

# THE VITAMIN A, VITAMIN B<sub>1</sub> (THIAMIN), VITAMIN C (ASCORBIC ACID) AND RIBO- FLAVIN CONTENT OF COMMON FOODS

A SUMMARY OF "REPRESENTATIVE" VALUES

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**D**URING the past two years there has been a decided increase in the attention given by various investigators to the subject of the vitamin content of foods. This is due in part to the interest in nutrition aroused by our National emergency but more largely to the new methods of vitamin assay now being developed. These newer techniques concern practically all of the known vitamins and are rapidly gaining favor because of the ease and rapidity with which results may be obtained with them. While there may be questions in some cases as to the degree of specificity under certain conditions, the interest shown by the numerous investigators working with them warrants confidence that most of these questions will be answered by improvements in procedure as the subject develops.

In a paper published in the October, 1940, issue of the *Quarterly*<sup>2</sup> a table of values for the vitamin A, vitamin B<sub>1</sub>, vitamin C, and riboflavin content of foods was presented. The values offered were selected by first making a compilation of all published data and then from a consideration of all of the data on a food, assigning a single value for each vitamin which was considered as "representative." This designation was intended to make clear that the values presented were not averages but were selected according to the best judgment of the author as being most generally applicable.

A sincere effort was made to have the values for similar food

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<sup>2</sup> Munsell, Hazel E.: Vitamins and Their Occurrence in Foods. The Milbank Memorial Fund *Quarterly*, October, 1940, xviii, No. 4, pp. 311-344.

items consistent with each other. This required giving particular attention to comparisons made by a single investigator and in some cases applying the relations brought out by such data in assessing more numerous data presented by other investigators.

In cases where values were given for parts of a food item as well as for the whole, care was taken to have the sum total of the values for the various parts approximate, at least, the value for the whole food. An example may be found in the vitamin A values for whole milk, skim milk, and butter. There may be certain arguments against this procedure but in the light of the variations in values encountered for most food items it seemed the most reasonable.

Since July, 1940, when the compilation which served as a basis of the table of vitamin values described above was completed a large number of reports have appeared in the published literature giving information on the vitamin content of foods. In many cases information is now available where there had been none before and in others more reliable data have been presented which can be used as the basis of values to replace uncertain estimates made previously.

In accordance with these developments a complete revision of the table of vitamin values published in 1940 has been made and is offered here. The compilation of data for this revision included published data to July, 1942. The same policy was followed in selecting the values as was followed in preparing the first table. The major change involves expression of values for vitamin B<sub>1</sub>, vitamin C, and riboflavin in terms of weight rather than in terms of units. If expression by units is desired the values by weight may be converted by the appropriate factor.<sup>8</sup>

It seems advisable to direct attention to the fact that in selecting these "representative" values no discrimination was made against data in the compilation on the basis of the method of assay used in the determination although this was considered in the evaluation.

<sup>8</sup>One mg. thiamin equals 333 International units; 1 mg. ascorbic acid equals 20 International units (1 International unit equals 1 U.S.P. unit).

This policy was followed from the viewpoint that it is a fallacy to discount data absolutely because they were determined by methods now outmoded when careful consideration in many cases showed that data obtained by these "outmoded" methods were more consistent than data obtained by a more recently developed method which has not been perfected to the point of strict reliability.

The values suggested here, as in the first table, apply to the edible portion of the fresh food. No attempt whatever has been made to give summarizing statements for treated foods. Whereas, information on the effect of various treatments on the nutritive value of foods, especially vitamin content, is much to be desired and whereas programs of research have recently been designed for obtaining such information it may be some time before this is available in a form for practical application.

The Vitamin A; Vitamin B<sub>1</sub>, or Thiamin; Vitamin C, or Ascorbic Acid; and Riboflavin Content of Common Foods.

	VITAMIN A	THIAMIN	ASCORBIC ACID	RIBOFLAVIN
	Values per 100 Grams Edible Portion			
	I.U.	Micrograms	Milligrams	Micrograms
Alfalfa Leaf Meal, Dried	8,000			1,500
Almond	75	225		300
Apple	75	35	.5-20 Av. 6	10
Apricot, Fresh	4,000	45	7	
Dried	6,000	90	2	100
Artichoke, Globe ( <i>Cynara Scolymus</i> )	200	75	9	30
Artichoke, Jerusalem ( <i>Helianthus Tuberosus</i> )		60	7	
Asparagus, Green	900	180	40	120
Bleached	0-50	180	30	
Avocado	125	90	10	90
Banana	350	50	10	75
Barley	0	500	0	120
Beans, Snap				
Green	1,000	75	25	110
Wax	300	75	25	100
Beans, Shelled, Fresh				
Lima	300	300	30	175
Runner	500	300	25	
Soybean	200	500	40	300
Beans, Shelled, Dried				
Lima	100	525	0	750
Navy	0	510	0	325

	VITAMIN A	THIAMIN	ASCORBIC ACID	RIBOFLAVIN
	Values per 100 Grams Edible Portion			
	I.U.	Micrograms	Milligrams	Micrograms
Beans, Shelled, Dried (Continued)				
Red Kidney		450	0	
Soybean	100	1,200	0	750
Beef, Lean	20	125	0	225
Beet	0	30	15	50
Beet Tops	15,000		50	300
Blackberry	75	30	7	
Black-Eyed Peas— <i>see</i> Cowpeas				
Blueberry	50	30	Av. 10	
Brazil Nut	10	500		
Bread, White 6% Milk Solids		65	0	130
Whole Wheat 6% Milk Solids		210	0	180
Rye		210	0	
Broccoli, Entire Plant	9,000	111	65	225
Flower	3,000	135	65	240
Leaf	12,000	135	70	450
Stem	1,000	75		
Brussel Sprouts	500	150	65	
Buckwheat		450	0	
Butter, Average	2,700		0	
From Cows on Dry Feed	2,000		0	
From Cows on Green Feed	5,000		0	
Cabbage, Head,				
Young, Partly Green	150	30	60	50
Mature, Bleached	0	30	60	25
Red			60	
Chinese	9,000	30	45	45
Cantaloupe	1,000	50	30	60
Carrot	10,000	60	10	60
Cauliflower	50	150	75	105
Celery Stalks				
Green	1,000	30	5	100
Bleached (Hearts)	10	30	5	35
Chard	10,000		35	125
Cheese				
Cheddar	1,500	24	0	550
Cottage	175		0	280
Cream	2,000			
Cherry	15-800 Av. 150	45	8	
Chicken, Muscle				
Dark		150		260
Light		90		70
Clam	200	25		
Cod Fish	0	90	0	
Cod-Liver Oil	*	0	0	
Collards	12,000	80	60	300
Corn, Sweet				
White	0-50	135	10	
Yellow	600	135	10	60

\* Use value given on the container.

	VITAMIN A	THIAMIN	ASCORBIC ACID	RIBOFLAVIN
	Values per 100 Grams Edible Portion			
	I.U.	Micrograms	Milligrams	Micrograms
Corn, Dried				
White	0	450	0	130
Yellow (Whole Grain Cornmeal)	750	450	0	130
Corn Oil, Refined	0	0	0	0
Cottonseed Oil, Refined	0	0	0	0
Cowpea, Fresh			5	
Dried	30	500	0	300
Cranberry	50		12	0
Cream, 20 Per Cent	650	35		
Cucumber	20	30	9	25
Currant, Black	400	30	150	
Red		45	45	
Dandelion	12,000		100	
Dates, Cured	300	75	0	45
Dock Leaves	14,000			
Egg, Whole, Average	1,000	150	0	250
White	0	0	0	230
Yolk	2,800	420	0	285
Eggplant	100	45	10	30
Endive, Escarole	10,000	50	15	200
French		75	20	60
Fig, Fresh	10	60	2	5
Dried	60	60	0	45
Flour, White, Patent	0	75	0	40
Whole Wheat		450		100
Garden Cress		90		
Gooseberry			25	
Grape	0	50	4	15
Grape Juice			2	
Grapefruit	0	40	43	
Grapefruit Juice	0	45	45	12
Canned	0	45	40	
Guava	200	45	75	10
Haddock	0	15	0	
Halibut		90		
Hazelnut	100	400		
Heart				
Beef	200	600		900
Lamb	trace	600		
Pork		600		900
Honey	0	0	0	0
Horseradish			100	
Huckleberry			30	
Kale	16,000	150	100	400
Kidney				
Beef or Veal	1,000	250		2,100
Lamb	1,000	300		2,000
Pork		500		2,100
Kohlrabi		50	60	
Lamb Muscle, Lean	trace	200	0	250
Lard	5	0		

	VITAMIN A	THIAMIN	ASCORBIC ACID	RIBOFLAVIN
	Values per 100 Grams Edible Portion			
	I.U.	Micrograms	Milligrams	Micrograms
Leek	1,000	80	15	
Lemon Juice	0	30	45	0
Lentils, Dried	50	500	0	315
Lettuce				
Green	5,000	75	15	150
Bleached, Head	100	75	15	45
Romaine or Cos	1,000			100
Lime Juice		30	37	
Liver, Beef	30,000	400	fresh 37	3,000
Calf	27,000	400	fresh 32	3,300
Chicken	24,000	400	fresh 35	2,500
Lamb	27,000	400	fresh 37	3,300
Pig	27,000	425	fresh 27	2,700
Mango	1,000	60	25	50
Milk				
Whole, Fresh, Average Market	120	42	{ fresh 2.2	195
From Cows on Dry Feed	60	42	{ pasteurized 1.3	160
From Cows on Pasture	180	42	1.5	210
Whole Dried, Average	960	250	0	1,500
From Cows on Dry Feed	480		0	
From Cows on Pasture	1,440		0	
Skim	10	45	0	200
Skim, Dried	100	320	0	1,600
**Milk, Whole, Evaporated	400	53	1.2	390
Molasses	0	0	0	
Mushrooms	0	60	1	5
Mustard Greens	10,000	100	120	
Oats, Rolled or Oatmeal	0	540	0	100
Okra	2,000	120	20	
Olive, Canned, Green	200		0	
Ripe	125	6	0	0
Olive Oil, Refined	0			
Onion, Green	5,000		30	
Mature	0	30	15	50
Orange Juice	150	70	45	15
Oyster	200	300		
Papaya	2,500	50	45	180
Parsley	18,000		100	
Parsnip	0	80	22	
Pea, Green, Fresh	1,000	400	25	200
Dried	750	525	0	300
Peach				
White	100	40	10	
Yellow	2,000	40	10	60
Yellow, Dried	3,000		0	
Peanut, Jumbo	0	900		500
Roasted	0	200	0	
Spanish	0	900		500
Roasted		200		
Pear	30	40	7	20

\*\*Values should be considered tentative until more reliable values are available.

	VITAMIN A	THIAMIN	ASCORBIC ACID	RIBOFLAVIN
	Values per 100 Grams Edible Portion			
	I.U.	Micrograms	Milligrams	Micrograms
Pecan	300	500		300
Pepper, Green	3,000	30	125	50
Red	2,000	30	150	
Pineapple, Whole	150	50	20	5
Juice, Fresh	125	65	25	
Juice, Canned	100	50	20	
Plum	350	50	7	45
Pork Muscle, Lean	0	1,200		225
Potato, White, Average	30	100	10	40
New			15	
Old			9	
Prune, Fresh	1,500	50		
Dried	2,500	125	0.5	50
Pumpkin	2,000	45	5	45
Quince			8	
Radish	25	60	25	30
Raisin, Seedless	0	100	0	
Raspberry, Red	150	30	25	
Rhubarb	100	15	20	
Rice, Brown	0	225	0	80
Polished	0	30	0	0
Roe	2,000	1,000	5	100
Rutabaga, White	0	70	45	
Yellow	25	70	45	
Rye	0	500	0	140
Salmon, Canned				
Chum	30	30		
Chinook	750	30		
Pink	100	30		
Red	325	30	0	225
Sardine	150	50		
Soybean— <i>see</i> Bean				
Spinach	18,000	100	50	400
Squash, Summer	750	45		50
Winter	4,000	45	5	50
Strawberry	50	25	50	
Sweet Potato	3,500	90	20	75
Tangerine		70	35	20
Tomato, Mature Green	800	70	22	45
Ripe	1,000	75	22	45
Tomato Juice, Fresh	1,000	75	22	45
Commercial Canned			8-29 Av. 18	
Turnip, White	0	30	30	30
Yellow	20	30	30	35
Turnip, Greens	18,000	100	100	350
Walnuts, Black	70	330	0	
English	50	450	0	
Watercress	4,000	100	75	270
Watermelon	50	30	7	15
Wheat, Hard	0	525	0	100
Soft	0	350	0	100