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Information  
Service

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Number 8-11

# Composition of Foods: Vegetables and Vegetable Products

- Raw
- Processed
- Prepared

By Nutrition Monitoring Division

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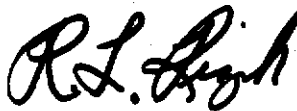
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## FOREWORD

Agriculture Handbook No. 8 represents a traditional function of the U.S. Department of Agriculture. The development of the basic food composition tables used in the United States began more than 80 years ago. Data on the nutritive value of foods were first compiled and evaluated in the Department by W. O. Atwater in the 1890's. This nutrition pioneer organized and became the first director of the Office of Experiment Stations in the USDA. In 1896, the now classic USDA Bulletin No. 28, "The Chemical Composition of American Food Materials," by W. O. Atwater and C. D. Woods was published. This document was the first in a long series of food composition tables that have been issued by the Department.

The scope of succeeding tables has been expanded with the discovery of the presence and role of vitamins, minerals, and other dietary essentials in foods. Values from these tables have been used in many other compilations, both in this country and abroad. Nutritionists and scientists working in health-related fields depend on these composition data. Increasing emphasis on food and nutrition in national policies and programs has accelerated the need for comprehensive, up-to-date tabulations of the nutrient content of foods. USDA is continuing to expand and improve these food data.

This publication is a major revision of the 1963 edition of USDA Agriculture Handbook No. 8, "Composition of Foods... Raw, processed, prepared," currently a basic source of food composition data in this country. Dr. Atwater stated in Bulletin No. 28, "This table is intended to replace previous ones and to serve as a standard reference until it shall in its turn be replaced by a larger and more complete compilation." This revision of Agriculture Handbook No. 8 will, in its turn, also be replaced. The task of deriving representative nutritive values of foods is a historical responsibility of USDA. This task is never ending and is essential in providing more complete knowledge so that we can use our food resources wisely.



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Nutrients and units	Amount in 100 grams, edible portion			Amount in edible portion of common measures of food		Amount in edible portion of 1 pound of food as purchased
	Mean	Standard error	Number of samples	Approximate measure and weight		Refuse: Outer leaves, core and trimmings 36%
				1 leaf = 10 g	1/2 c shredded = 28 g	
A	B	C	D	E	F	G
<b>PROXIMATE:</b>						
Water . . . . . g . . . . .	94.00			9.40	26.32	272.88
Food energy . . . . . kcal . . . . .	18			2	5	52
Food energy . . . . . kJ . . . . .	75			8	21	219
Protein (N X 6.25) . . . . . g . . . . .	1.30			0.13	0.36	3.77
Total lipid (fat) . . . . . g . . . . .	0.30			0.03	0.08	0.87
Carbohydrate, total . . . . . g . . . . .	3.50			0.35	0.98	10.16
Fiber . . . . . g . . . . .	0.70			0.07	0.20	2.03
Ash . . . . . g . . . . .	0.90			0.09	0.25	2.61
<b>MINERALS:</b>						
Calcium . . . . . mg . . . . .	68			7	19	197
Iron . . . . . mg . . . . .	1.40			0.14	0.39	4.06
Magnesium . . . . . mg . . . . .	11			1	3	32
Phosphorus . . . . . mg . . . . .	25			3	7	73
Potassium . . . . . mg . . . . .	264			26	74	766
Sodium . . . . . mg . . . . .	9			1	3	26
Zinc . . . . . mg . . . . .						
Copper . . . . . mg . . . . .						
Manganese . . . . . mg . . . . .						
<b>VITAMINS:</b>						
Ascorbic acid . . . . . mg . . . . .	18.0			1.8	5.0	52.3
Thiamin . . . . . mg . . . . .	0.050			0.005	0.014	0.145
Riboflavin . . . . . mg . . . . .	0.080			0.008	0.022	0.232
Niacin . . . . . mg . . . . .	0.400			0.040	0.112	1.161
Pantothenic acid . . . . . mg . . . . .	0.200			0.020	0.056	0.581
Vitamin B6 . . . . . mg . . . . .	0.055			0.006	0.015	0.160
Folic acid . . . . . mcg . . . . .	0			0	0	0
Vitamin B12 . . . . . mcg . . . . .	0			19	53	552
Vitamin A . . . . . RE . . . . .	190			190	532	5,516
Vitamin A . . . . . IU . . . . .	1,900					
<b>LIPIDS:</b>						
Fatty acids:						
Saturated, total . . . . . g . . . . .	0.039			0.004	0.011	0.113
4:0 . . . . . g . . . . .						
6:0 . . . . . g . . . . .						
8:0 . . . . . g . . . . .						
10:0 . . . . . g . . . . .						
12:0 . . . . . g . . . . .						
14:0 . . . . . g . . . . .						
16:0 . . . . . g . . . . .	0.035			0.004	0.010	0.102
18:0 . . . . . g . . . . .	0.004			0.000	0.001	0.012
Monounsaturated, total . . . . . g . . . . .	0.012			0.001	0.003	0.035
16:1 . . . . . g . . . . .	0.003			0.000	0.001	0.009
18:1 . . . . . g . . . . .	0.009			0.001	0.003	0.026
20:1 . . . . . g . . . . .						
22:1 . . . . . g . . . . .						
Polyunsaturated, total . . . . . g . . . . .	0.159			0.016	0.045	0.462
18:2 . . . . . g . . . . .	0.047			0.005	0.013	0.136
18:3 . . . . . g . . . . .	0.113			0.011	0.032	0.328
18:4 . . . . . g . . . . .						
20:4 . . . . . g . . . . .						
20:5 . . . . . g . . . . .						
22:5 . . . . . g . . . . .						
22:6 . . . . . g . . . . .						
Cholesterol . . . . . mg . . . . .	0			0	0	0
Phytosterols . . . . . mg . . . . .	38			4	11	110
<b>AMINO ACIDS:</b>						
Tryptophan . . . . . g . . . . .	0.009			0.001	0.003	0.026
Threonine . . . . . g . . . . .	0.059			0.006	0.017	0.171
Isoleucine . . . . . g . . . . .	0.084			0.008	0.024	0.244
Leucine . . . . . g . . . . .	0.079			0.008	0.022	0.229
Lysine . . . . . g . . . . .	0.084			0.008	0.024	0.244
Methionine . . . . . g . . . . .	0.016			0.002	0.004	0.046
Cystine . . . . . g . . . . .	0.016			0.002	0.004	0.046
Phenylalanine . . . . . g . . . . .	0.055			0.006	0.015	0.160
Tyrosine . . . . . g . . . . .	0.032			0.003	0.009	0.093
Valine . . . . . g . . . . .	0.070			0.007	0.020	0.203
Arginine . . . . . g . . . . .	0.071			0.007	0.020	0.206
Histidine . . . . . g . . . . .	0.022			0.002	0.006	0.064
Alanine . . . . . g . . . . .	0.056			0.006	0.016	0.163
Aspartic acid . . . . . g . . . . .	0.142			0.014	0.040	0.412
Glutamic acid . . . . . g . . . . .	0.182			0.018	0.051	0.528
Glycine . . . . . g . . . . .	0.057			0.006	0.016	0.165
Proline . . . . . g . . . . .	0.048			0.005	0.013	0.139
Serine . . . . . g . . . . .	0.039			0.004	0.011	0.113



**LETTUCE, BUTTERHEAD, Raw**  
*Lactuca sativa*

Includes Boston and Bibb types.

Nutrients and units	Amount in 100 grams, edible portion			Amount in edible portion of common measures of food		Amount in edible portion of 1 pound of food as purchased
	Mean	Standard error	Number of samples	Approximate measure and weight		Refuse: Outer leaves and core 26%
				2 leaves = 15 g <sup>1</sup>	1 head = 163 g <sup>2</sup>	
A	B	C	D	E	F	G
<b>PROXIMATE:</b>	95.58	0.407	8	14.34	154.84	320.86
Water . . . . . g . . . . .	13			8	91	186
Food energy . . . . . { kcal . . . . .	56			0.19	2.09	4.32
Protein (N X 6.25) . . . . . g . . . . .	1.29		1	0.03	0.36	0.74
Total lipid (fat) . . . . . g . . . . .	0.22		1	0.35	3.76	7.80
Carbohydrate, total . . . . . g . . . . .	2.32					
Fiber <sup>3</sup> . . . . . g . . . . .	0.59		1	0.09	0.96	1.98
Ash . . . . . g . . . . .						
<b>MINERALS:</b>				0.04	0.49	0.99
Calcium . . . . . mg . . . . .	0.30		1			
Iron . . . . . mg . . . . .						
Magnesium . . . . . mg . . . . .						
Phosphorus . . . . . mg . . . . .	257	20.332	4	39	416	862
Potassium . . . . . mg . . . . .	5	2.818	4	1	8	18
Sodium . . . . . mg . . . . .	0.17		1	0.03	0.28	0.57
Zinc . . . . . mg . . . . .	0.023		1	0.003	0.037	0.077
Copper . . . . . mg . . . . .	0.133		1	0.020	0.215	0.446
Manganese . . . . . mg . . . . .				1.2	13.0	26.9
<b>VITAMINS:</b>	8.0			0.009	0.098	0.201
Ascorbic acid . . . . . mg . . . . .	0.060			0.009	0.098	0.201
Thiamin . . . . . mg . . . . .	0.060			0.045	0.489	1.007
Riboflavin . . . . . mg . . . . .	0.300					
Niacin . . . . . mg . . . . .						
Pantothenic acid . . . . . mg . . . . .						
Vitamin B <sub>6</sub> . . . . . mg . . . . .	73.3	25.427	3	11.0	118.7	246.0
Folacin . . . . . mcg . . . . .	0			0	0	0
Vitamin B <sub>12</sub> . . . . . mcg . . . . .	97			15	158	326
Vitamin A . . . . . { RE . . . . .	970			146	1,581	3,256
<b>LIPIDS:</b>				0.004	0.047	0.097
Fatty acids:	0.029					
Saturated, total . . . . . g . . . . .						
4:0 . . . . . g . . . . .						
6:0 . . . . . g . . . . .						
8:0 . . . . . g . . . . .						
10:0 . . . . . g . . . . .						
12:0 . . . . . g . . . . .						0.087
14:0 . . . . . g . . . . .				0.004	0.042	0.010
16:0 . . . . . g . . . . .	0.026			0.000	0.005	0.027
18:0 . . . . . g . . . . .	0.003			0.001	0.013	0.007
Monounsaturated, total . . . . . g . . . . .	0.008			0.000	0.003	0.020
16:1 . . . . . g . . . . .	0.002			0.001	0.010	
18:1 . . . . . g . . . . .	0.006					
20:1 . . . . . g . . . . .						0.393
22:1 . . . . . g . . . . .				0.018	0.190	0.114
Polyunsaturated, total . . . . . g . . . . .	0.117			0.005	0.055	0.279
18:2 . . . . . g . . . . .	0.034			0.012	0.134	
18:3 . . . . . g . . . . .	0.083					
18:4 . . . . . g . . . . .						
20:4 . . . . . g . . . . .						
20:5 . . . . . g . . . . .						
22:5 . . . . . g . . . . .						
22:6 . . . . . g . . . . .				0	0	0
Cholesterol . . . . . mg . . . . .	0					
Phytosterols . . . . . mg . . . . .						
<b>AMINO ACIDS:</b>	0.009		97	0.001	0.015	0.030
Tryptophan . . . . . g . . . . .	0.059		100	0.009	0.096	0.198
Threonine . . . . . g . . . . .	0.083		100	0.012	0.134	0.279
Isoleucine . . . . . g . . . . .	0.078		100	0.012	0.126	0.262
Leucine . . . . . g . . . . .	0.084		104	0.013	0.136	0.282
Lysine . . . . . g . . . . .	0.016		104	0.002	0.026	0.054
Methionine . . . . . g . . . . .	0.015		104	0.002	0.024	0.050
Cystine . . . . . g . . . . .	0.054		3	0.002	0.028	0.181
Phenylalanine . . . . . g . . . . .	0.015		100	0.008	0.088	0.107
Tyrosine . . . . . g . . . . .	0.032		8	0.005	0.052	0.107
Valine . . . . . g . . . . .	0.069		100	0.010	0.112	0.232
Arginine . . . . . g . . . . .	0.070		100	0.011	0.113	0.235
Histidine . . . . . g . . . . .	0.022		100	0.011	0.113	0.074
Alanine . . . . . g . . . . .	0.055		7	0.003	0.036	0.185
Aspartic acid . . . . . g . . . . .	0.141		7	0.008	0.089	0.473
Glutamic acid . . . . . g . . . . .	0.180		7	0.021	0.228	0.604
Glycine . . . . . g . . . . .	0.057		7	0.027	0.292	0.191
Proline . . . . . g . . . . .	0.048		7	0.009	0.092	0.161
Serine . . . . . g . . . . .	0.039		7	0.007	0.078	0.131

<sup>1</sup> Inner leaves.

<sup>2</sup> With refuse = 220 g, 5-in diam.

<sup>3</sup> Insoluble dietary fiber as determined by the neutral detergent fiber method = 0.7 g per 100 g.

