

Canadian Pulse Nutrient Profiles: Analysis Methodology

Pooled samples of the top three varieties of peas, lentils and chickpeas produced in Canada between 2010 and 2013 were obtained from the Crop Development Centre in Saskatoon, SK and analyzed for nutritional composition between September and December, 2013. Pooled bean samples were provided by Viterra and analyzed in 2014.

The dehulling and splitting activities for large green and small red lentils and green and yellow peas took place at the Canadian International Grains Institute in Winnipeg, MB. The nutritional analysis was performed by Merieux NutriSciences (formerly known as Silliker Laboratories) in Mississauga, ON. All pulse samples were tested in both their raw and cooked forms. The cooking protocol followed a standardized procedure developed by the Canadian International Grains Institute. Whole peas, chickpeas, and beans were soaked in deionized water at a ratio of 1:4 (seed to water) for 16 hours at room temperature. Split green peas, split yellow peas, whole green lentils and split red lentils were not soaked prior to cooking. Pulses were cooked in deionized water at a ratio of 1:5 (seed to water). Cooking times for the different pulses are listed below:

Pulse Type	Cooking Time (min)
Split green pea	34.0
Split yellow pea	37.0
Whole green lentil	26.0
Split red lentil	12.0
Chickpea	22.7
Navy bean	18.6
Pinto bean	19.2
Red kidney bean	24.5
Black bean	18.5

All pulse samples were analyzed for the following nutrients: Ash, Protein, Total Fat, Saturated Fat, Trans Fat, Carbohydrate, Sugars, Energy, Total Fibre, Soluble Fibre, Insoluble Fibre, Cholesterol, Sodium, Vitamin A, Vitamin C, Iron, Potassium, Calcium, Folate, Phosphorous, Magnesium, Zinc and Selenium.

Pulse Nutrition Information

Pulse Type: Green Pea
Format: Whole Seed, Raw

Nutrient	Units	Value (per 100g) ¹	Reference
Energy ²	Cal	309	General Atwater factors, USDA Handbook No.74; Health Canada, 2012; CFR101.9(c)(1)(i)(C)
Protein ³	g	18.44	AOAC 992.23
Fat, total	g	1.40	AOAC 996.06
Fat, saturated	g	0.32	AOAC 996.06
Fat, <i>trans</i>	g	<0.01	AOAC 996.06
Fat, monounsaturated	g	0.33	AOAC 996.06
Fat, polyunsaturated	g	0.68	AOAC 996.06
<i>Omega 6</i>	g	0.55	AOAC 996.06
<i>Omega 3</i>	g	0.13	AOAC 996.06
Carbohydrate, total	g	68.4	Calculated by difference
Sugars, total	g	2.9	AOAC 982.14
Fibre, total dietary	g	25.6	AOAC 2011.25
<i>Soluble</i>	g	5.3	AOAC 2011.25
<i>Insoluble</i>	g	20.3	AOAC 2011.25
Ash	g	2.3	AOAC 925.51A
Moisture	g	9.53	AOAC 926.08
Sodium	mg	9.3	AOAC 984.27
Potassium	mg	1010	AOAC 984.27
Calcium	mg	62.8	AOAC 984.27
Iron	mg	3.5	AOAC 984.27
Phosphorus	mg	295	AOAC 984.27
Magnesium	mg	116	AOAC 984.27
Zinc	mg	2.39	AOAC 984.27
Selenium	ppm	0.4	EPA 3050/6020 USP730
Folate	mcg	138	AOAC 944.12
Vitamin A	RE	30	AOAC 2001.13
Vitamin C	mg	4.8	AOAC 984.26

Code: P5

Notes:

¹ Source of Data: Analyses conducted by Mérieux NutriSciences, 2014

² Energy calculated: [(4 Cal/g x g protein) + (4 Cal/g x (g carbohydrates - g total fibre))] + (9 Cal/g x g fat) + (2 Cal/g x g total fibre)

³ Nitrogen to Protein Conversion Factor: 6.25

Pulse Nutrition Information

Pulse Type: Green Pea

Format: Dehulled Seed, Split, Raw

Nutrient	Units	Value (per 100g) ¹	Reference
Energy ²	Cal	327	General Atwater factors, USDA Handbook No.74; Health Canada, 2012; CFR101.9(c)(1)(i)(C)
Protein ³	g	19.61	AOAC 992.23
Fat, total	g	1.56	AOAC 996.06
Fat, saturated	g	0.33	AOAC 996.06
Fat, <i>trans</i>	g	<0.01	AOAC 996.06
Fat, monounsaturated	g	0.38	AOAC 996.06
Fat, polyunsaturated	g	0.77	AOAC 996.06
<i>Omega 6</i>	g	0.63	AOAC 996.06
<i>Omega 3</i>	g	0.14	AOAC 996.06
Carbohydrate, total	g	66.8	Calculated by difference
Sugars, total	g	3.2	AOAC 982.14
Fibre, total dietary	g	16.1	AOAC 2011.25
<i>Soluble</i>	g	5.7	AOAC 2011.25
<i>Insoluble</i>	g	10.4	AOAC 2011.25
Ash	g	2.4	AOAC 925.51A
Moisture	g	9.62	AOAC 926.08
Sodium	mg	15.3	AOAC 984.27
Potassium	mg	980	AOAC 984.27
Calcium	mg	36.4	AOAC 984.27
Iron	mg	3.3	AOAC 984.27
Phosphorus	mg	308	AOAC 984.27
Magnesium	mg	92.7	AOAC 984.27
Zinc	mg	2.55	AOAC 984.27
Selenium	ppm	0.4	EPA 3050/6020 USP730
Folate	mcg	129	AOAC 944.12
Vitamin A	RE	31	AOAC 2001.13
Vitamin C	mg	5.2	AOAC 984.26

Code: P6

Notes:

¹ Source of Data: Analyses conducted by Mérieux NutriSciences, 2014

² Energy calculated: [(4 Cal/g x g protein) + (4 Cal/g x (g carbohydrates - g total fibre))] + (9 Cal/g x g fat) + (2 Cal/g x g total fibre)

³ Nitrogen to Protein Conversion Factor: 6.25

Pulse Nutrition Information

Pulse Type: Yellow Pea

Format: Dehulled Seed, Split, Raw

Nutrient	Units	Value (per 100g) ¹	Reference
Energy ²	Cal	331	General Atwater factors, USDA Handbook No.74; Health Canada, 2012; CFR101.9(c)(1)(i)(C)
Protein ³	g	19.81	AOAC 992.23
Fat, total	g	1.62	AOAC 996.06
Fat, saturated	g	0.36	AOAC 996.06
Fat, <i>trans</i>	g	<0.01	AOAC 996.06
Fat, monounsaturated	g	0.35	AOAC 996.06
Fat, polyunsaturated	g	0.83	AOAC 996.06
<i>Omega 6</i>	g	0.67	AOAC 996.06
<i>Omega 3</i>	g	0.15	AOAC 996.06
Carbohydrate, total	g	66.2	Calculated by difference
Sugars, total	g	2.6	AOAC 982.14
Fibre, total dietary	g	13.7	AOAC 2011.25
<i>Soluble</i>	g	4.4	AOAC 2011.25
<i>Insoluble</i>	g	9.3	AOAC 2011.25
Ash	g	2.4	AOAC 925.51A
Moisture	g	9.94	AOAC 926.08
Sodium	mg	7.4	AOAC 984.27
Potassium	mg	1080	AOAC 984.27
Calcium	mg	33.5	AOAC 984.27
Iron	mg	4.0	AOAC 984.27
Phosphorus	mg	330	AOAC 984.27
Magnesium	mg	98	AOAC 984.27
Zinc	mg	2.58	AOAC 984.27
Selenium	ppm	0.4	EPA 3050/6020 USP730
Folate	mcg	66.3	AOAC 944.12
Vitamin A	RE	<20	AOAC 2001.13
Vitamin C	mg	4.6	AOAC 984.26

Code: P2

Notes:

¹ Source of Data: Analyses conducted by Mérieux NutriSciences, 2014

² Energy calculated: [(4 Cal/g x g protein) + (4 Cal/g x (g carbohydrates - g total fibre)) + (9 Cal/g x g fat) + (2 Cal/g x g total fibre)]

³ Nitrogen to Protein Conversion Factor: 6.25

Pulse Nutrition Information

Pulse Type: Yellow Pea
Format: Whole Seed, Raw

Nutrient	Units	Value (per 100g) ¹	Reference
Energy ²	Cal	312	General Atwater factors, USDA Handbook No.74; Health Canada, 2012; CFR101.9(c)(1)(i)(C)
Protein ³	g	18.66	AOAC 992.23
Fat, total	g	1.58	AOAC 996.06
Fat, saturated	g	0.35	AOAC 996.06
Fat, <i>trans</i>	g	<0.01	AOAC 996.06
Fat, monounsaturated	g	0.36	AOAC 996.06
Fat, polyunsaturated	g	0.79	AOAC 996.06
<i>Omega 6</i>	g	0.66	AOAC 996.06
<i>Omega 3</i>	g	0.13	AOAC 996.06
Carbohydrate, total	g	67.6	Calculated by difference
Sugars, total	g	2.2	AOAC 982.14
Fibre, total dietary	g	23.7	AOAC 2011.25
<i>Soluble</i>	g	5.0	AOAC 2011.25
<i>Insoluble</i>	g	18.7	AOAC 2011.25
Ash	g	1.8	AOAC 925.51A
Moisture	g	10.36	AOAC 926.08
Sodium	mg	8.4	AOAC 984.27
Potassium	mg	961	AOAC 984.27
Calcium	mg	63.0	AOAC 984.27
Iron	mg	3.8	AOAC 984.27
Phosphorus	mg	283	AOAC 984.27
Magnesium	mg	120	AOAC 984.27
Zinc	mg	2.36	AOAC 984.27
Selenium	ppm	0.4	EPA 3050/6020 USP730
Folate	mcg	43.4	AOAC 944.12
Vitamin A	RE	<20	AOAC 2001.13
Vitamin C	mg	4.9	AOAC 984.26

Code: P1

Notes:

¹ Source of Data: Analyses conducted by Mérieux NutriSciences, 2014

² Energy calculated: [(4 Cal/g x g protein) + (4 Cal/g x (g carbohydrates - g total fibre))] + (9 Cal/g x g fat) + (2 Cal/g x g total fibre)

³ Nitrogen to Protein Conversion Factor: 6.25

Pulse Nutrition Information

Pulse Type: Green Pea
Format: Whole Seed, Boiled

Nutrient	Units	Value (per 100g) ¹	Reference
Energy ²	Cal	118	General Atwater factors, USDA Handbook No.74; Health Canada, 2012; CFR101.9(c)(1)(i)(C)
Protein ³	g	7.34	AOAC 992.23
Fat, total	g	0.60	AOAC 996.06
Fat, saturated	g	0.13	AOAC 996.06
Fat, <i>trans</i>	g	<0.01	AOAC 996.06
Fat, monounsaturated	g	0.14	AOAC 996.06
Fat, polyunsaturated	g	0.31	AOAC 996.06
<i>Omega 6</i>	g	0.25	AOAC 996.06
<i>Omega 3</i>	g	0.05	AOAC 996.06
Carbohydrate, total	g	25.2	Calculated by difference
Sugars, total	g	0.6	AOAC 982.14
Fibre, total dietary	g	9.0	AOAC 2011.25
<i>Soluble</i>	g	1.8	AOAC 2011.25
<i>Insoluble</i>	g	7.2	AOAC 2011.25
Ash	g	0.7	AOAC 925.51A
Moisture	g	66.18	AOAC 926.08
Sodium	mg	5.1	AOAC 984.27
Potassium	mg	257	AOAC 984.27
Calcium	mg	24.8	AOAC 984.27
Iron	mg	1.2	AOAC 984.27
Phosphorus	mg	94.4	AOAC 984.27
Magnesium	mg	36.1	AOAC 984.27
Zinc	mg	0.94	AOAC 984.27
Selenium	ppm	0.2	EPA 3050/6020 USP730
Folate	mcg	5.6	AOAC 944.12
Vitamin A	RE	12	AOAC 2001.13
Vitamin C	mg	<1.0	AOAC 984.26

Code: P7

Notes:

¹ Source of Data: Analyses conducted by Mérieux NutriSciences, 2014

² Energy calculated: [(4 Cal/g x g protein) + (4 Cal/g x (g carbohydrates - g total fibre))] + (9 Cal/g x g fat) + (2 Cal/g x g total fibre)

³ Nitrogen to Protein Conversion Factor: 6.25

Pulse Nutrition Information

Pulse Type: Green Pea

Format: Dehulled Seed, Split, Boiled

Nutrient	Units	Value (per 100g) ¹	Reference
Energy ²	Cal	114	General Atwater factors, USDA Handbook No.74; Health Canada, 2012; CFR101.9(c)(1)(i)(C)
Protein ³	g	7.54	AOAC 992.23
Fat, total	g	0.53	AOAC 996.06
Fat, saturated	g	0.11	AOAC 996.06
Fat, <i>trans</i>	g	<0.01	AOAC 996.06
Fat, monounsaturated	g	0.14	AOAC 996.06
Fat, polyunsaturated	g	0.26	AOAC 996.06
<i>Omega 6</i>	g	0.22	AOAC 996.06
<i>Omega 3</i>	g	0.04	AOAC 996.06
Carbohydrate, total	g	22.3	Calculated by difference
Sugars, total	g	0.7	AOAC 982.14
Fibre, total dietary	g	5.1	AOAC 2011.25
<i>Soluble</i>	g	2.2	AOAC 2011.25
<i>Insoluble</i>	g	2.9	AOAC 2011.25
Ash	g	0.6	AOAC 925.51A
Moisture	g	69.02	AOAC 926.08
Sodium	mg	12.7	AOAC 984.27
Potassium	mg	251	AOAC 984.27
Calcium	mg	13.5	AOAC 984.27
Iron	mg	1.1	AOAC 984.27
Phosphorus	mg	95.6	AOAC 984.27
Magnesium	mg	27.6	AOAC 984.27
Zinc	mg	0.89	AOAC 984.27
Selenium	ppm	0.2	EPA 3050/6020 USP730
Folate	mcg	20.8	AOAC 944.12
Vitamin A	RE	6	AOAC 2001.13
Vitamin C	mg	<1.0	AOAC 984.26

Code: P8

Notes:

¹ Source of Data: Analyses conducted by Mérieux NutriSciences, 2014

² Energy calculated: [(4 Cal/g x g protein) + (4 Cal/g x (g carbohydrates - g total fibre))] + (9 Cal/g x g fat) + (2 Cal/g x g total fibre)

³ Nitrogen to Protein Conversion Factor: 6.25

Pulse Nutrition Information

Pulse Type: Yellow Pea

Format: Dehulled Seed, Split, Boiled

Nutrient	Units	Value (per 100g) ¹	Reference
Energy ²	Cal	146	General Atwater factors, USDA Handbook No.74; Health Canada, 2012; CFR101.9(c)(1)(i)(C)
Protein ³	g	9.48	AOAC 992.23
Fat, total	g	0.82	AOAC 996.06
Fat, saturated	g	0.16	AOAC 996.06
Fat, <i>trans</i>	g	<0.01	AOAC 996.06
Fat, monounsaturated	g	0.18	AOAC 996.06
Fat, polyunsaturated	g	0.45	AOAC 996.06
<i>Omega 6</i>	g	0.37	AOAC 996.06
<i>Omega 3</i>	g	0.08	AOAC 996.06
Carbohydrate, total	g	28.8	Calculated by difference
Sugars, total	g	0.5	AOAC 982.14
Fibre, total dietary	g	7.4	AOAC 2011.25
<i>Soluble</i>	g	2.7	AOAC 2011.25
<i>Insoluble</i>	g	4.7	AOAC 2011.25
Ash	g	0.6	AOAC 925.51A
Moisture	g	60.37	AOAC 926.08
Sodium	mg	6.0	AOAC 984.27
Potassium	mg	291	AOAC 984.27
Calcium	mg	15.1	AOAC 984.27
Iron	mg	1.8	AOAC 984.27
Phosphorus	mg	135	AOAC 984.27
Magnesium	mg	36	AOAC 984.27
Zinc	mg	1.13	AOAC 984.27
Selenium	ppm	0.2	EPA 3050/6020 USP730
Folate	mcg	45.7	AOAC 944.12
Vitamin A	RE	<20	AOAC 2001.13
Vitamin C	mg	<1.0	AOAC 984.26

Code: P4

Notes:

¹ Source of Data: Analyses conducted by Mérieux NutriSciences, 2014

² Energy calculated: [(4 Cal/g x g protein) + (4 Cal/g x (g carbohydrates - g total fibre))] + (9 Cal/g x g fat) + (2 Cal/g x g total fibre)

³ Nitrogen to Protein Conversion Factor: 6.25

Pulse Nutrition Information

Pulse Type: Yellow Pea
Format: Whole Seed, Boiled

Nutrient	Units	Value (per 100g) ¹	Reference
Energy ²	Cal	120	General Atwater factors, USDA Handbook No.74; Health Canada, 2012; CFR101.9(c)(1)(i)(C)
Protein ³	g	7.52	AOAC 992.23
Fat, total	g	0.84	AOAC 996.06
Fat, saturated	g	0.17	AOAC 996.06
Fat, <i>trans</i>	g	<0.01	AOAC 996.06
Fat, monounsaturated	g	0.20	AOAC 996.06
Fat, polyunsaturated	g	0.43	AOAC 996.06
<i>Omega 6</i>	g	0.36	AOAC 996.06
<i>Omega 3</i>	g	0.07	AOAC 996.06
Carbohydrate, total	g	26.4	Calculated by difference
Sugars, total	g	0.4	AOAC 982.14
Fibre, total dietary	g	11.6	AOAC 2011.25
<i>Soluble</i>	g	3.0	AOAC 2011.25
<i>Insoluble</i>	g	8.6	AOAC 2011.25
Ash	g	0.8	AOAC 925.51A
Moisture	g	64.45	AOAC 926.08
Sodium	mg	10.1	AOAC 984.27
Potassium	mg	280	AOAC 984.27
Calcium	mg	25.3	AOAC 984.27
Iron	mg	1.6	AOAC 984.27
Phosphorus	mg	113	AOAC 984.27
Magnesium	mg	43	AOAC 984.27
Zinc	mg	1.06	AOAC 984.27
Selenium	ppm	0.2	EPA 3050/6020 USP730
Folate	mcg	4.6	AOAC 944.12
Vitamin A	RE	<20	AOAC 2001.13
Vitamin C	mg	<1.0	AOAC 984.26

Code: P3

Notes:

¹ Source of Data: Analyses conducted by Mérieux NutriSciences, 2014

² Energy calculated: [(4 Cal/g x g protein) + (4 Cal/g x (g carbohydrates - g total fibre))] + (9 Cal/g x g fat) + (2 Cal/g x g total fibre)

³ Nitrogen to Protein Conversion Factor: 6.25