega$ 11		0.000	0.3	0.002
20:1 $\omega$ 9	2.2	0.007	1.7	0.009
20:1 $\omega$ 7		0.000		0.000
Sum 20:1's	2.2	0.007	2.0	0.010
22:1 $\omega$ 13+11	0.7	0.002		0.000
22:1 $\omega$ 9		0.000		0.000
22:1 $\omega$ 7		0.000		0.000
Sum 22:1's	0.7	0.002	0.0	0.000
18:2 $\omega$ 6	0.8	0.002	0.7	0.004
20:2 $\omega$ 6		0.000		0.000
18:3 $\omega$ 3		0.000	0.3	0.001
20:3 $\omega$ 3		0.000		0.000
20:3 $\omega$ 6		0.000		0.000
18:4 $\omega$ 3		0.000	0.5	0.003
20:4 $\omega$ 6	2.3	0.007	2.3	0.012
20:5 $\omega$ 3	9.4	0.028	10.2	0.052
22:5 $\omega$ 3	1.8	0.005	2.0	0.010
22:6 $\omega$ 3	39.6	0.117	40.4	0.207
<b>TOTALS:</b>				
Saturates	29.3	0.086	25.0	0.128
Monounsaturates	14.8	0.044	13.2	0.067
Polyunsaturates	54.0	0.159	56.4	0.289
Omega-3's	50.8	0.150	53.4	0.274
Omega-6's	3.1	0.009	3.1	0.016



Hake, Red (cont.)

*Urophycis chuss*

		RAW		COOKED				RAW		COOKED	
Date of capture		04/27/86		04/27/86		Date of capture		01/22/87		01/22/87	
% Fat		0.51		0.66		% Fat		0.63		0.88	
% Moisture		82.30		77.45		% Moisture		82.99		78.24	
% Ash		1.07		1.61		% Ash		1.00		1.18	
mg% Cholesterol		44.74		48.30		mg% Cholesterol		47.53		65.27	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	0.4	0.001	0.3	0.002	14:0	1.2	0.005	1.0	0.006		
15:0	0.2	0.001	0.2	0.001	15:0	0.3	0.001	0.2	0.001		
16:0	17.7	0.059	18.3	0.081	16:0	14.5	0.060	15.3	0.097		
17:0	0.2	0.001	0.2	0.001	17:0	0.3	0.001	0.3	0.002		
18:0	5.4	0.018	5.4	0.024	18:0	3.7	0.015	3.8	0.024		
20:0		0.000		0.000	20:0		0.000		0.000		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1 $\omega$ 7	0.9	0.003	1.1	0.005	16:1 $\omega$ 7	2.2	0.009	2.0	0.013		
16:1 $\omega$ 5		0.000	0.1	0.000	16:1 $\omega$ 5	0.2	0.001	0.2	0.001		
18:1 $\omega$ 9	9.1	0.031	7.6	0.034	18:1 $\omega$ 9	9.0	0.037	9.1	0.058		
18:1 $\omega$ 7	3.0	0.010	2.7	0.012	18:1 $\omega$ 7	3.7	0.015	3.7	0.023		
18:1 $\omega$ 5	0.2	0.001	0.2	0.001	18:1 $\omega$ 5	0.3	0.001	0.3	0.002		
20:1 $\omega$ 11	0.3	0.001	0.3	0.001	20:1 $\omega$ 11	0.5	0.002	0.4	0.003		
20:1 $\omega$ 9	1.2	0.004	1.0	0.004	20:1 $\omega$ 9	2.0	0.008	1.5	0.010		
20:1 $\omega$ 7		0.000		0.000	20:1 $\omega$ 7	0.2	0.001	0.2	0.001		
Sum 20:1's	1.5	0.005	1.3	0.006	Sum 20:1's	2.7	0.011	2.1	0.013		
22:1 $\omega$ 13+11		0.000		0.000	22:1 $\omega$ 13+11		0.000		0.000		
22:1 $\omega$ 9		0.000		0.000	22:1 $\omega$ 9		0.000		0.000		
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	0.0	0.000	0.0	0.000	Sum 22:1's	0.0	0.000	0.0	0.000		
18:2 $\omega$ 6	0.6	0.002	0.5	0.002	18:2 $\omega$ 6	0.7	0.003	0.7	0.004		
20:2 $\omega$ 6		0.000	0.2	0.001	20:2 $\omega$ 6	0.2	0.001	0.2	0.001		
18:3 $\omega$ 3		0.000		0.000	18:3 $\omega$ 3	0.3	0.001	0.3	0.002		
20:3 $\omega$ 3		0.000		0.000	20:3 $\omega$ 3	0.1	0.000		0.000		
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3	0.2	0.001		0.000	18:4 $\omega$ 3	0.4	0.002	0.3	0.002		
20:4 $\omega$ 6	2.5	0.008	2.4	0.010	20:4 $\omega$ 6	2.8	0.012	2.7	0.017		
20:5 $\omega$ 3	10.4	0.035	10.3	0.046	20:5 $\omega$ 3	13.8	0.057	13.9	0.088		
22:5 $\omega$ 3	2.5	0.008	2.6	0.012	22:5 $\omega$ 3	2.7	0.011	2.5	0.016		
22:6 $\omega$ 3	42.1	0.141	42.7	0.189	22:6 $\omega$ 3	35.5	0.147	36.6	0.232		
TOTALS:					TOTALS:						
Saturates	23.8	0.080	24.5	0.109	Saturates	20.0	0.083	20.5	0.130		
Monounsaturates	14.7	0.049	13.1	0.058	Monounsaturates	18.0	0.075	17.4	0.110		
Polyunsaturates	58.3	0.195	58.7	0.260	Polyunsaturates	56.4	0.235	57.2	0.362		
Omega-3's	55.2	0.185	55.6	0.246	Omega-3's	52.7	0.219	53.7	0.339		
Omega-6's	3.1	0.010	3.1	0.014	Omega-6's	3.7	0.015	3.6	0.023		

**Hake, Silver**  
*Merluccius bilinearis*

		RAW		COOKED				RAW		COOKED	
Date of capture		06/19/85		06/19/85		Date of capture		04/16/86		04/16/86	
% Fat		2.68		4.70		% Fat		5.59		4.94	
% Moisture		79.08		75.92		% Moisture		76.07		74.17	
% Ash		1.27		1.48		% Ash		1.52		1.83	
mg% Cholesterol		45.62		41.10		mg% Cholesterol		37.98		42.70	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	4.2	0.100	N.D.	N.D.	14:0	5.5	0.282	5.1	0.231		
15:0	0.4	0.010	N.D.	N.D.	15:0	0.4	0.022	0.4	0.018		
16:0	15.0	0.357	N.D.	N.D.	16:0	13.5	0.697	12.8	0.583		
17:0	0.2	0.005	N.D.	N.D.	17:0	0.2	0.010	0.2	0.009		
18:0	2.4	0.057	N.D.	N.D.	18:0	1.8	0.095	1.9	0.087		
20:0	0.1	0.003	N.D.	N.D.	20:0		0.000	0.1	0.007		
22:0		0.000	N.D.	N.D.	22:0		0.000	0.1	0.002		
16:1 $\omega$ 7	5.2	0.124	N.D.	N.D.	16:1 $\omega$ 7	4.9	0.252	4.7	0.212		
16:1 $\omega$ 5	0.2	0.006	N.D.	N.D.	16:1 $\omega$ 5	0.3	0.013	0.3	0.011		
18:1 $\omega$ 9	13.7	0.326	N.D.	N.D.	18:1 $\omega$ 9	12.3	0.636	11.6	0.527		
18:1 $\omega$ 7	4.2	0.101	N.D.	N.D.	18:1 $\omega$ 7	2.6	0.136	2.4	0.110		
18:1 $\omega$ 5	0.3	0.007	N.D.	N.D.	18:1 $\omega$ 5	0.3	0.018	0.3	0.016		
20:1 $\omega$ 11		0.000	N.D.	N.D.	20:1 $\omega$ 11		0.000		0.000		
20:1 $\omega$ 9	8.2	0.196	N.D.	N.D.	20:1 $\omega$ 9	12.4	0.639	11.9	0.543		
20:1 $\omega$ 7	0.5	0.011	N.D.	N.D.	20:1 $\omega$ 7	0.3	0.015		0.000		
Sum 20:1's	8.7	0.206	N.D.	N.D.	Sum 20:1's	12.7	0.654	11.9	0.543		
22:1 $\omega$ 13+11	6.9	0.165	N.D.	N.D.	22:1 $\omega$ 13+11	13.8	0.711	14.3	0.649		
22:1 $\omega$ 9	0.7	0.016	N.D.	N.D.	22:1 $\omega$ 9	0.7	0.036	0.1	0.005		
22:1 $\omega$ 7	0.1	0.002	N.D.	N.D.	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	7.7	0.183	N.D.	N.D.	Sum 22:1's	14.5	0.747	14.4	0.653		
18:2 $\omega$ 6	1.7	0.039	N.D.	N.D.	18:2 $\omega$ 6	1.6	0.082	1.5	0.069		
20:2 $\omega$ 6	0.3	0.008	N.D.	N.D.	20:2 $\omega$ 6	0.2	0.011	0.2	0.010		
18:3 $\omega$ 3	0.8	0.019	N.D.	N.D.	18:3 $\omega$ 3	0.9	0.049	0.9	0.042		
20:3 $\omega$ 3	0.3	0.007	N.D.	N.D.	20:3 $\omega$ 3	0.1	0.008	0.2	0.007		
20:3 $\omega$ 6	0.1	0.001	N.D.	N.D.	20:3 $\omega$ 6		0.000	0.1	0.003		
18:4 $\omega$ 3	2.2	0.053	N.D.	N.D.	18:4 $\omega$ 3	2.1	0.110	2.1	0.097		
20:4 $\omega$ 6	0.8	0.020	N.D.	N.D.	20:4 $\omega$ 6	0.7	0.035	0.9	0.041		
20:5 $\omega$ 3	8.8	0.208	N.D.	N.D.	20:5 $\omega$ 3	6.1	0.314	6.6	0.298		
22:5 $\omega$ 3	1.0	0.023	N.D.	N.D.	22:5 $\omega$ 3	1.2	0.060	1.1	0.049		
22:6 $\omega$ 3	15.4	0.365	N.D.	N.D.	22:6 $\omega$ 3	13.3	0.688	14.1	0.638		
TOTALS:					TOTALS:						
Saturates	22.4	0.534			Saturates	21.4	1.105	20.7	0.938		
Monounsaturates	40.1	0.952			Monounsaturates	47.5	2.456	45.7	2.073		
Polyunsaturates	31.3	0.745			Polyunsaturates	26.2	1.356	27.6	1.254		
Omega-3's	28.4	0.675			Omega-3's	23.8	1.227	24.9	1.131		
Omega-6's	2.9	0.069			Omega-6's	2.5	0.129	2.7	0.123		

**Hake, Silver (cont.)**  
***Merluccius bilinearis***

		RAW		COOKED				RAW		COOKED	
Date of capture		09/18/86		09/18/86		Date of capture		12/17/86		12/17/86	
% Fat		2.86		3.23		% Fat		4.44		6.83	
% Moisture		79.51		77.51		% Moisture		78.06		73.27	
% Ash		1.19		1.33		% Ash		1.35		1.22	
mg% Cholesterol		50.54		57.96		mg% Cholesterol		47.45		50.95	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	4.6	0.116	4.9	0.141	14:0	6.8	0.275	6.7	0.422		
15:0	0.5	0.012	0.5	0.015	15:0	0.4	0.018	0.4	0.026		
16:0	14.1	0.358	14.8	0.427	16:0	13.7	0.554	12.7	0.804		
17:0	0.3	0.007	0.3	0.008	17:0	0.2	0.007	0.2	0.010		
18:0	2.2	0.057	2.3	0.065	18:0	1.4	0.058	1.3	0.084		
20:0		0.000		0.000	20:0		0.000	0.1	0.008		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1 $\omega$ 7	4.5	0.116	5.1	0.148	16:1 $\omega$ 7	5.2	0.210	5.1	0.326		
16:1 $\omega$ 5	0.5	0.012	0.5	0.014	16:1 $\omega$ 5	0.3	0.013	0.3	0.018		
18:1 $\omega$ 9	11.0	0.280	11.4	0.328	18:1 $\omega$ 9	11.4	0.463	11.3	0.714		
18:1 $\omega$ 7	3.3	0.083	3.7	0.106	18:1 $\omega$ 7	2.2	0.090	2.2	0.137		
18:1 $\omega$ 5	0.3	0.008	0.3	0.009	18:1 $\omega$ 5	0.3	0.012	0.3	0.019		
20:1 $\omega$ 11		0.000		0.000	20:1 $\omega$ 11	1.7	0.071		0.000		
20:1 $\omega$ 9	5.9	0.150	5.2	0.148	20:1 $\omega$ 9	13.1	0.532	15.1	0.953		
20:1 $\omega$ 7	0.3	0.007	0.3	0.008	20:1 $\omega$ 7	0.2	0.008	0.3	0.021		
Sum 20:1's	6.2	0.157	5.4	0.157	Sum 20:1's	15.1	0.611	15.4	0.974		
22:1 $\omega$ 13+11	5.9	0.151	5.1	0.146	22:1 $\omega$ 13+11	15.3	0.618	16.5	1.042		
22:1 $\omega$ 9	0.4	0.009		0.000	22:1 $\omega$ 9	0.7	0.026	0.7	0.045		
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	6.3	0.160	5.1	0.146	Sum 22:1's	15.9	0.645	17.2	1.088		
18:2 $\omega$ 6	1.7	0.044	1.7	0.050	18:2 $\omega$ 6	1.6	0.065	1.6	0.100		
20:2 $\omega$ 6	0.2	0.006		0.000	20:2 $\omega$ 6		0.000	0.2	0.011		
18:3 $\omega$ 3	1.2	0.032	1.2	0.035	18:3 $\omega$ 3	0.9	0.037	0.9	0.056		
20:3 $\omega$ 3	0.2	0.006		0.000	20:3 $\omega$ 3		0.000		0.000		
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3	2.7	0.070	2.7	0.078	18:4 $\omega$ 3	1.9	0.076	1.8	0.115		
20:4 $\omega$ 6	0.9	0.023	1.0	0.029	20:4 $\omega$ 6	0.5	0.022	0.5	0.033		
20:5 $\omega$ 3	8.7	0.222	10.6	0.304	20:5 $\omega$ 3	5.7	0.233	5.8	0.366		
22:5 $\omega$ 3	1.0	0.024	0.9	0.027	22:5 $\omega$ 3	1.2	0.048	1.2	0.073		
22:6 $\omega$ 3	18.9	0.480	18.4	0.530	22:6 $\omega$ 3	12.3	0.499	10.9	0.693		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates	21.6	0.550	22.7	0.655	Saturates	22.5	0.911	21.4	1.354		
Monounsaturates	32.1	0.816	31.5	0.907	Monounsaturates	50.4	2.044	51.7	3.275		
Polyunsaturates	35.6	0.906	36.5	1.053	Polyunsaturates	24.2	0.980	22.8	1.446		
Omega-3's	32.8	0.833	33.8	0.974	Omega-3's	22.0	0.892	20.6	1.303		
Omega-6's	2.9	0.073	2.7	0.079	Omega-6's	2.2	0.087	2.3	0.143		

**Hake, White**  
*Urophycis tenuis*

	RAW		COOKED	
Date of capture	10/30/86		10/30/86	
% Fat	0.84		0.92	
% Moisture	82.37		78.80	
% Ash	1.29		1.42	
mg% Cholesterol	48.91		58.18	
FAME	% FAME	g/100g	% FAME	g/100g
14:0	1.0	0.006	0.7	0.005
15:0	0.2	0.001	0.2	0.001
16:0	13.6	0.084	14.8	0.101
17:0	0.3	0.002	0.3	0.002
18:0	4.3	0.026	4.8	0.033
20:0		0.000		0.000
22:0		0.000		0.000
16:1 $\omega$ 7	3.2	0.020	2.7	0.018
16:1 $\omega$ 5	0.1	0.001	0.1	0.001
18:1 $\omega$ 9	11.1	0.068	8.8	0.060
18:1 $\omega$ 7	4.1	0.025	4.0	0.028
18:1 $\omega$ 5	0.2	0.001	0.3	0.002
20:1 $\omega$ 11		0.000		0.000
20:1 $\omega$ 9	3.9	0.024	2.2	0.015
20:1 $\omega$ 7	0.2	0.001	0.2	0.002
Sum 20:1's	4.1	0.025	2.4	0.017
22:1 $\omega$ 13+11	3.1	0.019	1.7	0.012
22:1 $\omega$ 9		0.000		0.000
22:1 $\omega$ 7		0.000		0.000
Sum 22:1's	3.1	0.019	1.7	0.012
18:2 $\omega$ 6	0.8	0.005	0.6	0.004
20:2 $\omega$ 6	0.3	0.002	0.2	0.001
18:3 $\omega$ 3	0.2	0.001	0.2	0.001
20:3 $\omega$ 3		0.000		0.000
20:3 $\omega$ 6		0.000		0.000
18:4 $\omega$ 3	0.2	0.002	0.2	0.001
20:4 $\omega$ 6	2.1	0.013	2.4	0.016
20:5 $\omega$ 3	9.7	0.060	11.3	0.077
22:5 $\omega$ 3	2.1	0.013	2.2	0.015
22:6 $\omega$ 3	28.3	0.174	29.9	0.204
<b>TOTALS:</b>				
Saturates	19.4	0.119	20.9	0.142
Monounsaturates	26.0	0.160	20.0	0.136
Polyunsaturates	43.7	0.269	46.9	0.320
Omega-3's	40.6	0.249	43.7	0.298
Omega-6's	3.1	0.019	3.2	0.022

**Herring, Atlantic**  
***Clupea harengus harengus***

Date of capture	RAW		COOKED		Date of capture	RAW		COOKED	
	07/03/85		07/03/85			01/31/86		01/31/86	
% Fat	12.19		13.48		% Fat	5.19		3.59	
% Moisture	67.40		65.69		% Moisture	73.46		74.95	
% Ash	1.10		0.99		% Ash	2.11		1.57	
mg% Cholesterol	44.40		43.73		mg% Cholesterol	39.38		43.74	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g
14:0	7.2	0.829	7.1	0.905	14:0	7.0	0.334	6.2	0.200
15:0	0.5	0.056	0.5	0.062	15:0	0.5	0.023	0.4	0.012
16:0	12.7	1.453	12.8	1.631	16:0	12.2	0.583	11.8	0.382
17:0	0.2	0.017	0.1	0.019	17:0	0.2	0.008	0.1	0.005
18:0	0.9	0.106	0.9	0.117	18:0	1.2	0.059	1.2	0.038
20:0	0.2	0.018	0.1	0.019	20:0		0.000		0.000
22:0		0.000		0.000	22:0		0.000		0.000
16:1 $\omega$ 7	5.1	0.588	5.6	0.711	16:1 $\omega$ 7	4.3	0.204	3.6	0.117
16:1 $\omega$ 5	0.4	0.047	0.4	0.052	16:1 $\omega$ 5	0.2	0.012	0.2	0.008
18:1 $\omega$ 9	6.5	0.741	6.3	0.806	18:1 $\omega$ 9	10.0	0.476	8.7	0.282
18:1 $\omega$ 7	1.4	0.160	1.5	0.193	18:1 $\omega$ 7	2.0	0.096	1.6	0.050
18:1 $\omega$ 5	0.4	0.047	0.4	0.052	18:1 $\omega$ 5	0.3	0.014	0.3	0.010
20:1 $\omega$ 11	0.9	0.107		0.000	20:1 $\omega$ 11		0.000		0.000
20:1 $\omega$ 9	11.0	1.259	11.3	1.429	20:1 $\omega$ 9	13.2	0.629	15.9	0.516
20:1 $\omega$ 7		0.000	0.3	0.038	20:1 $\omega$ 7		0.000		0.000
Sum 20:1's	11.9	1.366	11.6	1.468	Sum 20:1's	13.2	0.629	15.9	0.516
22:1 $\omega$ 13+11	20.8	2.383	20.7	2.627	22:1 $\omega$ 13+11	26.7	1.275	27.6	0.897
22:1 $\omega$ 9	0.8	0.095	0.9	0.117	22:1 $\omega$ 9	0.2	0.008	0.2	0.006
22:1 $\omega$ 7	0.1	0.015	0.1	0.018	22:1 $\omega$ 7		0.000		0.000
Sum 22:1's	21.7	2.493	21.7	2.762	Sum 22:1's	26.8	1.283	27.8	0.903
18:2 $\omega$ 6	1.4	0.166	1.4	0.174	18:2 $\omega$ 6	1.1	0.052	1.0	0.033
20:2 $\omega$ 6	0.3	0.030	0.2	0.030	20:2 $\omega$ 6	0.2	0.008	0.2	0.006
18:3 $\omega$ 3	1.2	0.140	1.1	0.138	18:3 $\omega$ 3	0.7	0.031	0.5	0.017
20:3 $\omega$ 3	0.1	0.016	0.1	0.017	20:3 $\omega$ 3	0.2	0.008	0.1	0.003
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6	0.0	0.002		0.000
18:4 $\omega$ 3	3.8	0.430	3.4	0.437	18:4 $\omega$ 3	1.0	0.046	1.0	0.031
20:4 $\omega$ 6	0.4	0.047	0.5	0.058	20:4 $\omega$ 6	0.7	0.033	0.6	0.020
20:5 $\omega$ 3	7.3	0.837	7.3	0.931	20:5 $\omega$ 3	4.5	0.216	4.1	0.134
22:5 $\omega$ 3	0.7	0.082	0.7	0.088	22:5 $\omega$ 3	0.5	0.026	0.7	0.021
22:6 $\omega$ 3	10.0	1.152	10.0	1.266	22:6 $\omega$ 3	7.4	0.354	9.3	0.302
<b>TOTALS:</b>					<b>TOTALS:</b>				
Saturates	21.6	2.480	21.7	2.752	Saturates	21.1	1.008	19.6	0.637
Monounsaturates	47.4	5.441	47.6	6.044	Monounsaturates	56.8	2.715	58.0	1.885
Polyunsaturates	25.3	2.901	24.7	3.138	Polyunsaturates	16.2	0.777	17.5	0.567
Omega-3's	23.2	2.658	22.6	2.877	Omega-3's	14.2	0.681	15.7	0.508
Omega-6's	2.1	0.243	2.1	0.262	Omega-6's	2.0	0.095	1.8	0.059

**Herring, Atlantic (cont.)**

***Clupea harengus harengus***

		RAW		COOKED				RAW		COOKED	
Date of capture		07/21/86		07/21/86		Date of capture		11/15/86		11/15/86	
% Fat		10.68		11.36		% Fat		6.87		9.12	
% Moisture		69.29		64.06		% Moisture		75.25		67.31	
% Ash		2.53		2.69		% Ash		2.01		3.15	
mg% Cholesterol		84.00		86.99		mg% Cholesterol		93.13		113.34	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	7.5	0.745	6.2	0.654	14:0	8.4	0.531	9.0	0.763		
15:0		0.000	0.4	0.039	15:0	0.4	0.026	0.4	0.036		
16:0	12.0	1.193	11.0	1.174	16:0	11.8	0.747	12.0	1.015		
17:0		0.000		0.000	17:0		0.000		0.000		
18:0	0.9	0.089	0.9	0.098	18:0	1.1	0.073	1.0	0.088		
20:0		0.000	0.2	0.017	20:0	0.2	0.010	0.2	0.014		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1ω7	5.6	0.556	4.8	0.513	16:1ω7	5.0	0.320	5.3	0.451		
16:1ω5		0.000		0.000	16:1ω5	0.3	0.018	0.3	0.025		
18:1ω9	5.4	0.543	5.2	0.556	18:1ω9	5.4	0.343	5.5	0.467		
18:1ω7	1.5	0.154	1.5	0.162	18:1ω7	1.3	0.079	1.4	0.117		
18:1ω5	0.4	0.036	0.3	0.037	18:1ω5	0.3	0.022	0.3	0.029		
20:1ω11		0.000		0.000	20:1ω11		0.000		0.000		
20:1ω9	12.9	1.287	13.0	1.379	20:1ω9	11.6	0.734	11.3	0.954		
20:1ω7		0.000		0.000	20:1ω7	0.2	0.012	0.2	0.015		
Sum 20:1's	12.9	1.287	13.0	1.379	Sum 20:1ω's	11.8	0.746	11.5	0.969		
22:1ω13+11	24.4	2.437	25.3	2.686	22:1ω13+11	22.4	1.418	22.1	1.874		
22:1ω9		0.000		0.000	22:1ω9	0.9	0.054	0.8	0.069		
22:1ω7		0.000		0.000	22:1ω7	0.1	0.008	0.1	0.010		
Sum 22:1's	24.4	2.437	25.3	2.686	Sum 22:1ω's	23.3	1.480	23.1	1.953		
18:2ω6	1.3	0.126	1.1	0.121	18:2ω6	0.9	0.059	1.1	0.092		
20:2ω6		0.000	0.2	0.019	20:2ω6	0.1	0.008	0.1	0.010		
18:3ω3	0.9	0.088	0.8	0.088	18:3ω3	0.7	0.045	0.8	0.065		
20:3ω3		0.000	0.1	0.011	20:3ω3	0.1	0.005	0.1	0.007		
20:3ω6		0.000	0.1	0.008	20:3ω6	0.0	0.002		0.000		
18:4ω3	2.5	0.251	2.6	0.275	18:4ω3	1.6	0.104	1.8	0.150		
20:4ω6	0.3	0.027	0.3	0.031	20:4ω6	0.4	0.027	0.4	0.035		
20:5ω3	7.3	0.729	7.5	0.799	20:5ω3	7.2	0.455	7.2	0.608		
22:5ω3	0.8	0.084	0.9	0.092	22:5ω3	1.0	0.061	0.9	0.079		
22:6ω3	9.3	0.927	10.8	1.151	22:6ω3	10.0	0.631	9.2	0.781		
					24:1ω?	0.6	0.041	0.6	0.052		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates	20.1	2.027	18.5	1.968	Saturates	21.9	1.387	22.6	1.916		
Monounsaturates	50.2	5.013	50.2	7.301	Monounsaturates	47.5	3.008	47.4	4.011		
Polyunsaturates	22.4	2.232	24.8	2.641	Polyunsaturates	22.5	1.438	22.2	1.879		
Omega-3's	20.8	2.079	23.2	2.462	Omega-3's	20.5	1.301	20.0	1.683		
Omega-6's	1.5	0.153	1.7	0.179	Omega-6's	1.5	0.096	1.6	0.137		

**Mackerel, Atlantic**  
***Scomber scombrus***

	RAW		COOKED			RAW		COOKED	
Date of capture	07/02/86		07/02/86		Date of capture	06/11/87		06/11/87	
% Fat	7.06		7.38		% Fat	1.75		1.90	
% Moisture	70.65		67.38		% Moisture	75.94		74.70	
% Ash	1.57		1.54		% Ash	1.11		0.84	
mg% Cholesterol	49.75		55.83		mg% Cholesterol	95.32		102.26	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g
14:0	5.8	0.380	5.7	0.394	14:0	2.8	0.081	2.5	0.079
15:0	0.4	0.027	0.4	0.028	15:0		0.000		0.000
16:0	13.4	0.880	13.2	0.904	16:0	12.3	0.354	13.6	0.434
17:0	0.3	0.019	0.3	0.020	17:0		0.000		0.000
18:0	2.8	0.187	3.0	0.205	18:0	3.9	0.056	4.9	0.078
20:0		0.000		0.000	20:0		0.000		0.000
22:0		0.000		0.000	22:0		0.000		0.000
16:1 $\omega$ 7	3.4	0.224	3.5	0.238	16:1 $\omega$ 7	2.0	0.029	1.6	0.026
16:1 $\omega$ 5	0.3	0.022	0.3	0.024	16:1 $\omega$ 5		0.000		0.000
18:1 $\omega$ 9	7.6	0.497	8.2	0.560	18:1 $\omega$ 9	6.4	0.092	5.8	0.092
18:1 $\omega$ 7	1.9	0.125	2.0	0.139	18:1 $\omega$ 7	2.1	0.030	2.4	0.039
18:1 $\omega$ 5	0.4	0.026	0.4	0.027	18:1 $\omega$ 5		0.000		0.000
20:1 $\omega$ 11		0.000		0.000	20:1 $\omega$ 11		0.000		0.000
20:1 $\omega$ 9	12.6	0.826	12.4	0.853	20:1 $\omega$ 9	11.5	0.166	9.4	0.150
20:1 $\omega$ 7		0.000	0.3	0.022	20:1 $\omega$ 7	0.9	0.013	0.4	0.006
Sum 20:1's	12.6	0.826	12.7	0.875	Sum 20:1's	12.4	0.179	9.8	0.156
22:1 $\omega$ 13+11	21.4	1.407	20.4	1.402	22:1 $\omega$ 13+11	16.8	0.243	13.8	0.220
22:1 $\omega$ 9	1.2	0.077	1.2	0.079	22:1 $\omega$ 9	1.5	0.022	1.3	0.020
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000
Sum 22:1's	22.6	1.483	21.6	1.481	Sum 22:1's	18.4	0.265	15.1	0.240
18:2 $\omega$ 6	1.7	0.112	1.7	0.119	18:2 $\omega$ 6	1.3	0.019	1.4	0.023
20:2 $\omega$ 6		0.000		0.000	20:2 $\omega$ 6	0.3	0.004	0.3	0.004
18:3 $\omega$ 3	1.4	0.089	1.3	0.089	18:3 $\omega$ 3	0.5	0.007	0.5	0.008
20:3 $\omega$ 3		0.000		0.000	20:3 $\omega$ 3		0.000		0.000
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000
18:4 $\omega$ 3	3.5	0.228	3.4	0.231	18:4 $\omega$ 3	0.8	0.011	0.7	0.011
20:4 $\omega$ 6		0.000		0.000	20:4 $\omega$ 6	0.7	0.010	1.0	0.016
20:5 $\omega$ 3	5.2	0.341	5.3	0.362	20:5 $\omega$ 3	5.5	0.079	6.7	0.106
22:5 $\omega$ 3	1.0	0.069	1.0	0.069	22:5 $\omega$ 3	1.4	0.020	1.6	0.026
22:6 $\omega$ 3	12.3	0.809	12.1	0.831	22:6 $\omega$ 3	21.5	0.310	25.7	0.408
<b>TOTALS:</b>					<b>TOTALS:</b>				
Saturates	22.8	1.493	22.6	1.550	Saturates	19.0	0.491	21.1	0.592
Monounsaturates	48.8	3.203	48.7	3.343	Monounsaturates	43.8	0.631	35.8	0.569
Polyunsaturates	25.1	1.648	24.8	1.702	Polyunsaturates	32.0	0.461	37.9	0.602
Omega-3's	23.4	1.536	23.1	1.583	Omega-3's	29.7	0.427	35.2	0.560
Omega-6's	1.7	0.112	1.7	0.119	Omega-6's	2.3	0.034	2.7	0.043

**Monkfish**  
*Lophius americanus*

		RAW		COOKED				RAW		COOKED	
Date of capture		11/01/85		11/01/85		Date of capture		07/31/86		07/31/86	
% Fat		0.31		0.80		% Fat		0.58		0.86	
% Moisture		84.96		76.86		% Moisture		81.65		73.94	
% Ash		1.12		1.06		% Ash		1.04		1.04	
mg% Cholesterol		42.78		81.10		mg% Cholesterol		53.23		75.67	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	1.3	0.003	0.8	0.005	14:0	1.3	0.005	1.0	0.006		
15:0	0.3	0.001	0.2	0.001	15:0	0.2	0.001	0.2	0.001		
16:0	22.0	0.042	16.1	0.088	16:0	14.6	0.055	14.8	0.090		
17:0		0.000		0.000	17:0	0.1	0.000	0.7	0.004		
18:0	6.8	0.013	6.2	0.034	18:0	3.5	0.013	3.5	0.021		
20:0		0.000		0.000	20:0		0.000		0.000		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1 $\omega$ 7	4.0	0.008	2.7	0.015	16:1 $\omega$ 7	2.5	0.010	2.0	0.012		
16:1 $\omega$ 5		0.000		0.000	16:1 $\omega$ 5	0.3	0.001	0.3	0.002		
18:1 $\omega$ 9	11.2	0.022	10.2	0.056	18:1 $\omega$ 9	9.4	0.036	7.2	0.044		
18:1 $\omega$ 7	3.6	0.007	3.5	0.019	18:1 $\omega$ 7	2.6	0.010	1.9	0.012		
18:1 $\omega$ 5		0.000		0.000	18:1 $\omega$ 5		0.000	0.2	0.001		
20:1 $\omega$ 11		0.000		0.000	20:1 $\omega$ 11		0.000		0.000		
20:1 $\omega$ 9	1.6	0.003	1.6	0.009	20:1 $\omega$ 9	3.7	0.014	3.2	0.019		
20:1 $\omega$ 7		0.000		0.000	20:1 $\omega$ 7		0.000		0.000		
Sum 20:1's	1.6	0.003	1.6	0.009	Sum 20:1's	3.7	0.014	3.2	0.019		
22:1 $\omega$ 13+11		0.000	0.6	0.003	22:1 $\omega$ 13+11	1.5	0.006	1.3	0.008		
22:1 $\omega$ 9		0.000		0.000	22:1 $\omega$ 9		0.000		0.000		
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	0.0	0.000	0.6	0.003	Sum 22:1's	1.5	0.006	1.3	0.008		
18:2 $\omega$ 6	1.8	0.003	1.4	0.008	18:2 $\omega$ 6	1.5	0.006	1.4	0.009		
20:2 $\omega$ 6		0.000		0.000	20:2 $\omega$ 6		0.000		0.000		
18:3 $\omega$ 3		0.000		0.000	18:3 $\omega$ 3	0.2	0.001	0.3	0.002		
20:3 $\omega$ 3		0.000		0.000	20:3 $\omega$ 3		0.000		0.000		
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3		0.000		0.000	18:4 $\omega$ 3	0.4	0.002	0.5	0.003		
20:4 $\omega$ 6	6.3	0.012	5.8	0.032	20:4 $\omega$ 6	2.8	0.011	3.1	0.019		
20:5 $\omega$ 3	10.6	0.020	9.5	0.052	20:5 $\omega$ 3	7.0	0.027	7.6	0.046		
22:5 $\omega$ 3	2.0	0.004	2.0	0.011	22:5 $\omega$ 3	1.4	0.005	1.3	0.008		
22:6 $\omega$ 3	23.3	0.045	24.8	0.136	22:6 $\omega$ 3	28.8	0.109	28.2	0.172		
TOTALS:					TOTALS:						
Saturates	30.4	0.059	23.4	0.128	Saturates	19.7	0.075	20.3	0.123		
Monounsaturates	20.4	0.039	18.7	0.102	Monounsaturates	20.0	0.076	16.1	0.098		
Polyunsaturates	43.9	0.084	43.6	0.238	Polyunsaturates	42.1	0.160	42.3	0.257		
Omega-3's	35.8	0.069	36.3	0.198	Omega-3's	37.8	0.143	37.9	0.230		
Omega-6's	8.1	0.016	7.3	0.040	Omega-6's	4.3	0.016	4.5	0.027		



**Ocean Perch**  
*Sebastes fasciatus*

		RAW		COOKED				RAW		COOKED	
Date of capture		07/10/85		07/10/85		Date of capture		09/25/86		09/25/86	
% Fat		1.09		1.03		% Fat		1.87		2.10	
% Moisture		78.66		75.83		% Moisture		78.43		74.36	
% Ash		1.50		0.81		% Ash		1.20		1.28	
mg% Cholesterol		53.07		60.87		mg% Cholesterol		59.61		65.71	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	N.D.	N.D.	N.D.	N.D.	14:0	5.4	0.086	4.2	0.077		
15:0	N.D.	N.D.	N.D.	N.D.	15:0	0.5	0.007	0.4	0.007		
16:0	N.D.	N.D.	N.D.	N.D.	16:0	13.7	0.217	13.4	0.242		
17:0	N.D.	N.D.	N.D.	N.D.	17:0	0.2	0.004	0.2	0.004		
18:0	N.D.	N.D.	N.D.	N.D.	18:0	2.6	0.041	2.8	0.051		
20:0	N.D.	N.D.	N.D.	N.D.	20:0		0.000	0.1	0.002		
22:0	N.D.	N.D.	N.D.	N.D.	22:0		0.000		0.000		
24:0	N.D.	N.D.	N.D.	N.D.	16:1ω7	5.0	0.080	4.6	0.084		
16:1ω7	N.D.	N.D.	N.D.	N.D.	16:1ω5	0.4	0.006	0.4	0.006		
16:1ω5	N.D.	N.D.	N.D.	N.D.	18:1ω9	10.7	0.169	10.8	0.195		
18:1ω9	N.D.	N.D.	N.D.	N.D.	18:1ω7	2.9	0.046	2.9	0.053		
18:1ω7	N.D.	N.D.	N.D.	N.D.	18:1ω5	0.5	0.008	0.5	0.009		
18:1ω5	N.D.	N.D.	N.D.	N.D.	20:1ω11	0.8	0.012	0.7	0.013		
20:1ω11	N.D.	N.D.	N.D.	N.D.	20:1ω9	5.0	0.079	5.1	0.091		
20:1ω9	N.D.	N.D.	N.D.	N.D.	20:1ω7	0.3	0.005	0.3	0.006		
20:1ω7	N.D.	N.D.	N.D.	N.D.	Sum 20:1's	6.0	0.096	6.1	0.110		
Sum 20:1's	N.D.	N.D.	N.D.	N.D.	22:1ω13+11	6.5	0.103	6.5	0.116		
22:1ω13+11	N.D.	N.D.	N.D.	N.D.	22:1ω9	0.6	0.009	0.6	0.011		
22:1ω9	N.D.	N.D.	N.D.	N.D.	22:1ω7		0.000		0.000		
22:1ω7	N.D.	N.D.	N.D.	N.D.	Sum 22:1's	7.1	0.112	7.1	0.128		
Sum 22:1's	N.D.	N.D.	N.D.	N.D.	18:2ω6	1.5	0.024	1.5	0.027		
18:2ω6	N.D.	N.D.	N.D.	N.D.	20:2ω6	0.2	0.004	0.2	0.004		
20:2ω6	N.D.	N.D.	N.D.	N.D.	18:3ω3	0.9	0.014	0.8	0.014		
18:3ω3	N.D.	N.D.	N.D.	N.D.	20:3ω3		0.000	0.1	0.002		
20:3ω3	N.D.	N.D.	N.D.	N.D.	20:3ω6		0.000		0.000		
20:3ω6	N.D.	N.D.	N.D.	N.D.	18:4ω3	2.3	0.037	1.9	0.034		
18:4ω3	N.D.	N.D.	N.D.	N.D.	20:4ω6	1.5	0.024	1.7	0.030		
20:4ω6	N.D.	N.D.	N.D.	N.D.	20:5ω3	11.0	0.175	10.8	0.195		
20:5ω3	N.D.	N.D.	N.D.	N.D.	22:5ω3	1.0	0.016	1.0	0.019		
22:5ω3	N.D.	N.D.	N.D.	N.D.	22:6ω3	20.4	0.324	22.4	0.405		
22:6ω3	N.D.	N.D.	N.D.	N.D.	TOTALS:						
					Saturates	22.4	0.356	21.2	0.383		
					Monounsaturates	32.6	0.518	32.4	0.585		
					Polyunsaturates	38.8	0.617	40.5	0.730		
					Omega-3's	35.5	0.565	37.1	0.669		
					Omega-6's	3.3	0.052	3.4	0.061		

**Ocean Pout**  
*Macrozoarces americanus*

		RAW		COOKED				RAW		COOKED	
Date of capture		01/05/87		01/05/87		Date of capture		05/08/87		05/08/87	
% Fat		0.63		1.15		% Fat		1.07		1.60	
% Moisture		82.00		74.36		% Moisture		79.65		73.04	
% Ash		1.12		1.05		% Ash		0.82		0.90	
mg% Cholesterol		63.25		94.62		mg% Cholesterol		98.01		147.23	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	1.1	0.005	0.9	0.008	14:0	2.1	0.033	2.2	0.056		
15:0	0.2	0.001	0.2	0.002	15:0		0.000		0.000		
16:0	14.4	0.058	14.4	0.124	16:0	12.7	0.199	12.7	0.323		
17:0	0.3	0.001	0.3	0.002	17:0		0.000		0.000		
18:0	4.9	0.020	4.2	0.037	18:0	3.8	0.030	3.8	0.048		
20:0		0.000		0.000	20:0		0.000		0.000		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1 $\omega$ 7	2.5	0.010	3.7	0.032	16:1 $\omega$ 7	4.1	0.032	4.0	0.050		
16:1 $\omega$ 5	0.3	0.001	0.3	0.002	16:1 $\omega$ 5	0.2	0.002	0.2	0.003		
18:1 $\omega$ 9	12.7	0.052	14.1	0.122	18:1 $\omega$ 9	14.5	0.113	16.1	0.204		
18:1 $\omega$ 7	4.2	0.017	4.5	0.039	18:1 $\omega$ 7	3.9	0.031	3.7	0.047		
18:1 $\omega$ 5	0.4	0.002	0.4	0.003	18:1 $\omega$ 5	0.4	0.003	0.4	0.005		
20:1 $\omega$ 11	1.3	0.005	1.2	0.010	20:1 $\omega$ 11	2.5	0.020	2.5	0.032		
20:1 $\omega$ 9	0.9	0.004	0.9	0.007	20:1 $\omega$ 9	1.1	0.009	1.7	0.022		
20:1 $\omega$ 7	0.8	0.003	1.0	0.009	20:1 $\omega$ 7	1.1	0.009	0.8	0.010		
Sum 20:1's	3.0	0.012	3.1	0.027	Sum 20:1's	4.8	0.038	5.1	0.064		
22:1 $\omega$ 13+11		0.000		0.000	22:1 $\omega$ 13+11	1.1	0.008	1.3	0.017		
22:1 $\omega$ 9		0.000		0.000	22:1 $\omega$ 9	0.3	0.002	0.3	0.003		
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	0.0	0.000	0.0	0.000	Sum 22:1's	1.3	0.010	1.6	0.020		
18:2 $\omega$ 6	0.6	0.002	0.6	0.005	18:2 $\omega$ 6	0.5	0.004	0.6	0.008		
20:2 $\omega$ 6	0.3	0.001	0.4	0.004	20:2 $\omega$ 6	0.7	0.005	0.2	0.003		
18:3 $\omega$ 3	0.2	0.001	0.3	0.003	18:3 $\omega$ 3	0.2	0.001	0.2	0.002		
20:3 $\omega$ 3		0.000	0.2	0.002	20:3 $\omega$ 3		0.000		0.000		
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3	0.3	0.001	0.3	0.002	18:4 $\omega$ 3	0.3	0.002	0.3	0.004		
20:4 $\omega$ 6	3.5	0.014	3.1	0.026	20:4 $\omega$ 6	4.5	0.035	3.9	0.050		
20:5 $\omega$ 3	20.7	0.084	20.7	0.178	20:5 $\omega$ 3	17.1	0.134	15.9	0.202		
22:5 $\omega$ 3	2.5	0.010	3.3	0.029	22:5 $\omega$ 3	1.6	0.013	1.4	0.018		
22:6 $\omega$ 3	18.7	0.076	16.9	0.146	22:6 $\omega$ 3	16.5	0.129	18.6	0.237		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates	21.0	0.085	20.0	0.173	Saturates	18.7	0.262	18.7	0.427		
Monounsaturates	23.2	0.094	26.0	0.224	Monounsaturates	29.7	0.232	31.5	0.399		
Polyunsaturates	46.8	0.189	45.8	0.395	Polyunsaturates	41.4	0.324	41.3	0.523		
Omega-3's	42.4	0.172	41.7	0.359	Omega-3's	35.7	0.280	36.5	0.463		
Omega-6's	4.4	0.018	4.1	0.035	Omega-6's	5.7	0.044	4.8	0.060		

**Pollock**  
*Pollachius virens*

		RAW		COOKED				RAW		COOKED	
Date of capture		09/06/85		09/06/85		Date of capture		01/10/86		01/10/86	
% Fat		0.45		1.05		% Fat		0.59		0.84	
% Moisture		80.16		75.59		% Moisture		78.25		74.84	
% Ash		1.33		1.60		% Ash		1.57		1.41	
mg% Cholesterol		54.88		60.72		mg% Cholesterol		58.06		63.51	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	1.2	0.003	1.2	0.010	14:0	0.8	0.003	0.8	0.005		
15:0	0.3	0.001	0.3	0.002	15:0	0.2	0.001	0.2	0.001		
16:0	17.6	0.050	18.0	0.145	16:0	14.4	0.055	14.8	0.089		
17:0	0.2	0.001	0.2	0.002	17:0	0.4	0.002	0.4	0.002		
18:0	4.9	0.014	5.0	0.041	18:0	4.9	0.019	4.7	0.028		
20:0		0.000		0.000	20:0		0.000		0.000		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1 $\omega$ 7	1.0	0.003	1.0	0.008	16:1 $\omega$ 7	1.3	0.005	1.3	0.008		
16:1 $\omega$ 5	0.2	0.001	0.2	0.002	16:1 $\omega$ 5	0.2	0.001	0.2	0.001		
18:1 $\omega$ 9	8.8	0.025	9.1	0.073	18:1 $\omega$ 9	9.8	0.037	8.4	0.051		
18:1 $\omega$ 7	3.1	0.009	3.4	0.027	18:1 $\omega$ 7	3.4	0.013	3.1	0.019		
18:1 $\omega$ 5		0.000	0.2	0.002	18:1 $\omega$ 5	0.1	0.001	0.1	0.001		
20:1 $\omega$ 11		0.000		0.000	20:1 $\omega$ 11	0.3	0.001		0.000		
20:1 $\omega$ 9	1.8	0.005	1.9	0.016	20:1 $\omega$ 9	2.0	0.008	2.3	0.014		
20:1 $\omega$ 7		0.000		0.000	20:1 $\omega$ 7		0.000	0.1	0.001		
Sum 20:1's	1.8	0.005	1.9	0.016	Sum 20:1's	2.3	0.009	2.4	0.015		
22:1 $\omega$ 13+11	0.8	0.002	0.8	0.006	22:1 $\omega$ 13+11	0.7	0.003	1.2	0.007		
22:1 $\omega$ 9		0.000	0.1	0.001	22:1 $\omega$ 9		0.000		0.000		
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	0.8	0.002	0.9	0.007	Sum 22:1's	0.7	0.003	1.2	0.007		
18:2 $\omega$ 6	1.0	0.003	1.1	0.009	18:2 $\omega$ 6	1.0	0.004	0.9	0.005		
20:2 $\omega$ 6		0.000	0.2	0.002	20:2 $\omega$ 6		0.000		0.000		
18:3 $\omega$ 3	0.3	0.001	0.4	0.003	18:3 $\omega$ 3	0.4	0.002	0.4	0.003		
20:3 $\omega$ 3		0.000	0.3	0.002	20:3 $\omega$ 3		0.000		0.000		
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3	0.5	0.001	0.6	0.005	18:4 $\omega$ 3	0.6	0.002	0.6	0.003		
20:4 $\omega$ 6	2.0	0.006	2.1	0.017	20:4 $\omega$ 6	1.8	0.007	1.8	0.011		
20:5 $\omega$ 3	13.0	0.037	13.7	0.110	20:5 $\omega$ 3	11.4	0.043	11.5	0.069		
22:5 $\omega$ 3	1.2	0.003	1.1	0.009	22:5 $\omega$ 3	1.2	0.004	0.9	0.006		
22:6 $\omega$ 3	36.7	0.104	35.6	0.286	22:6 $\omega$ 3	40.4	0.155	38.4	0.231		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates	24.2	0.069	24.7	0.199	Saturates	20.7	0.079	20.9	0.126		
Monounsaturates	15.8	0.045	16.8	0.135	Monounsaturates	17.8	0.068	16.8	0.101		
Polyunsaturates	54.7	0.156	55.2	0.444	Polyunsaturates	56.8	0.217	54.5	0.328		
Omega-3's	51.7	0.147	51.7	0.416	Omega-3's	53.9	0.207	51.8	0.311		
Omega-6's	3.0	0.009	3.5	0.028	Omega-6's	2.8	0.011	2.7	0.016		

**Skate, Thorny**  
***Raja radiata***

	RAW		COOKED	
Date of capture	02/25/86		02/25/86	
% Fat	0.69		0.90	
% Moisture	79.51		76.40	
% Ash	1.25		1.11	
mg% Cholesterol	55.76		80.39	
FAME	% FAME	g/100g	% FAME	g/100g
14:0	0.4	0.002	0.5	0.003
15:0	0.4	0.002	0.3	0.002
16:0	18.6	0.086	21.1	0.135
17:0	1.3	0.006	0.9	0.006
18:0	5.6	0.026	5.2	0.034
20:0		0.000		0.000
22:0		0.000		0.000
16:1 $\omega$ 7	1.8	0.008	1.8	0.012
16:1 $\omega$ 5	0.4	0.002	0.4	0.003
18:1 $\omega$ 9	8.0	0.037	10.1	0.065
18:1 $\omega$ 7	4.9	0.023	5.0	0.032
18:1 $\omega$ 5	0.5	0.002	0.6	0.004
20:1 $\omega$ 11	0.4	0.002		0.000
20:1 $\omega$ 9	1.1	0.005	1.3	0.008
20:1 $\omega$ 7	0.4	0.002		0.000
Sum 20:1's	1.9	0.009	1.3	0.008
22:1 $\omega$ 13+11		0.000		0.000
22:1 $\omega$ 9		0.000		0.000
22:1 $\omega$ 7		0.000		0.000
Sum 22:1's	0.0	0.000	0.0	0.000
18:2 $\omega$ 6	1.1	0.005	1.2	0.008
20:2 $\omega$ 6		0.000	0.3	0.002
18:3 $\omega$ 3	0.2	0.001		0.000
20:3 $\omega$ 3		0.000		0.000
20:3 $\omega$ 6		0.000		0.000
18:4 $\omega$ 3		0.000		0.000
20:4 $\omega$ 6	4.3	0.020	5.2	0.034
20:5 $\omega$ 3	9.4	0.044	7.0	0.045
22:5 $\omega$ 3	5.6	0.026	4.5	0.029
22:6 $\omega$ 3	26.2	0.122	27.7	0.178
<b>TOTALS:</b>				
Saturates	26.2	0.122	28.0	0.180
Monounsaturates	17.4	0.081	19.2	0.123
Polyunsaturates	46.8	0.217	45.9	0.295
Omega-3's	41.4	0.192	39.2	0.251
Omega-6's	5.4	0.025	6.7	0.043

**Skate, Winter**  
***Raja ocellata***

		RAW		COOKED				RAW		COOKED	
Date of capture		02/19/87		02/19/87		Date of capture		03/26/87		03/26/87	
% Fat		0.67		1.00		% Fat		0.68		0.80	
% Moisture		78.91		75.64		% Moisture		77.78		74.04	
% Ash		1.12		1.13		% Ash		0.97		1.02	
mg% Cholesterol		52.65		64.60		mg% Cholesterol		60.30		68.27	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	0.4	0.002	0.5	0.004	14:0	0.4	0.002	0.4	0.002		
15:0	0.2	0.001	0.2	0.001	15:0	0.2	0.001	0.2	0.001		
16:0	21.5	0.096	21.5	0.161	16:0	22.1	0.099	21.6	0.120		
17:0	0.4	0.002	0.4	0.003	17:0	0.3	0.002	0.4	0.002		
18:0	4.4	0.020	4.8	0.036	18:0	3.9	0.017	4.1	0.023		
20:0		0.000		0.000	20:0		0.000		0.000		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1 $\omega$ 7	1.1	0.005	1.3	0.010	16:1 $\omega$ 7	1.3	0.006	1.2	0.007		
16:1 $\omega$ 5	0.3	0.001	0.3	0.002	16:1 $\omega$ 5	0.3	0.001	0.3	0.002		
18:1 $\omega$ 9	7.0	0.031	8.6	0.064	18:1 $\omega$ 9	8.5	0.039	8.5	0.048		
18:1 $\omega$ 7	3.1	0.014	3.6	0.027	18:1 $\omega$ 7	3.3	0.015	3.4	0.019		
18:1 $\omega$ 5	0.2	0.001	0.3	0.002	18:1 $\omega$ 5	0.3	0.001	0.3	0.001		
20:1 $\omega$ 11	0.2	0.001	0.2	0.001	20:1 $\omega$ 11	0.3	0.001	0.3	0.002		
20:1 $\omega$ 9	1.9	0.008	2.1	0.016	20:1 $\omega$ 9	2.1	0.010	2.3	0.013		
20:1 $\omega$ 7		0.000		0.000	20:1 $\omega$ 7	0.1	0.001	0.1	0.001		
Sum 20:1's	2.0	0.009	2.3	0.017	Sum 20:1's	2.6	0.012	2.8	0.016		
22:1 $\omega$ 13+11		0.000		0.000	22:1 $\omega$ 13+11		0.000		0.000		
22:1 $\omega$ 9		0.000		0.000	22:1 $\omega$ 9		0.000		0.000		
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	0.0	0.000	0.0	0.000	Sum 22:1's	0.0	0.000	0.0	0.000		
18:2 $\omega$ 6	2.2	0.010	2.3	0.017	18:2 $\omega$ 6	1.7	0.008	1.8	0.010		
20:2 $\omega$ 6	0.3	0.001	0.4	0.003	20:2 $\omega$ 6	0.3	0.001	0.3	0.002		
18:3 $\omega$ 3	0.4	0.002	0.4	0.003	18:3 $\omega$ 3	0.3	0.002	0.3	0.002		
20:3 $\omega$ 3	0.2	0.001		0.000	20:3 $\omega$ 3	0.1	0.000	0.1	0.001		
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3	0.2	0.001	0.2	0.001	18:4 $\omega$ 3	0.1	0.001	0.1	0.001		
20:4 $\omega$ 6	3.0	0.013	3.0	0.022	20:4 $\omega$ 6	2.9	0.013	3.0	0.017		
20:5 $\omega$ 3	6.7	0.030	6.3	0.047	20:5 $\omega$ 3	6.3	0.028	6.0	0.034		
22:5 $\omega$ 3	4.0	0.018	3.8	0.028	22:5 $\omega$ 3	4.8	0.022	4.7	0.026		
22:6 $\omega$ 3	35.5	0.159	34.1	0.255	22:6 $\omega$ 3	32.4	0.146	33.2	0.185		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates	26.9	0.121	27.3	0.204	Saturates	26.9	0.121	26.7	0.149		
Monounsaturates	13.8	0.062	16.4	0.122	Monounsaturates	16.3	0.073	16.5	0.092		
Polyunsaturates	52.5	0.235	50.3	0.376	Polyunsaturates	49.1	0.221	49.7	0.277		
Omega-3's	47.0	0.211	44.7	0.334	Omega-3's	44.1	0.199	44.6	0.249		
Omega-6's	5.5	0.025	5.6	0.042	Omega-6's	5.0	0.022	5.1	0.028		

**Sole, Gray**  
*Glyptocephalus cynoglossus*

		RAW		COOKED				RAW		COOKED	
Date of capture		05/29/86		05/29/86		Date of capture		11/06/86		11/06/86	
% Fat		0.72		0.93		% Fat		0.80		1.08	
% Moisture		81.44		76.55		% Moisture		79.62		76.61	
% Ash		1.01		0.90		% Ash		1.40		1.26	
mg% Cholesterol		53.50		68.03		mg% Cholesterol		49.01		60.63	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	3.2	0.016	2.5	0.017	14:0	2.9	0.017	2.7	0.023		
15:0	1.1	0.005	1.2	0.008	15:0	1.0	0.005	0.8	0.007		
16:0	27.0	0.134	37.4	0.255	16:0	18.5	0.107	18.7	0.156		
17:0	1.0	0.005	1.1	0.007	17:0	0.6	0.004	0.5	0.005		
18:0	7.4	0.036	10.4	0.071	18:0	3.6	0.020	3.8	0.032		
20:0		0.000		0.000	20:0		0.000		0.000		
22:0		0.000		0.000	22:0		0.000		0.000		
16:1 $\omega$ 7	7.2	0.035	4.5	0.030	16:1 $\omega$ 7	4.8	0.028	3.8	0.031		
16:1 $\omega$ 5	0.8	0.004	1.0	0.007	16:1 $\omega$ 5	0.7	0.004	0.7	0.006		
18:1 $\omega$ 9	10.4	0.052	10.2	0.069	18:1 $\omega$ 9	6.2	0.036	5.5	0.046		
18:1 $\omega$ 7	6.4	0.031	6.6	0.045	18:1 $\omega$ 7	4.2	0.024	3.6	0.030		
18:1 $\omega$ 5	0.7	0.003	0.7	0.004	18:1 $\omega$ 5	0.4	0.002	0.3	0.003		
20:1 $\omega$ 11	2.3	0.012	1.2	0.008	20:1 $\omega$ 11	1.1	0.006	0.8	0.007		
20:1 $\omega$ 9	1.5	0.008	1.0	0.007	20:1 $\omega$ 9	1.3	0.007	0.7	0.006		
20:1 $\omega$ 7	3.6	0.018	2.4	0.016	20:1 $\omega$ 7	1.7	0.010	1.4	0.012		
Sum 20:1's	7.5	0.037	4.6	0.031	Sum 20:1's	4.0	0.023	2.9	0.024		
22:1 $\omega$ 13+11		0.000		0.000	22:1 $\omega$ 13+11		0.000		0.000		
22:1 $\omega$ 9		0.000		0.000	22:1 $\omega$ 9		0.000		0.000		
22:1 $\omega$ 7		0.000		0.000	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	0.0	0.000	0.0	0.000	Sum 22:1's	0.0	0.000	0.0	0.000		
18:2 $\omega$ 6	0.6	0.003	0.5	0.004	18:2 $\omega$ 6	0.7	0.004	0.7	0.006		
20:2 $\omega$ 6		0.000	0.3	0.002	20:2 $\omega$ 6		0.000		0.000		
18:3 $\omega$ 3		0.000		0.000	18:3 $\omega$ 3		0.000		0.000		
20:3 $\omega$ 3		0.000		0.000	20:3 $\omega$ 3		0.000		0.000		
20:3 $\omega$ 6		0.000		0.000	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3	0.8	0.004		0.000	18:4 $\omega$ 3	0.6	0.004	0.7	0.006		
20:4 $\omega$ 6	1.9	0.010	1.3	0.009	20:4 $\omega$ 6	3.7	0.021	4.1	0.034		
20:5 $\omega$ 3	7.3	0.036	4.0	0.027	20:5 $\omega$ 3	19.1	0.110	21.7	0.181		
22:5 $\omega$ 3	1.9	0.010	1.0	0.007	22:5 $\omega$ 3	5.0	0.029	4.8	0.040		
22:6 $\omega$ 3	5.4	0.027	2.9	0.020	22:6 $\omega$ 3	16.8	0.097	18.2	0.151		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates	39.7	0.197	52.6	0.359	Saturates	26.5	0.153	26.6	0.222		
Monounsaturates	32.9	0.163	27.5	0.188	Monounsaturates	20.3	0.117	16.7	0.139		
Polyunsaturates	18.0	0.089	10.1	0.069	Polyunsaturates	45.9	0.265	50.2	0.418		
Omega-3's	15.5	0.077	7.9	0.054	Omega-3's	41.5	0.239	45.4	0.378		
Omega-6's	2.5	0.013	2.1	0.015	Omega-6's	4.4	0.025	4.8	0.040		

**Sole, Gray (cont.)**  
*Glyptocephalus cynoglossus*

	RAW		COOKED	
Date of capture	03/05/87		03/05/87	
% Fat	0.81		0.82	
% Moisture	82.59		78.53	
% Ash	1.32		1.15	
mg% Cholesterol	46.58		57.17	
FAME	% FAME	g/100g	% FAME	g/100g
14:0	2.9	0.017	1.8	0.011
15:0	1.0	0.006	0.8	0.005
16:0	14.8	0.087	16.4	0.097
17:0	0.7	0.004	0.6	0.003
18:0	3.0	0.018	3.5	0.020
20:0	0.1	0.001		0.000
22:0	0.5	0.003	0.4	0.002
16:1 $\omega$ 7	4.6	0.027	2.7	0.016
16:1 $\omega$ 5	0.8	0.004	0.6	0.004
18:1 $\omega$ 9	6.7	0.039	5.3	0.031
18:1 $\omega$ 7	4.3	0.025	3.1	0.018
18:1 $\omega$ 5	0.8	0.005	0.5	0.003
20:1 $\omega$ 11	1.5	0.009	0.8	0.005
20:1 $\omega$ 9	1.5	0.009	1.2	0.007
20:1 $\omega$ 7	1.5	0.009	0.9	0.005
Sum 20:1's	4.6	0.027	2.9	0.017
22:1 $\omega$ 13+11		0.000		0.000
22:1 $\omega$ 9		0.000		0.000
22:1 $\omega$ 7		0.000		0.000
Sum 22:1's		0.000		0.000
18:2 $\omega$ 6	0.8	0.005	0.6	0.004
20:2 $\omega$ 6	0.6	0.004	0.4	0.002
18:3 $\omega$ 3	0.3	0.002	0.1	0.001
20:3 $\omega$ 3		0.000		0.000
20:3 $\omega$ 6		0.000		0.000
18:4 $\omega$ 3	0.4	0.002	0.2	0.001
20:4 $\omega$ 6	4.0	0.024	4.8	0.028
20:5 $\omega$ 3	16.9	0.100	19.3	0.113
22:5 $\omega$ 3	4.6	0.027	5.3	0.031
22:6 $\omega$ 3	14.4	0.085	19.2	0.113
<b>TOTALS:</b>				
Saturates	23.1	0.136	23.4	0.138
Monounsaturates	21.7	0.127	15.2	0.090
Polyunsaturates	42.1	0.248	50.1	0.294
Omega-3's	36.7	0.216	44.2	0.260
Omega-6's	5.4	0.032	5.9	0.034

**Tuna, Bluefin  
(tail section)  
*Thunnus thynnus***

	RAW	COOKED
Date of capture	08/08/85	08/08/85
% Fat	23.06	24.41
% Moisture	59.50	52.39
% Ash	0.90	1.54
mg% Cholesterol	53.41	42.13

FAME	% FAME	g/100g	% FAME	g/100g
14:0	N.D.	N.D.	5.7	1.318
15:0	N.D.	N.D.	0.4	0.102
16:0	N.D.	N.D.	17.8	4.116
17:0	N.D.	N.D.	0.3	0.064
18:0	N.D.	N.D.	4.4	1.009
20:0	N.D.	N.D.	0.2	0.038
22:0	N.D.	N.D.	0.0	0.000
16:1 $\omega$ 7	N.D.	N.D.	6.0	1.380
16:1 $\omega$ 5	N.D.	N.D.	0.3	0.062
18:1 $\omega$ 9	N.D.	N.D.	15.3	3.542
18:1 $\omega$ 7	N.D.	N.D.	3.0	0.705
18:1 $\omega$ 5	N.D.	N.D.	0.5	0.125
20:1 $\omega$ 11	N.D.	N.D.	0.0	0.000
20:1 $\omega$ 9	N.D.	N.D.	9.9	2.296
20:1 $\omega$ 7	N.D.	N.D.	0.3	0.072
Sum 20:1's	N.D.	N.D.	10.2	2.368
22:1 $\omega$ 13+11	N.D.	N.D.	12.4	2.883
22:1 $\omega$ 9	N.D.	N.D.	0.8	0.184
22:1 $\omega$ 7	N.D.	N.D.	0.4	0.083
Sum 22:1's	N.D.	N.D.	13.6	3.150
18:2 $\omega$ 6	N.D.	N.D.	1.2	0.277
20:2 $\omega$ 6	N.D.	N.D.	0.2	0.051
18:3 $\omega$ 3	N.D.	N.D.	0.8	0.180
20:3 $\omega$ 3	N.D.	N.D.	0.0	0.000
20:3 $\omega$ 6	N.D.	N.D.	0.0	0.000
18:4 $\omega$ 3	N.D.	N.D.	2.0	0.454
20:4 $\omega$ 6	N.D.	N.D.	0.4	0.086
20:5 $\omega$ 3	N.D.	N.D.	5.3	1.230
22:5 $\omega$ 3	N.D.	N.D.	0.9	0.220
22:6 $\omega$ 3	N.D.	N.D.	6.8	1.584
<b>TOTALS:</b>				
Saturates			28.7	6.646
Monounsaturates			48.9	11.333
Polyunsaturates			17.6	4.081
Omega-3's			15.8	3.667
Omega-6's			1.8	0.414

**Tuna, Yellowfin  
*Thunnus albacares***

	RAW	COOKED
Date of capture	06/02/86	06/02/86
% Fat	4.19	6.54
% Moisture	69.25	65.05
% Ash	2.45	0.99
mg% Cholesterol	44.73	37.14

FAME	% FAME	g/100g	% FAME	g/100g
14:0	2.2	0.085	2.3	0.142
15:0	0.7	0.025	0.7	0.044
16:0	20.4	0.779	21.1	1.280
17:0	0.8	0.030	0.9	0.053
18:0	7.0	0.266	6.9	0.422
20:0		0.000	0.4	0.022
22:0		0.000		0.000
16:1 $\omega$ 7	4.5	0.172	4.7	0.288
16:1 $\omega$ 5		0.000	0.1	0.006
18:1 $\omega$ 9	21.4	0.819	18.6	1.131
18:1 $\omega$ 7		0.000	2.6	0.157
18:1 $\omega$ 5		0.000	0.1	0.008
20:1 $\omega$ 11		0.000	0.2	0.011
20:1 $\omega$ 9	1.0	0.039	1.1	0.069
20:1 $\omega$ 7		0.000	0.2	0.012
Sum 20:1's	1.0	0.039	1.5	0.092
22:1 $\omega$ 13+11		0.000		0.000
22:1 $\omega$ 9		0.000		0.000
22:1 $\omega$ 7		0.000		0.000
Sum 22:1's	0.0	0.000	0.0	0.000
18:2 $\omega$ 6	1.0	0.038	1.0	0.060
20:2 $\omega$ 6		0.000	0.2	0.014
18:3 $\omega$ 3	0.5	0.020	0.6	0.034
20:3 $\omega$ 3		0.000	0.2	0.011
20:3 $\omega$ 6		0.000	0.1	0.007
18:4 $\omega$ 3	0.6	0.023	0.6	0.038
20:4 $\omega$ 6	2.0	0.076	1.7	0.104
20:5 $\omega$ 3	5.6	0.215	5.2	0.313
22:5 $\omega$ 3	1.9	0.074	1.6	0.099
22:6 $\omega$ 3	24.7	0.942	20.1	1.223
<b>TOTALS:</b>				
Saturates	31.0	1.185	32.3	1.962
Monounsaturates	27.0	1.030	27.7	1.682
Polyunsaturates	36.3	1.387	31.3	1.902
Omega-3's	33.3	1.274	28.3	1.718
Omega-6's	3.0	0.113	3.0	0.184



**Wolffish, Atlantic**  
*Anarhichas lupus*

		RAW		COOKED				RAW		COOKED	
Date of capture		06/21/85		06/21/85		Date of capture		03/28/86		03/28/86	
% Fat		5.29		3.15		% Fat		2.14		1.46	
% Moisture		76.13		74.91		% Moisture		79.25		76.37	
% Ash		0.84		1.34		% Ash		1.04		1.11	
mg% Cholesterol		47.27		54.83		mg% Cholesterol		50.48		52.42	
FAME	% FAME	g/100g	% FAME	g/100g	FAME	% FAME	g/100g	% FAME	g/100g		
14:0	2.4	0.116	N.D.	N.D.	14:0	1.7	0.031	1.2	0.015		
15:0	0.5	0.022	N.D.	N.D.	15:0	0.4	0.007	0.3	0.004		
16:0	14.0	0.680	N.D.	N.D.	16:0	14.3	0.266	15.7	0.189		
17:0	0.3	0.015	N.D.	N.D.	17:0	0.3	0.005	0.3	0.003		
18:0	2.3	0.110	N.D.	N.D.	18:0	2.7	0.050	3.5	0.042		
20:0	0.1	0.006	N.D.	N.D.	20:0	0.1	0.002		0.000		
22:0		0.000	N.D.	N.D.	22:0		0.000		0.000		
16:1 $\omega$ 7	10.5	0.511	N.D.	N.D.	16:1 $\omega$ 7	9.0	0.166	6.3	0.076		
16:1 $\omega$ 5	0.2	0.012	N.D.	N.D.	16:1 $\omega$ 5	0.3	0.005	0.3	0.003		
18:1 $\omega$ 9	23.7	1.153	N.D.	N.D.	18:1 $\omega$ 9	18.0	0.335	14.2	0.170		
18:1 $\omega$ 7	5.1	0.246	N.D.	N.D.	18:1 $\omega$ 7	5.9	0.109	5.2	0.062		
18:1 $\omega$ 5	0.5	0.024	N.D.	N.D.	18:1 $\omega$ 5	0.5	0.009	0.4	0.005		
20:1 $\omega$ 11	1.5	0.073	N.D.	N.D.	20:1 $\omega$ 11	1.2	0.021	0.8	0.010		
20:1 $\omega$ 9	1.6	0.079	N.D.	N.D.	20:1 $\omega$ 9	1.8	0.034	1.4	0.016		
20:1 $\omega$ 7		0.000	N.D.	N.D.	20:1 $\omega$ 7	1.4	0.026	1.0	0.012		
Sum 20:1's	3.1	0.152	N.D.	N.D.	Sum 20:1's	4.4	0.081	3.2	0.039		
22:1 $\omega$ 13+11		0.000	N.D.	N.D.	22:1 $\omega$ 13+11		0.000		0.000		
22:1 $\omega$ 9		0.000	N.D.	N.D.	22:1 $\omega$ 9		0.000		0.000		
22:1 $\omega$ 7		0.000	N.D.	N.D.	22:1 $\omega$ 7		0.000		0.000		
Sum 22:1's	0.0	0.000	N.D.	N.D.	Sum 22:1's	0.0	0.000	0.0	0.000		
18:2 $\omega$ 6	0.5	0.024	N.D.	N.D.	18:2 $\omega$ 6	0.7	0.014	0.7	0.008		
20:2 $\omega$ 6	0.6	0.029	N.D.	N.D.	20:2 $\omega$ 6	0.5	0.010		0.000		
18:3 $\omega$ 3	0.3	0.014	N.D.	N.D.	18:3 $\omega$ 3	0.2	0.004	0.2	0.002		
20:3 $\omega$ 3		0.000	N.D.	N.D.	20:3 $\omega$ 3		0.000		0.000		
20:3 $\omega$ 6		0.000	N.D.	N.D.	20:3 $\omega$ 6		0.000		0.000		
18:4 $\omega$ 3	1.1	0.052	N.D.	N.D.	18:4 $\omega$ 3	0.5	0.009	0.3	0.004		
20:4 $\omega$ 6	2.3	0.113	N.D.	N.D.	20:4 $\omega$ 6	2.7	0.050	3.8	0.045		
20:5 $\omega$ 3	10.2	0.497	N.D.	N.D.	20:5 $\omega$ 3	12.9	0.240	17.7	0.213		
22:5 $\omega$ 3	1.2	0.058	N.D.	N.D.	22:5 $\omega$ 3	1.8	0.034	1.8	0.021		
22:6 $\omega$ 3	8.7	0.423	N.D.	N.D.	22:6 $\omega$ 3	13.5	0.251	17.1	0.206		
<b>TOTALS:</b>					<b>TOTALS:</b>						
Saturates	19.5	0.949			Saturates	19.5	0.361	21.0	0.253		
Monounsaturates	43.1	2.098			Monounsaturates	38.0	0.705	29.5	0.356		
Polyunsaturates	24.8	1.210			Polyunsaturates	33.0	0.612	41.5	0.500		
Omega-3's	21.4	1.044			Omega-3's	29.0	0.538	37.1	0.447		
Omega-6's	3.4	0.165			Omega-6's	4.0	0.074	4.4	0.053		

