

HULLESS PUMPKIN SEED: A NEW CROP FOR ORGANIC PRODUCTION IN QUÉBEC

PART 3 - Economic Feasibility

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The production of hulless-seed pumpkins for the snack market or for processing has the potential to spur crop diversification, especially on organic farms. The work carried out between 2009 and 2012 at the Organic Agriculture Innovation Platform in Saint-Bruno-de-Montarville validated the agronomic feasibility of this production under conditions found in southern Québec. The performance of four cultivars (Kakai, Styriaca, Snackjack, and Snackface) was evaluated there, as were the effects of different organic-farming growing practices.

An economic analysis was also conducted to assess the profitability prospects for the production of organic hulless-seed pumpkins for horticultural and field crop farms in Québec.

ANTICIPATED PROFITABILITY FOR FARMS

For this production to be attractive, the revenue generated must cover the variable costs and generate profit margins comparable to those of other potential or existing farm crops.

Therefore we based our economic analysis on the gross margin (GM). The GM is the difference between the crop's revenue and its variable costs. This is what producers have left to cover fixed costs, return on assets, and compensation for labour.



Basically the crop revenues depend on the yields and the prices obtained, while the variable costs include supplies, farming operations, marketing costs, labour, and other direct costs. The GM is calculated as follows:

$$\text{GM} = (\text{Yield} \times \text{Price}) - \text{Variable Costs}$$

Hulless-seed pumpkins can be produced to sell either seeds or whole fruit. Production for the seed market could attract field crop businesses, since it can be scaled up by mechanizing certain operations (harvesting, rippling, etc.) On the other hand, the sale of the fruit is more likely to interest horticultural businesses, which have the human and material resources, as well as the market required for this type of product.

The *CRAAQ economic references* (Références économiques) were used to obtain the baseline GMs for various organic crops, including field crop and horticultural production (Table 1). In general, horticultural businesses produce on a smaller scale than field crop businesses and use higher value land on which they must generate a higher margin per hectare. These GM averages therefore served as targets for anticipated profitability levels for organic pumpkin production for the seed or fruit market, for field crop or horticultural businesses, respectively.

Table 1. Average contribution margin (CM) for certain field crops and organic horticultural crops

PRODUCTION SECTOR	AVERAGE CM
Organic field crops	\$875/ ha
Organic horticulture	\$3,542 / ha

TARGET PRICES ACCORDING TO VARIOUS SCENARIOS

Based on these baseline GMs, it's possible to calculate a certain break-even point, which translates into the target price. The target price is the market price required to make organic pumpkin production competitive, both for farmers planning their crop rotations and for buyers who can purchase elsewhere on the international market. In this context, the target price is calculated in reverse. We start by considering the variable costs, followed by the baseline GM and yields:

$$\text{Target price (\$/t)} = \frac{\text{Variable Costs (\$/ha)} + \text{Average GM for the Sector (\$/ha)}}{\text{Yield (t/ha)}}$$

Target prices were calculated for 13 scenarios whose agronomic results suggested profitability prospects. These scenarios take into consideration the results obtained in 2011 and 2012 using three cultivars and four weeding strategies (Table 2). One of these scenarios is based on the results obtained in 2012 on an organic CSA (Community supported agriculture) farm located in western Montérégie.

Lastly, three target prices were determined for each of these scenarios:

- one target price for the sale of seeds based on the average GM for the organic field crops sector
- two target prices for the sale of fruits based on average GM for the organic horticultural sector: one for mechanical harvesting of fruits and the other for hand harvesting (the costs are obviously higher for hand harvesting)

These target prices allowed us compare the production costs that one can reasonably predict from the market price, i.e., the price buyers of organic pumpkin (seeds or fruits) are willing to pay. The higher the market price is compared to the target price, the more reasonable it is to assume that this production would be feasible in Québec.

Table 2. Organic pumpkin production target prices for seeds and fruits under different scenarios

CULTIVAR WEEDING STRATEGY		TARGET PRICE SEEDS (\$/kg)	TARGET PRICES - FRUITS	
			HARVEST MECHANICAL (\$/fruit)	HARVEST BY HAND (\$/fruit)
Snackjack ¹	Field crop	6.25	0.55	0.76
	Horticultural	5.62	0.61	0.84
	By hand	6.97	0.65	0.84
	Biodegradable black mulch	6.98	0.63	0.83
Snackjack ²	CSA farm	6.56	0.56	0.72
Snackface ²	Field crop	5.33	0.64	0.84
	Horticultural	5.93	0.64	0.85
	By hand	6.93	0.74	0.92
	Biodegradable black mulch	5.75	0.66	0.84
Styriaca ²	Field crop	7.55	1.56	1.98
	Horticultural	7.80	1.47	1.90
	By hand	9.71	1.71	2.08
	Biodegradable black mulch	8.30	1.53	1.87

¹ From data gathered in 2011

² From data gathered in 2012

POTENTIAL MARKETS AND PRICES

Organic pumpkin seeds currently available in certain Québec grocery stores are imported from Europe or China. According to information gathered from buyers, Europe offers a premium product at prices ranging from \$8.00 to \$10.00 per kilogram. Seeds of Chinese origin can be bought at around \$6.00/kg but are less likely to meet certain quality criteria. We assumed the Québec production rivals the quality of the European products and therefore used the European prices as the basis for our economic analysis.

As far as sales prospects for whole fruit are concerned, an organic farmer who sold pumpkins at a public market indicated that the Snackjack and Snackface organic pumpkin cultivars would sell for between \$2.50 and \$3.00 per fruit.

PROMISING PROSPECTS UNDER CERTAIN CONDITIONS

Target prices calculated for the 13 scenarios point to a good profitability outlook for fruit sales. The higher density of fruit per hectare of the Snackjack and Snackface cultivars make these varieties more attractive, with a target price range of \$0.55 to \$0.66 per fruit when mechanically harvested and \$0.76 to \$0.84 per fruit when hand harvested. However, Styriaca cultivar pumpkins are larger and their green marbling spark the interest of customers looking for something new. We can therefore assume this cultivar's fruit would sell at higher prices. However, we need to wait and see to what extent before we can accurately determine the sales prospects.

The target prices for organic pumpkin seeds also point to the benefits of producing for this market, but with one major reservation. Scenarios involving the Snackjack and Snackface cultivars suggest target prices below \$7.00/kg, which compare favourably with current market prices (\$8.00 to \$10.00/kg). However, buyers have indicated that the Styriaca cultivar is more interesting in terms of seed quality and customer satisfaction.

The target prices for scenarios for this cultivar vary from \$7.55 to \$9.71/kg, still within the feasibility range, but with little room to manoeuvre. Therefore the seed market profitability prospects for the Styriaca cultivar depend on strict control of production factors and practices. Another thing to consider with these scenarios is that mechanical-type field crop or horticultural weeding protocols look to be more viable than hand weeding or black biodegradable mulch protocols. Agronomic improvements to boost yields or reduce the costs of organic farming are advisable for those considering growing the Styriaca cultivar for seed sales in Québec.

It is also worth keeping in mind that some transaction costs were not calculated in this analysis, such as the time spent at market to sell fruits or dealing with organic pumpkin seeds buyers. If we add in these costs, production would probably still be profitable, but with slimmer margins.

However, the assumptions behind our results do not cover all possible scenarios on farms. Some types of expenditures could be optimized by educating farmers who adopt this new approach. In addition, if production expands, the creation of a network of producers could facilitate the sharing of some resources, leading to greater efficiency.

In closing, farmers interested in adding this type of production to their crop rotations stand to gain by exploring the various options with their crop advisers.



For more information, visit the IRDA website:

See summary sheets for *Hulless pumpkin seed: a new crop for organic production in Québec*:

- [Part 1 - Cultivars and Sowing Methods](#)
- [Part 2 - Weeding Strategies](#)

Final report for this project: [Organic Production of Pumpkin Seeds as a Functional Food for the Snack Market and for Processing](#) (only available in French)

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IMPLEMENTATION AND FUNDING PARTNERS



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