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Quality of western Canadian peas

2017

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Canada

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Introduction

This report presents quality data for 2017 western Canadian peas from Canadian Grain Commission's Harvest Sample Program. Samples were submitted by western Canadian producers to the Canadian Grain Commission's Grain Research Laboratory for analysis.

Growing and harvesting conditions

Cool temperatures in Saskatchewan and Alberta in early spring resulted in delayed planting until May, especially in the central and northern areas of both provinces. Slightly above normal temperatures coupled with a lack of rainfall in May allowed growers in most areas to complete spring planting by the first week of June. However, in some areas of the northern Prairies, planting was delayed due to rainfall during the last week of May.

Above normal temperatures and mostly dry growing conditions prevailed during June and July over most of Western Canada. The primary pea growing areas in Western Canada experienced stress which reduced yield expectations. However, quality of dry peas was high for this year. The dry growing season resulted in minimal disease pressure in most pulse growing areas.

Excellent weather conditions in late August and September advanced crop maturity and allowed harvest to progress rapidly. Dry conditions occurred in the Peace River region, central Alberta and Saskatchewan. Wet conditions in northern regions caused delays in harvest. However, most pea crops were in the bin by mid-October.

Production

Pea production for 2017 was estimated to be 4.1 million tonnes, which was down approximately 15% from 2016, but 19% higher than the 10-year average of 3.3 million tonnes (Table 1). The decrease in production was the result of 2.7% reduction in harvested area and 14% decrease in yield from 2016. Saskatchewan accounted for 48.0% of Canadian pea production, while Alberta accounted for 50.0% and Manitoba accounted for 2.0%.

Table 1 – Production statistics for western Canadian peas[1]							
	Harvested area		Production		Yield		Mean production
Province	2017	2016	2017	2016	2017	2016	2007–2016
	thousand hectares		thousand tonnes		kg/ha		thousand tonnes
Peas							
Manitoba	25	65	80	164	3200	2500	82
Saskatchewan	867	870	1974	2346	2300	2700	2154
Alberta[2]	749	751	2058	2326	2748	3097	1112
Western Canada	**1641**	**1686**	**4112**	**4836**	**2500**	**2900**	**3347**

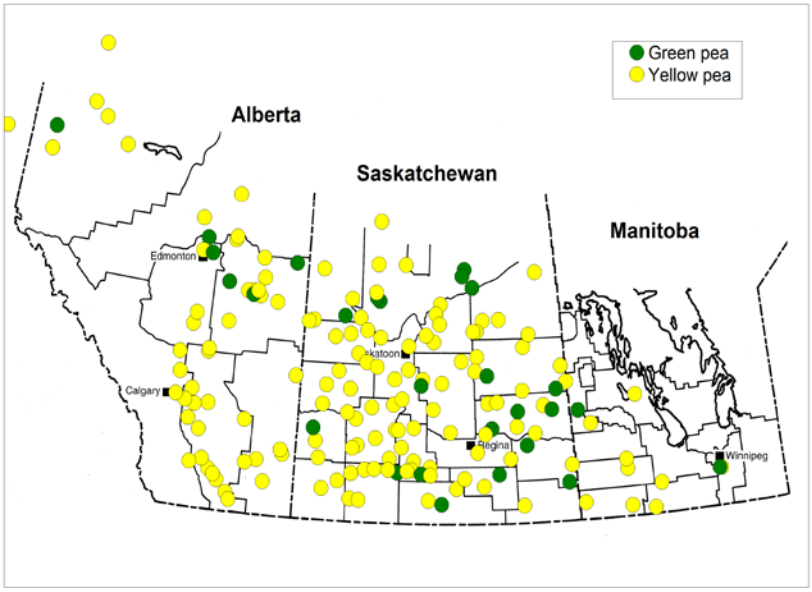
[1]Statistics Canada.
[2]Includes the Peace River area of British Columbia.

Western Canadian peas_____ 2017

Pea samples

Samples for the Canadian Grain Commission's Harvest Sample Program were collected from producers across western Canada (Figure 1). The Canadian Grain Commission received 555 pea samples consisting of 486 yellow pea samples and 69 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 that the samples reported by grade do not necessarily represent the actual distribution of grade.

Figure 1 – Map of western Canada showing origin of 2017 pea samples from CGC's Harvest Sample Program



Quality of 2017 western Canadian peas

Protein content for yellow and green peas ranged from 16.3% to 30.3% (Table 2). The mean protein content for western Canadian peas was 22.6%, which was higher than the mean of 22.1% for 2016, but lower than the ten-year mean protein content of 23.0% (Figure 2). Table 3 represents the mean protein and starch content for yellow and green peas by crop region (Figure 3).

Table 4 shows the quality data for 2017 yellow peas. Mean protein content for No. 1 Canada Yellow peas was 23.4%, which was higher than the mean for 2016 (21.5%). Mean protein content for No. 2 Canada Yellow peas was 22.8%, which was higher than the mean for 2016 (21.7%). Mean starch content for No. 1 Canada Yellow peas was 47.6%, lower than the mean for No. 1 Canada Yellow peas in 2016 (48.9%). The mean starch content for No. 2 Canada was 46.9%, lower than the mean for 2016. Mean total dietary fiber content for No.1 Canada Yellow peas was 15.0%, lower than the mean for No.1 Canada Yellow peas in 2016. Mean total dietary fiber for No. 2 Canada Yellow peas was 15.7% lower than the mean for No. 2 in 2016. Mean ash contents in both grades were slightly lower than that for 2016. 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). Mean water holding capacity for No. 1 Canada Yellow peas was 0.85 g H_2O per g sample, which was lower than the mean value for 2016 (Table 4). Mean water holding capacity for No. 2 Canada Yellow was 0.84 g H_2O per g sample, which was lower than the mean value for 2016. The emulsifying capacity of No. 1 Canada Yellow peas was 269.5 mL oil per g sample, which was lower than that for 2016. The emulsifying capacity of No. 2 Canada Yellow peas was 268.1 mL oil per g sample, which was slightly lower than the value for 2016.

Mean 100-seed weight for No. 1 Canada Yellow peas was 20.6 g (Table 4), while mean 100-seed weight for No. 2 Canada Yellow peas was 21.0 g. Mean 100-seed weights for both grades of peas were close to those in 2016. The water absorption value for No. 1 Canada Yellow peas was 0.89 g H_2O per g seeds. For No. 2 Canada Yellow peas, the water absorption value was 0.87 g H_2O per g seeds. Water absorption values for both grades were similar to the values in 2016.

Mean cooking time for No. 1 Canada Yellow peas was 12.9 min, shorter than that in 2016 (Table 4). Mean cooking time for No. 2 Canada Yellow peas was 18.5 min, which was longer than that in 2016. For both No. 1 and No. 2 grades, mean firmness values of cooked peas were higher than the values in 2016.

Table 5 shows the 2017 quality data for No. 1 Canada and No. 2 Canada Green peas. Mean protein content for No. 1 Canada Green peas was 22.8%, which was higher than the mean for 2016. Mean protein content for No. 2 Canada Green peas was 23.3%, which was higher than the mean in 2016. Mean starch content was 46.9% for No. 1 Canada Green peas, lower than the mean for 2016, and 46.6% for No. 2 Canada Green peas, lower than the mean for 2016. Mean total dietary fiber content for No. 1 Canada Green peas was 16.0%, lower than the mean for No. 1 Canada Green peas (17.7 %) for 2016. Mean total dietary fiber content for No. 2 Canada Green pea was 15.9%, lower than that for No. 2 Canada Green peas for 2016. Ash content values for No. 1 and No. 2 Canada Green peas were slightly lower than the values in 2016. Similar trends to yellow peas for both macroelements and microelements in green peas were noted (Table 5). Mean water holding capacity for No. 1 Canada Green peas (0.85 g H_2O per g sample) was similar to the mean for No. 2 Canada Green peas (0.83 g H_2O per g sample) (Table 5). The means for both grades were lower than the means for 2016. Mean emulsifying capacity was 270.0 mL oil per g sample for No. 1 Canada Green peas and 267.7 mL oil per g sample for No. 2 Canada Green peas. The means for both grades were lower than the means for 2016.

Mean 100-seed weight for No. 1 Canada Green peas was 21.6g, higher than that in 2016 (Table 5). Mean 100-seed weight for No. 2 Canada Green peas was 21.0 g, similar to that for 2016. Mean water absorption values for No. 1 Canada Green peas was slightly lower than that in 2016, while mean water absorption value for No. 2 Canada Green peas was higher than that in 2016. Mean cooking time for No. 1 Canada Green peas was similar to that for No. 2 Canada Green peas. Mean firmness values for cooked green peas for both grades were slightly higher than the values for 2016.

Table 2 – Mean protein content for 2017 western Canadian peas (yellow and green combined) by grade[1]

Grade	Protein content, % dry basis			
	2017			2016
	Mean	Min.	Max.	Mean
Manitoba				
Peas, No. 1 Canada	22.6	21.1	23.2	22.6
Peas, No. 2 Canada	22.5	21.5	23.2	23.5
Peas, No. 3 Canada	NS[2]	NS	NS	24.5
All grades	**22.7**	**21.1**	**24.0**	**23.6**
Saskatchewan				
Peas, No. 1 Canada	22.5	19.3	27.3	21.7
Peas, No. 2 Canada	22.2	17.2	28.2	22.1
Peas, No. 3 Canada	22.7	16.4	26.4	22.8
All grades	**22.4**	**16.4**	**28.2**	**22.1**
Alberta				
Peas, No. 1 Canada	23.3	16.3	30.3	20.9
Peas, No. 2 Canada	22.7	18.6	29.3	21.7
Peas, No. 3 Canada	22.5	19.4	25.7	22.5
All grades	**23.0**	**16.3**	**30.3**	**21.8**
Western Canada				
Peas, No. 1 Canada	22.8	16.3	30.3	21.5
Peas, No. 2 Canada	22.4	17.2	29.3	22.0
Peas, No. 3 Canada	22.6	16.4	26.4	22.8
All grades	**22.6**	**16.3**	**30.3**	**22.1**

[1]Protein content (N x 6.25) is determined by near infrared measurement calibrated against the Combustion Nitrogen Analysis reference method.

[2]NS=insufficient number of samples to generate a representative value.

Figure 2 – Mean protein content of western Canadian peas

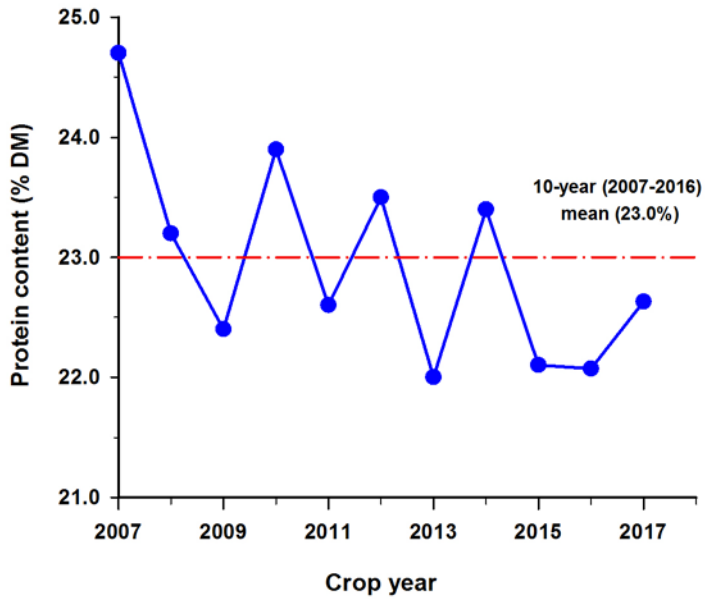


Figure 3 – Crop regions in western Canada

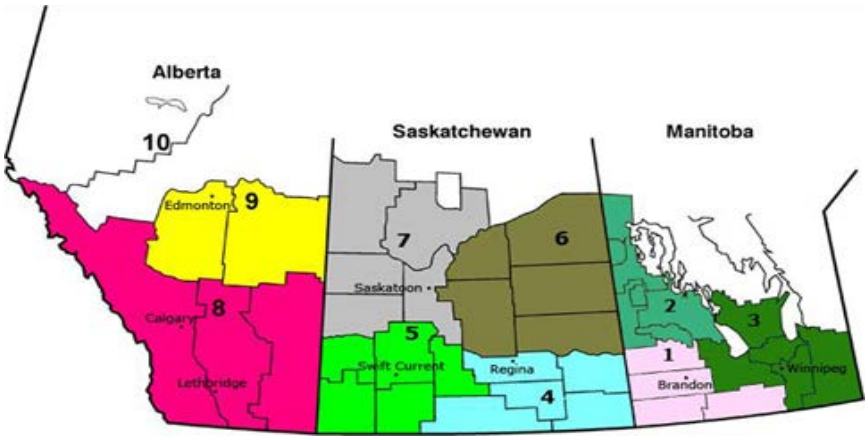


Table 3 – Mean protein and starch content for 2017 western Canadian peas (yellow and green combined) by crop region

	Protein content, % dry basis		Starch content, % dry basis	
Crop region[1]	2017	2016	2017	2016
1	22.6	22.9	46.9	47.9
2	23.1	21.1	47.3	47.7
3	23.1	NS[2]	46.7	NS
4	22.8	21.8	48.1	48.0
5	22.8	21.0	47.6	48.5
6	22.4	22.1	47.8	47.6
7	22.4	22.2	48.1	47.4
8	24.8	21.0	47.0	49.7
9	22.4	22.2	47.2	46.0
10	22.3	22.4	47.3	48.6

[1]Manitoba crop regions (Figure 3): 1 (Southwest Manitoba); 2 (Northwest Manitoba); 3 (Eastern Manitoba); Saskatchewan crop regions: 4 (South East Saskatchewan), 5 (South West Saskatchewan), 6 (North East Saskatchewan), and 7 (North West Saskatchewan); Alberta crop regions: 8 (Southern Alberta), 9 (Central Alberta), and 10 (Northern Alberta).

[2]NS= insufficient number of samples to generate a representative value.

Table 4 – Quality data for 2017 western Canadian yellow pea composite by grade				
	Peas, No. 1 Canada Yellow		Peas, No. 2 Canada Yellow	
Quality parameter	2017	2016	2017	2016
Chemical composition				
Moisture content, %	10.6	10.6	10.6	10.4
Protein content, % dry basis	23.4	21.5	22.8	21.7
Starch content, % dry basis	47.6	48.9	46.9	48.5
Total dietary fiber, % dry basis	15.0	16.6	15.7	16.5
Ash content, % dry basis	2.6	2.8	2.6	2.9
Mineral (mg/100 g dry basis)				
Calcium (Ca)	89.2	79.5	88.4	85.7
Copper (Cu)	0.86	0.71	0.84	0.74
Iron (Fe)	5.1	5.1	5.2	5.5
Potassium (K)	940.7	1037.5	965.9	1082.6
Magnesium (Mg)	132.6	138.4	137.8	138.7
Manganese (Mn)	1.1	1.3	1.2	1.4
Phosphorus (P)	323.7	342.5	326.4	384.9
Zinc (Zn)	3.6	3.4	3.8	3.6
Functional property				
Water holding capacity, g H_2O/g sample	0.85	0.92	0.84	0.94
Emulsifying capacity, mL oil/g sample	269.5	275.5	268.1	270.5
Physical characteristic				
100-seed weight, g/100 seeds	20.6	21.0	21.0	20.8
Water absorption, g H_2O/g seeds	0.89	0.86	0.87	0.87
Cooking characteristic				
Cooking time, min	12.9	15.0	18.5	11.4
Firmness, N/g cooked seeds	29.0	22.8	27.6	22.8

Table 5 – Quality data for 2017 western Canadian green pea composite by grade				
	Peas, No. 1 Canada Green		Peas, No. 2 Canada Green	
Quality parameter	2017	2016	2017	2016
Chemical composition				
Moisture content, %	10.7	10.8	10.7	10.8
Protein content, % dry basis	22.8	21.9	23.3	22.7
Starch content, % dry basis	46.9	47.9	46.6	47.6
Total dietary fiber, % dry basis	16.0	17.7	15.9	17.1
Ash content, % dry basis	2.6	2.9	2.7	3.0
Mineral (mg/100 g dry basis)				
Calcium (Ca)	82.2	77.2	82.3	80.0
Copper (Cu)	0.75	0.65	0.74	0.66
Iron (Fe)	4.8	4.9	4.9	5.5
Potassium (K)	982.9	1061.1	992.6	1063.5
Magnesium (Mg)	128.8	123.1	127.2	128.9
Manganese (Mn)	1.0	1.3	1.1	1.3
Phosphorus (P)	322.3	364.9	322.2	384.9
Zinc (Zn)	4.2	3.4	3.7	3.6
Functional property				
Water holding capacity, g H_2O/g sample	0.85	0.96	0.83	0.93
Emulsifying capacity, mL oil/g sample	270.0	279.6	267.7	273.9
Physical characteristic				
100-seed weight, g/100 seeds	21.6	20.7	21.0	20.9
Water absorption, g H_2O/g seeds	0.75	0.80	0.83	0.76
Cooking characteristic				
Cooking time, min	13.1	12.0	13.3	13.8
Firmness, N/g cooked seeds	26.7	23.2	26.5	22.4