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Fish in Your Nutrition Plan

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FISH IN YOUR NUTRITION PLAN

The per capita consumption of seafood in the Pacific Northwest is higher than the national average of 12 pounds per year. The variety of seafoods continually available encourages consumption. Seafoods can also be an important contribution to the diets of many individuals because of their unique nutritional composition. Fish with white flesh, such as cod and sole, are the most common type of food from the sea. These fish are known to be high in protein, low in fat and low in calories. This is not the total extent of our knowledge on the nutritional quality of this important food. Directing attention specifically to white fish, the purpose of this publication is to provide a more complete nutritional picture.

There are several ways to present the nutrient composition of foods. It is believed that nutritional labeling has certain advantages and will be used here for the first time on fish. This publication also gives some insight into nutritional labeling and how it can be used in selecting foods. It is hoped this discussion can serve as a foundation for future publications dealing with specific nutrients in all types of seafoods. The role foods from the sea can play in meeting our nutritional requirements can be an interesting story. Nutritional labeling provides a standardized format to appear on all foods giving such information and on a uniform basis for comparison.

In describing the nutritional value of fish in human nutrition we have two sets of values: the analyzed nutrient level in seafood and the nutrient requirements of the human body. Years of investigation have continued to identify the basic dietary requirements of humans. These research findings are regularly reviewed by the National Research Council of the National Academy of Sciences who have established Recommended Dietary Allowances (RDA).

Recommended Dietary Allowances are the levels of intake of essential nutrients considered to be adequate to meet the known nutritional needs of practically all healthy persons.¹ These are only recommendations for the amounts of nutrients that should be consumed daily. They provide excellent guidelines for cross reference between amounts of nutrients recommended and groups of people with specified physical (age, height, weight, and sex) characteristics. However, this volume of information might be better utilized by the nutritionist or other health professional.

There has recently been an increased consumer demand for nutritional information on all foods. While the use of all or parts of the RDA are too detailed for inclusion on a food package label, they still represent the backbone of a sound nutritional labeling policy. To provide nutritional information on labels, the Food and Drug Administration established the U.S. Recommended Daily Allowance (U.S. RDA) based on the Recommended Dietary Allowance (RDA). There are four U.S. RDA levels, but the one most commonly used is for the entire group of adults and children four or more years in age. For this combined group, the U.S. RDA is simply the highest amount for each nutrient recommended by the RDA. For example, young and adult women and young males have the highest requirement for iron, so this level, 18 mg, was chosen as the U.S. RDA. There are a few exceptions. The U.S. RDA levels for riboflavin, (1.7 mg) calcium and phosphorus, (both at 1.0 g) are halfway between the levels recommended for an adolescent and adult male. The complete list of nutrients and the levels at which they provide 100 percent of the U.S. RDA for the four population categories are listed in Table 1.

The quantity of each nutrient determined in a serving of food, usually 100 g or 1/2 cup, is reported on the label as a percentage of the U.S. RDA or

¹ Recommended Dietary Allowances. Food and Nutrition Board, National Research Council. National Academy of Sciences, Washington, D.C., 8th Ed., 1974.

daily human nutrient goal. An average serving (100 g) of white fish provides 17.2 grams of protein. The U.S. RDA of this nutrient for adults and children 4 or more years old is 45 grams. This serving of fish thus provides 38 percent of the U.S. RDA for protein.

The nutritional composition of foods may show as much variation as seen in people and their individual requirements. Seafoods, meats, fresh fruits and vegetables, and other natural foods show much greater variations in composition than processed foods. For this reason, the use of a nutritional label on these foods is only on the threshold of implementation. Extensive information is now being compiled on the nutritional composition of seafoods in the Pacific Northwest. Reporting this information in the form of a nutritional label is, hopefully, using it in a meaningful manner. The percent of the adult U.S. RDA provided by one serving (100 g) of Pacific white fish is presented in Table 2.

The information in Table 2 attempts to be as complete as possible. In doing so, the information presented is not in strict compliance with the Food and Drug Administration labeling guidelines.² Examples of non compliance are: 1) since the fat content of fish is below 2 grams per serving, information on cholesterol, polyunsaturated and saturated fat levels and sodium content should not be included, 2) any vitamin or mineral found to provide less than 2 percent of the U.S. RDA per serving should be so indicated on the label by use of an asterisk (*) and indicating this by footnote stating "less than 2%" or just placing "0" along side the nutrient.

In obtaining the values reported in Table 2, numerous chemical analyses were conducted on eight different species³ of Pacific white fish.

²Federal Register, Information panel and nutrition labeling, Vol. 39, No. 8 - Friday, Jan. 11, 1974.

³Nutritional information reported represents the average levels found in Pacific Cod (*Gadus macrocephalus*), Dover sole (*Microstomus pacificus*), Rockfishes (*Sebastes melanops* and *Sebastes pinniger*), Ling cod (*Ophiodon elongatus*), Petrale sole (*Eopsetta jordani*), English sole (*Parophrys vetulus*) and Pacific hake (*Merluccius productus*).

The mean nutrient levels found in all these fish were compared against U.S. RDA levels recommended for adults and children four years and older (Table 1). There appears to be enough similarity in nutrient levels of white fish to present an accurate nutritional profile on this class of seafood. Work continues on evaluating the individual nutrients in seafood and the role of seafoods in meeting human nutritional requirements.

One use of a nutritional label is to compare foods. Examples of nutritional labeling information available on selected foods are listed in Table 3. It is not intended to be all encompassing; it is only intended for comparative purposes. This table is also intended to relate other key points concerning the selection of food in our diet. Variety in food selection helps to balance our need for all nutrients. The use of the basic four food groups in meal planning is an excellent way to think variety. The importance of selecting different foods in our diet can be illustrated by looking at the level of individual nutrients in white fish. Iron levels in white fish are low. However, one serving of oysters, 100 g, can provide 40 percent of our U.S. RDA for this mineral. This example also helps to illustrate some of the variety that exists in seafood (Table 3). There appears to be a larger number of choices in food from the sea in composition, texture and flavor than can be found in meats.

White fish of the Pacific Northwest can play a role in your good dietary habits. Information in Table 2 can also be used for meal planning, comparing cost vs. nutrition, meeting special dietary restrictions and calorie counting. Consider white fish as part of your food plan: a serving supplies essential nutrients without adding an excessive number of calories to the diet.

Table 1. U. S. Recommended Daily Allowance (U. S. RDA) (for use in nutrition labeling of foods).

	Adults and Children Over 4 yrs.*	Children under 4 yrs.	Infants under 13 months	Pregnant or lactating women
Protein	45 g**	20 g**	18 g**	45 g**
Vitamin A	5,000 IU	2,500 IU	2,500 IU	8,000 IU
Vitamin C	60 mg	40 mg	40 mg	60 mg
Thiamin	1.5 mg	0.7 mg	0.7 mg	1.7 mg
Riboflavin	1.7 mg	0.8 mg	0.8 mg	2.0 mg
Niacin	20 mg	9.0 mg	9.0 mg	20 mg
Calcium	1.0 g	0.8 g	0.8 g	1.3 g
Iron	18 mg	10 mg	10 mg	18 mg
Vitamin D	400 IU	400 IU	400 IU	400 IU
Vitamin E	30 IU	10 IU	10 IU	30 IU
Vitamin B ₆	2.0 mg	0.7 mg	0.7 mg	2.5 mg
Folacin	0.4 mg	0.2 mg	0.2 mg	0.8 mg
Vitamin B ₁₂	6 mcg	3 mcg	3 mcg	8 mcg
Phosphorus	1.0 g	0.8 g	0.8 g	1.3 g
Iodine	150 mcg	70 mcg	70 mcg	150 mcg
Magnesium	400 mg	200 mg	200 mg	450 mg
Zinc	15 mg	8 mg	8 mg	15 mg
Copper	2 mg	1 mg	1 mg	2 mg
Biotin	0.3 mg	0.15 mg	0.15 mg	0.3 mg
Pantothenic acid	10 mg	5 mg	5 mg	10 mg

*The U.S. RDA used for the majority of food products. Other U.S. RDA's are intended for special population groups.

**If protein quality is not equal to that of casein, a milk protein, U.S. RDA is 65 g for adults and pregnant or lactating women, 28 g for children under 4 years of age and 25 g for infants.

Table 2. Nutrition Information on White Fish.

per 100 g: 3-1/2 oz; 1/2 cup

Calories	80 ¹
Protein	17.2 g ¹
Carbohydrate	0 g ¹
Fat	1.4 g ¹

Percent of Recommended Daily Allowances (U.S. RDA)² per portion

Protein	-----	40	Riboflavin (B ₂)	-----	6
Vitamin A	-----	0	Niacin	-----	10
Vitamin C	-----	0	Calcium	-----	0
Thiamine (B ₁)	-----	6	Iron	-----	2

Percent of Calories from Fat*	-----	16
Polyunsaturated*	-----	0.9 g
Saturated*	-----	0.3 g
Cholesterol*	-----	30 mg
Sodium	-----	52 mg

*Information on fat and cholesterol content is provided for those individuals who, on the advice of their physician, are modifying their total dietary intake of fat and/or cholesterol.

OPTIONAL (Percent of U. S. RDA)²

Vitamin D	-----	0
Vitamin E	-----	0
Vitamin B ₆	-----	15
Folic acid	-----	0
Vitamin B ₁₂	-----	15
Phosphorus	-----	15
Iodine	---	100
Magnesium	-----	6
Zinc	-----	2
Copper	-----	2
Biotin	-----	0
Pantothenic acid	-----	4

¹Average nutrient levels of white fish common to the Pacific Coast; not reported to nearest gram.

²Based on U.S. RDA for adults and children 4 or more years.

Table 3. Comparative nutrient levels in selected items of the four basic food groups.

SERVING SIZE	ENERGY kcal	PROTEIN	Percent U.S. RDA				CALCIUM	IRON	
			VIT. A	VIT. C	VIT. B ₁	VIT. B ₂			NIACIN
MILK GROUP									
Milk, whole ¹	150	15	6	4	6	25	2	30	0
Ice cream, 10% fat ²	270	10	10	0	4	20	2	20	0
Cheese, cheddar	114	15	6	0	0	6	0	20	0
FRUIT AND VEGETABLE GROUP									
Orange juice ³	112	0	10	200	14	4	4	0	2
Peaches, canned ¹	170	0	15	10	0	4	8	0	4
Apple, fresh	80	0	2	4	2	2	0	0	0
Cut green beans, canned ¹	35	2	25	15	2	8	2	6	8
Cream corn, canned ¹	160	6	8	20	4	8	8	0	4
Potato, fresh baked ³	145	4	0	50	10	4	14	0	4
FISH AND MEAT GROUP									
WHITE FISH, RAW ⁴	80	40	0	0	6	6	10	0	2
RED SALMON, CANNED ⁴	160	45	4	0	6	4	35	25	6
OYSTERS, RAW ⁴	75	20	0	0	8	10	10	0	40
Beef, round steak, raw ³	200	45	0	0	6	10	25	0	20
Pork, loin, raw ³	268	40	0	0	70	15	30	0	15
Chicken, white meat, raw ³	117	50	0	0	4	6	50	0	6
BREAD AND CEREAL GROUP									
White bread ¹	140	8	0	0	15	8	10	4	6
Cereal, dry	110	2	25	25	25	25	25	0	25
Spaghetti, cooked, enriched ³	192	10	0	0	15	8	10	0	8

¹ Items selected at local supermarkets having nutritional labeling information.

² Dairy Council Digest, National Dairy Council, Vol. 47, No. 5, 1976.

³ Nutritive Value of Common Foods in Common Units. Agriculture Handbook No. 456. United States Department of Agriculture. 1975; U.S. RDA:

⁴ Nutritional Labeling - Tools For Its Use. Agriculture Information Bulletin No. 382. U.S. Department of Agriculture.

⁵ Seafoods Laboratory, Oregon State University, 250-36th Street, Astoria, OR 97103.



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