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# Quality of western Canadian peas

## 2020

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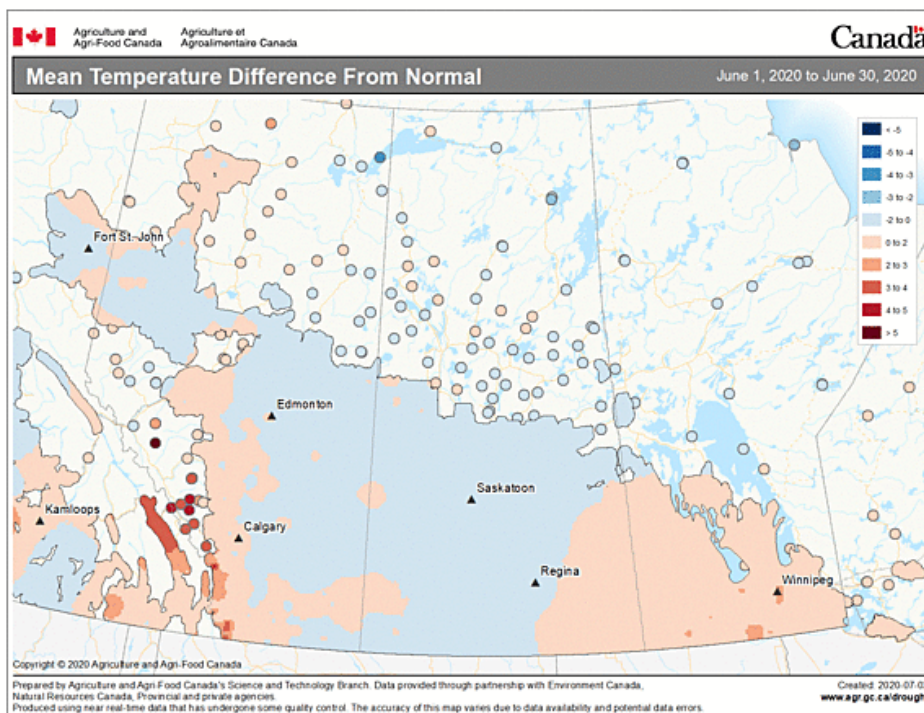
# Introduction

This report presents quality data for 2020 western Canadian peas from Canadian Grain Commission’s Harvest Sample Program. Western Canadian producers submitted samples to the Canadian Grain Commission’s Grain Research Laboratory for analysis.

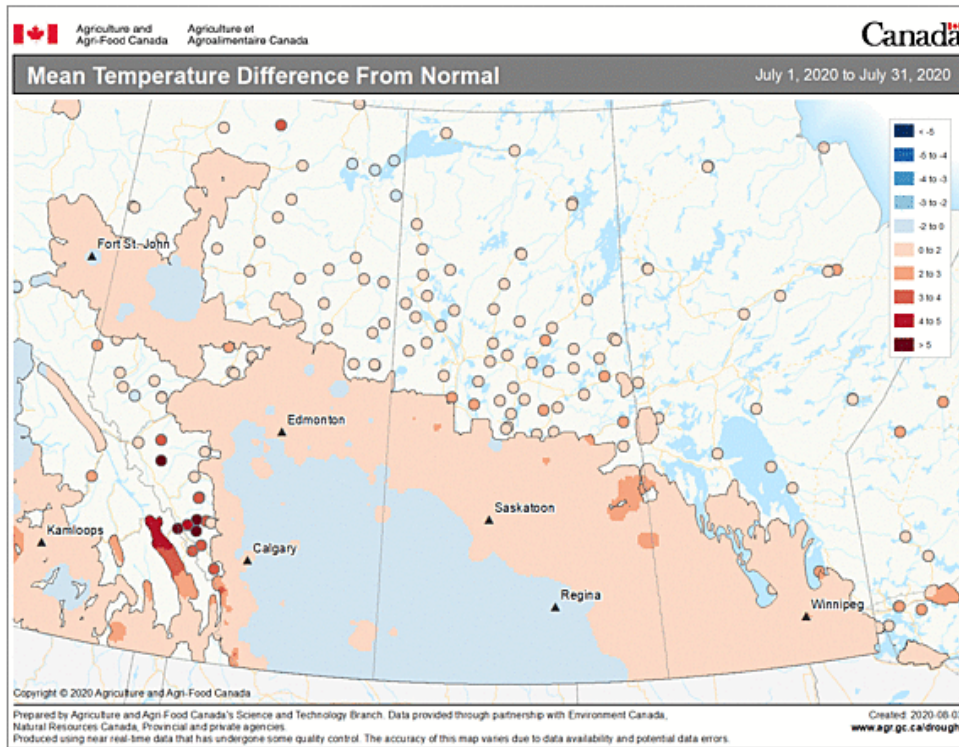
## Growing and harvesting conditions

Figures 1a and 1b show monthly mean temperature difference from normal (Prairie region) during the 2020 growing season (June and July). Figure 2 displays total precipitation (Prairie region) from April 1 to October 31, 2020.

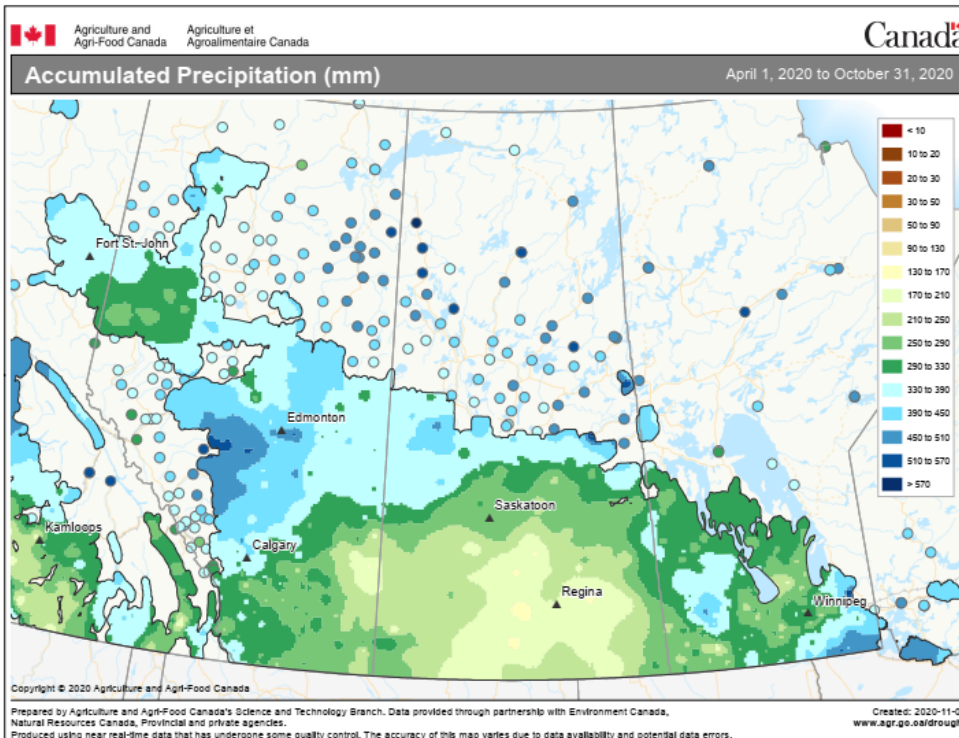
**Figure 1a Monthly mean temperature difference from normal (Prairie region) during growing season (June 2020)**



**Figure 1b Monthly mean temperature difference from normal (Prairie region) during growing season (July 2020)**



**Figure 2 Total precipitation (Prairie region) during 2020 growing season (April 1 to October 31, 2020)**



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Across all Prairie provinces, producers began with the challenge of removing overwintered crops and preparing fields to plant new crops. Seeding began in late April to early May and was completed by early June in Alberta and Saskatchewan, and mid-June in Manitoba.

A slow snow melt and a cold and wet spring in Alberta left saturated soils, flooded fields and delayed seeding, especially in parts of the northwest, northeast and Peace River regions. Warm and drier conditions in the southern and central region during summer promoted crop growth. However, persistent wet weather in some areas of northern Alberta and Peace region deteriorated crop conditions and reduced yield (Figure 2). Harvest was advanced across Alberta with low precipitation and warm conditions in the fall. Field peas were harvested from mid-August to early October with variable yield and quality.

During spring in Saskatchewan, hail damaged some crops in the southwest and northeast regions and heavy rains had drowned out some fields in the northern regions. In summer, warm and dry conditions across the province advanced crop growth. However, yield of some crops in the central region was negatively impacted due to the lack of moisture (Figure 2). Favourable weather allowed peas to be harvested in early August and harvest was completed by mid-September with average yield and good quality.

During this growing season, the northwest of Manitoba experienced severe winds that blew soils along with seed and fertilizer, damaging emerged crops. Severe rainstorms in some areas of the southwestern, central and eastern regions also caused flooding and setback crop growth. Overall, warmer temperature in Manitoba had advanced crop development (Figure 1a & b). However, 70% to 80% of normal precipitation for the season (Figure 2) and non-timely rainfalls had led to prematurely ripening of some crops in the Interlake region. Field peas were harvested with minimal weather delays from early August to mid-September and had variable yield but good quality.



## Production

Pea production for 2020 was estimated to be 4.6 million tonnes, which was up approximately 7.9% from 2019, and 24.5% higher than the 10-year average of 3.7 million tonnes (Table 1). The production growth was due to a 9.2% increase in yield from 2019. Saskatchewan accounted for 54.4% of Canadian pea production, while Alberta accounted for 40.2% and Manitoba accounted for 5.4%.

**Table 1 Production statistics for western Canadian peas<sup>1</sup>**

Province	Harvested area		Production		Yield		Mean production
	2020	2019	2020	2019	2020	2019	2010–2019
	thousand hectares		thousand tonnes		kg/ha		thousand tonnes
<b>Peas</b>							
Manitoba	70	49	246	164	3532	3318	87
Saskatchewan	933	930	2478	2313	2655	2488	2073
Alberta <sup>2</sup>	666	725	1830	1743	2749	2390	1497
<b>Western Canada</b>	<b>1669</b>	<b>1704</b>	<b>4554</b>	<b>4220</b>	<b>2729</b>	<b>2500</b>	<b>3657</b>

<sup>1</sup>Source: Statistics Canada.

<sup>2</sup>Includes the Peace River area of British Columbia.

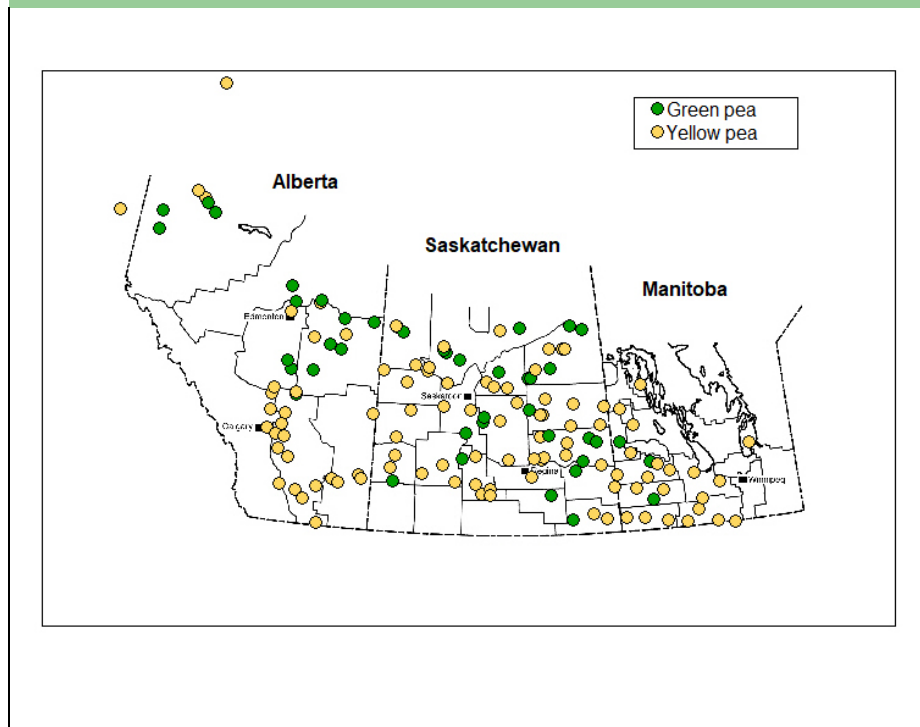
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# Western Canadian peas 2020

## Pea samples

Samples for the Canadian Grain Commission's Harvest Sample Program were collected from producers across western Canada (Figure 3). The Canadian Grain Commission received 693 pea samples consisting of 533 yellow pea samples and 160 green pea samples. All samples were graded and tested for protein content. Composite samples were prepared based on class (yellow and green), crop region and grade (No.1 and No.2). All composites were tested for chemical composition (moisture, protein, starch, total dietary fiber and ash content), mineral content, functional properties (water holding capacity and emulsifying capacity) and physical and cooking characteristics (100-seed weight, water absorption, cooking time and firmness of cooked peas). It is important to note the samples reported by grade do not necessarily represent the actual distribution of the grade across western Canada.

**Figure 3 Map of western Canada showing origin of 2020 pea samples from Canadian Grain Commission's Harvest Sample Program**



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## Quality of 2020 western Canadian peas

Protein content for yellow and green peas in 2020 ranged from 17.3% to 29.8% (Table 2). The mean protein content was 23.2%, which was similar to the mean for 2019 and was higher than the ten-year mean of 22.9% (Figure 4). Table 3 represents the mean protein and starch content for yellow and green peas by crop region (Figure 5).

Table 4 shows the quality data for 2020 yellow pea composite by grade. Mean protein content of No. 1 and No.2 Canada Yellow peas were 23.7%, higher than in 2019. Total starch content was also higher than in 2019 for No.1 (47.0%) and No.2 (46.1%) Canada Yellow peas. Ash and total dietary fiber content were similar to 2019, with a total dietary fiber of 14.6% for No.1 and 14.2% for No.2 and ash 2.7% for both grades.

Potassium (K) was the most abundant macroelement present in yellow peas, followed by phosphorus (P), magnesium (Mg) and calcium (Ca) (Table 4). Among microelements, iron (Fe) was the highest, followed by zinc (Zn), manganese (Mn) and copper (Cu). Element contents for No.1 and No.2 Canada Yellow peas remained similar to 2019 except for No.2 grade with a lower Ca level.

Mean water holding capacity for No.1 (0.89 g H<sub>2</sub>O/g sample) and No.2 (0.90 g H<sub>2</sub>O/g sample) Canada Yellow peas were the same as 2019 (Table 4). Mean oil emulsifying capacity of No.1 (270.2 mL oil/g sample) and No.2 (275.8 mL oil/g sample) Canada Yellow peas were higher than 2019, which may be related to higher protein content.

No.1 and No.2 Canada Yellow peas had similar 100-seed weight to 2019 and were 21.7 g/ 100 seeds for both grades in 2020. Yellow peas had higher water absorption values in 2020 than 2019, with 0.92 g H<sub>2</sub>O/g sample for No.1 grade and 0.94 g H<sub>2</sub>O/g sample for No.2 grade.

Cooking time of yellow peas was longer in 2020 for No.1 grade (19.2 min) while No.2 grade (18.5 min) remained similar to 2019 (Table 4). Firmness of cooked yellow peas was also reduced for both grades (22.8 and 22.3 N/g cooked seeds) in 2020.

Table 5 shows the 2020 quality data for No.1 and No.2 Canada Green pea composite by grade. No.1 Canada Green peas were higher in protein (24.5%) but lower in total starch (45.1%) and total dietary fiber (14.4%) than in 2019. Mean protein (24.0%), total starch (45.6%) and total dietary fiber (15.1%) were all higher for No.2 Canada Green peas than in 2019. Ash contents of No.1 (2.7%) and No.2 (2.8%) Canada Green peas were similar to 2019. Similar trends to yellow peas for micro-elements and macro-elements were noted in green peas (Table 5). Element quantity did not show much difference between 2019 and 2020 for No.1 and No.2 Canada Green peas.

Mean water holding capacity values for No.1 (0.88 g H<sub>2</sub>O/g sample) and No.2 (0.89 g H<sub>2</sub>O/g sample) Canada Green peas were similar to 2019 (Table 5). Mean oil emulsifying capacity values of the 2020 No. 1 (277.9 mL oil/g sample) and No.2 (263.8 mL oil/g sample) Canada Green peas were higher than in 2019, which may be associated with higher protein content.

Mean 100-seed weight and water absorption were higher for No.1 (21.3 g/100 seeds, 0.9 g H<sub>2</sub>O/g seeds) and No.2 (22.2 g/100 seeds, 0.86 g H<sub>2</sub>O/g seeds) Canada Green peas than in 2019 (Table 5). A longer cooking time and lower firmness were also shown from No.1 (14.2 min, 22.4 N/g cooked seeds) and No.2 (14.9 min, 22.8 N/g cooked seeds) Canada Green peas compared to 2019 (Table 5).



**Table 2 Mean protein content for 2020 western Canadian peas (yellow and green combined) by grade<sup>1</sup>**

Grade	Protein content, % (dry basis)			
		2020		2019
	Mean	Min.	Max.	Mean
<b>Manitoba</b>				
Peas, No.1 Canada	22.5	21.2	23.7	22.6
Peas, No.2 Canada	22.6	20.4	25.4	22.6
Peas, No.3 Canada	22.8	19.7	25.5	23.1
<b>All grades</b>	<b>22.6</b>	<b>19.7</b>	<b>25.5</b>	<b>22.7</b>
<b>Saskatchewan</b>				
Peas, No.1 Canada	23.4	19.6	27.8	22.8
Peas, No.2 Canada	23.1	17.3	27.6	23.3
Peas, No.3 Canada	23.5	19.2	29.8	23.6
<b>All grades</b>	<b>23.3</b>	<b>17.3</b>	<b>29.8</b>	<b>23.2</b>
<b>Alberta</b>				
Peas, No.1 Canada	23.3	18.8	27.6	23.1
Peas, No.2 Canada	23.3	19.5	29.5	23.1
Peas, No.3 Canada	23.4	18.7	27.4	22.7
<b>All grades</b>	<b>23.3</b>	<b>18.7</b>	<b>29.5</b>	<b>23.0</b>
<b>Western Canada</b>				
Peas, No.1 Canada	23.3	18.8	27.8	22.9
Peas, No.2 Canada	23.1	17.3	29.5	23.2
Peas, No.3 Canada	23.4	18.7	29.8	23.1
<b>All grades</b>	<b>23.2</b>	<b>17.3</b>	<b>29.8</b>	<b>23.1</b>

<sup>1</sup>Protein content (N x 6.25) is determined by near infrared measurement calibrated against the Combustion Nitrogen Analysis reference method.

Figure 4 Mean protein content of western Canadian peas

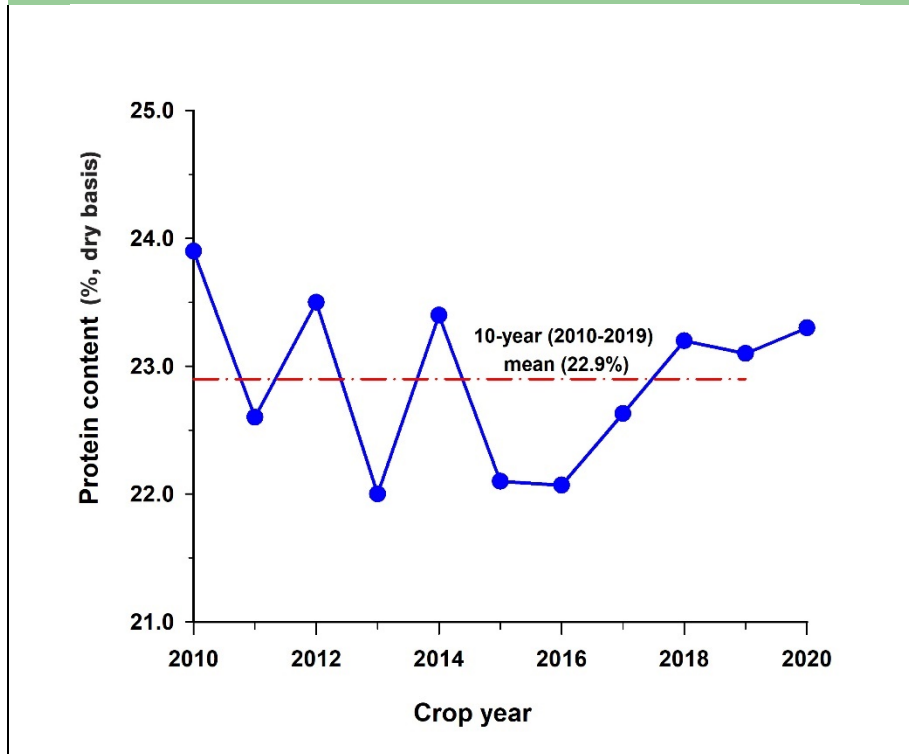
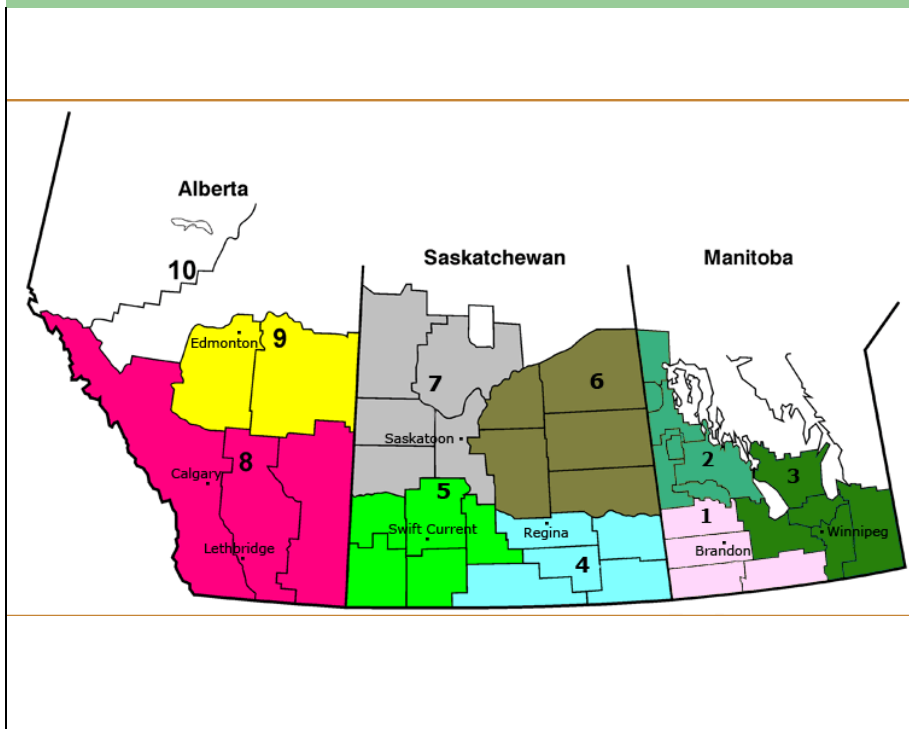


Figure 5 Crop regions in western Canada



**Table 3 Mean protein and starch content for 2020 western Canadian peas (yellow and green combined) by crop region**

Crop region	Protein content, % (dry basis)		Starch content, % (dry basis)	
	2020	2019	2020	2019
1	23.0	22.6	47.0	46.6
4	23.3	23.3	46.1	46.4
5	24.0	24.7	46.9	44.9
6	23.6	22.5	46.5	46.3
7	24.6	22.5	45.6	46.0
8	24.7	24.1	45.7	45.4
9	22.7	23.2	47.0	44.6
10	22.8	22.3	45.5	45.8

**Table 4 Quality data for 2020 western Canadian yellow pea composite by grade**

Quality parameter	Peas, No.1 Canada Yellow		Peas, No.2 Canada Yellow	
	2020	2019	2020	2019
<b>Chemical composition</b>				
Moisture content, %	10.3	10.2	10.3	10.1
Protein content, % (dry basis)	23.7	23.1	23.7	23.5
Starch content, % (dry basis)	47.0	45.8	46.1	45.7
Total dietary fiber, % (dry basis)	14.6	14.7	14.2	14.2
Ash content, % (dry basis )	2.7	2.6	2.7	2.7
<b>Mineral (mg/100 g, dry basis)</b>				
Calcium (Ca)	79.6	82.6	81.9	89.6
Copper (Cu)	0.77	0.76	0.76	0.77
Iron (Fe)	5.4	5.2	5.6	5.7
Potassium (K)	1076.2	1056.1	1060.2	1053.3
Magnesium (Mg)	137.0	136.0	138.3	137.9
Manganese (Mn)	1.2	1.3	1.3	1.3
Phosphorus (P)	348.1	348.3	358.7	356.6
Zinc (Zn)	3.2	3.1	3.3	3.3
<b>Functional property</b>				
Water holding capacity, g H <sub>2</sub> O/g sample	0.89	0.89	0.90	0.90
Emulsifying capacity, mL oil/g sample	270.2	261.3	275.8	265.6
<b>Physical characteristic</b>				
100-seed weight, g/100 seeds	21.7	21.8	21.7	21.7
Water absorption, g H <sub>2</sub> O/g seeds	0.92	0.82	0.94	0.85
<b>Cooking characteristic</b>				
Cooking time, min	19.2	17.7	18.5	18.7
Firmness, N/g cooked seeds	22.8	23.9	22.3	23.4

**Table 5 Quality data for 2020 western Canadian green pea composite by grade**

Quality parameter	Peas, No.1 Canada Green		Peas, No.2 Canada Green	
	2020	2019	2020	2019
<b>Chemical composition</b>				
Moisture content, %	10.3	10.3	10.2	10.1
Protein content, % (dry basis)	24.5	23.3	24.0	23.7
Starch content, % (dry basis)	45.1	46.1	45.6	45.2
Total dietary fiber, % (dry basis)	14.4	14.6	15.1	14.8
Ash content, % (dry basis)	2.7	2.8	2.8	2.8
<b>Mineral (mg/100 g, dry basis)</b>				
Calcium (Ca)	74.2	77.5	81.0	80.6
Copper (Cu)	0.75	0.69	0.73	0.69
Iron (Fe)	5.2	4.9	5.3	5.4
Potassium (K)	1072.7	1089.1	1087.9	1085.8
Magnesium (Mg)	132.2	131.5	135.1	128.0
Manganese (Mn)	1.1	1.2	1.2	1.3
Phosphorus (P)	365.6	355.8	374.4	372.4
Zinc (Zn)	3.3	3.2	3.2	3.4
<b>Functional property</b>				
Water holding capacity, g H <sub>2</sub> O/g sample	0.88	0.89	0.89	0.90
Emulsifying capacity, mL oil/g sample	277.9	267.6	263.8	259.5
<b>Physical characteristic</b>				
100-seed weight, g/100 seeds	21.3	20.1	22.2	20.7
Water absorption, g H <sub>2</sub> O/g seeds	0.90	0.86	0.86	0.81
<b>Cooking characteristic</b>				
Cooking time, min	14.2	13.6	14.9	11.1
Firmness, N/g cooked seeds	22.4	23.9	22.8	23.8