

Lutein in Yellow-Fleshed Potatoes – 2005 Lab Data Update

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Abstract

The color of yellow-fleshed potatoes is imparted by carotenoids. Carotenoids are anti-oxidant compounds that may protect against a variety of chronic diseases and certain cancers. Lutein is a specific carotenoid compound associated with a reduced incidence of age-related macular degeneration and cataract formation. This project involved growing ten yellow-fleshed potato varieties in three Alberta locations, harvesting at three different times and analyzing them for tuber flesh color intensity, total carotenoid content and lutein concentration. Total carotenoid content ranged from 17 to 250 µg per 100 g FW and was positively correlated with tuber flesh color intensity, especially when tubers were harvested at 100 days after planting. Lutein accounted for approximately 25% of the total carotenoid content in many varieties and ranged from 3.2 µg per 100 g FW in one variety (Sinora) to over 50 µg per 100 g FW in the variety Satina. Lutein concentration was determined most by variety, but varied with time of harvest and between locations. Satina and Victoria had consistently higher concentrations of lutein than most of the varieties studied. An average serving of Satina potatoes would provide approximately 100 µg of dietary lutein. Potato varieties with significant concentrations of lutein may be marketed in the future as functional foods.

Fresh Market Varieties



Objectives

1. To determine lutein concentration in up to 10 potato varieties grown at three locations in Alberta;
2. To determine what effect growing location and time of harvest have on lutein concentration in each variety;
3. To determine the amount of lutein contributed in an average potato serving for use in marketing strategies.

Acknowledgements

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Lutein Content

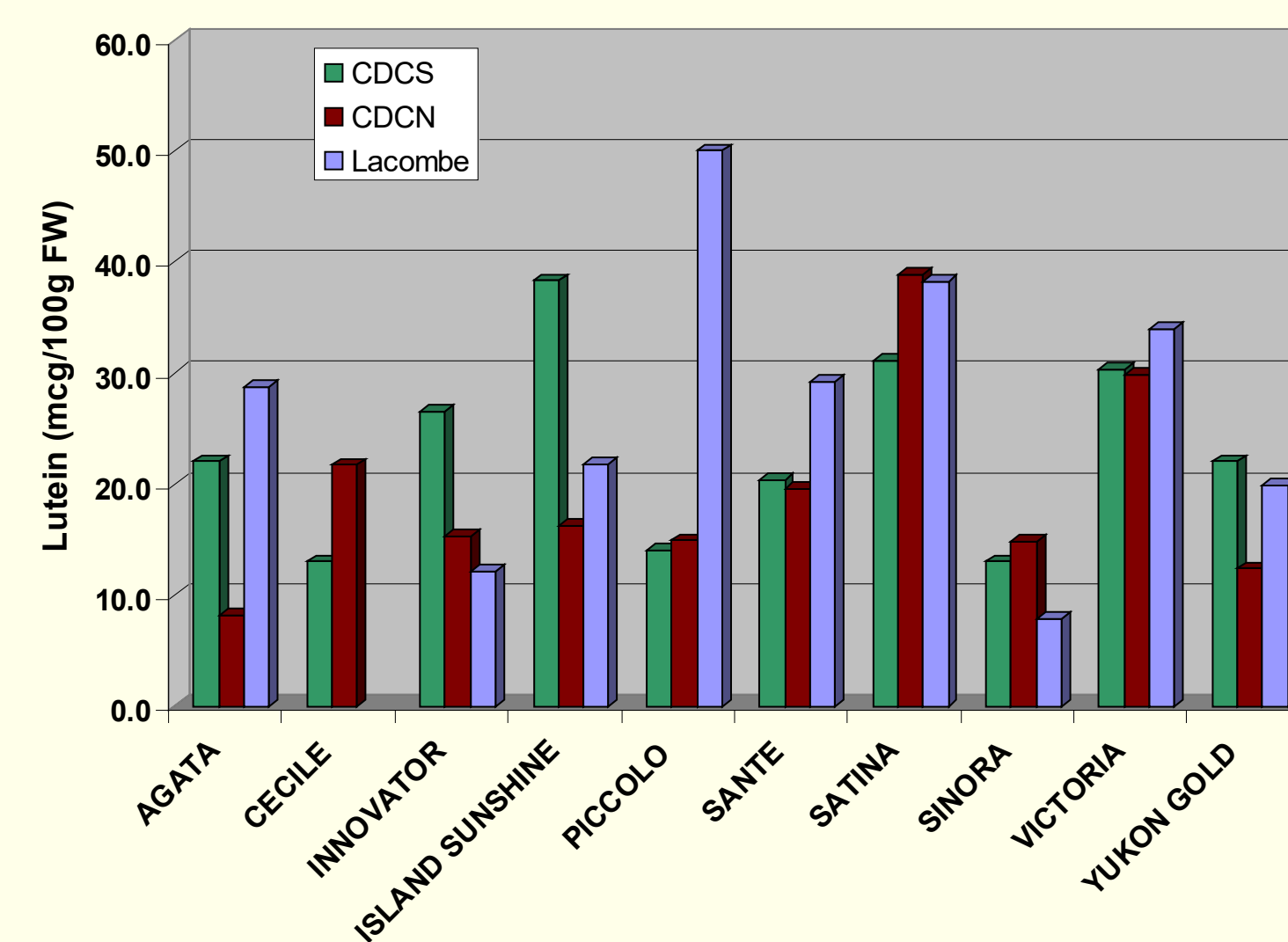


Figure 1: Concentration (µg / 100g FW) of lutein extracted from yellow-fleshed potatoes harvested at 80 days after planting (DAP) at CDCS in Brooks, AB, CDCN in Edmonton, AB, and in a commercial field in Lacombe.

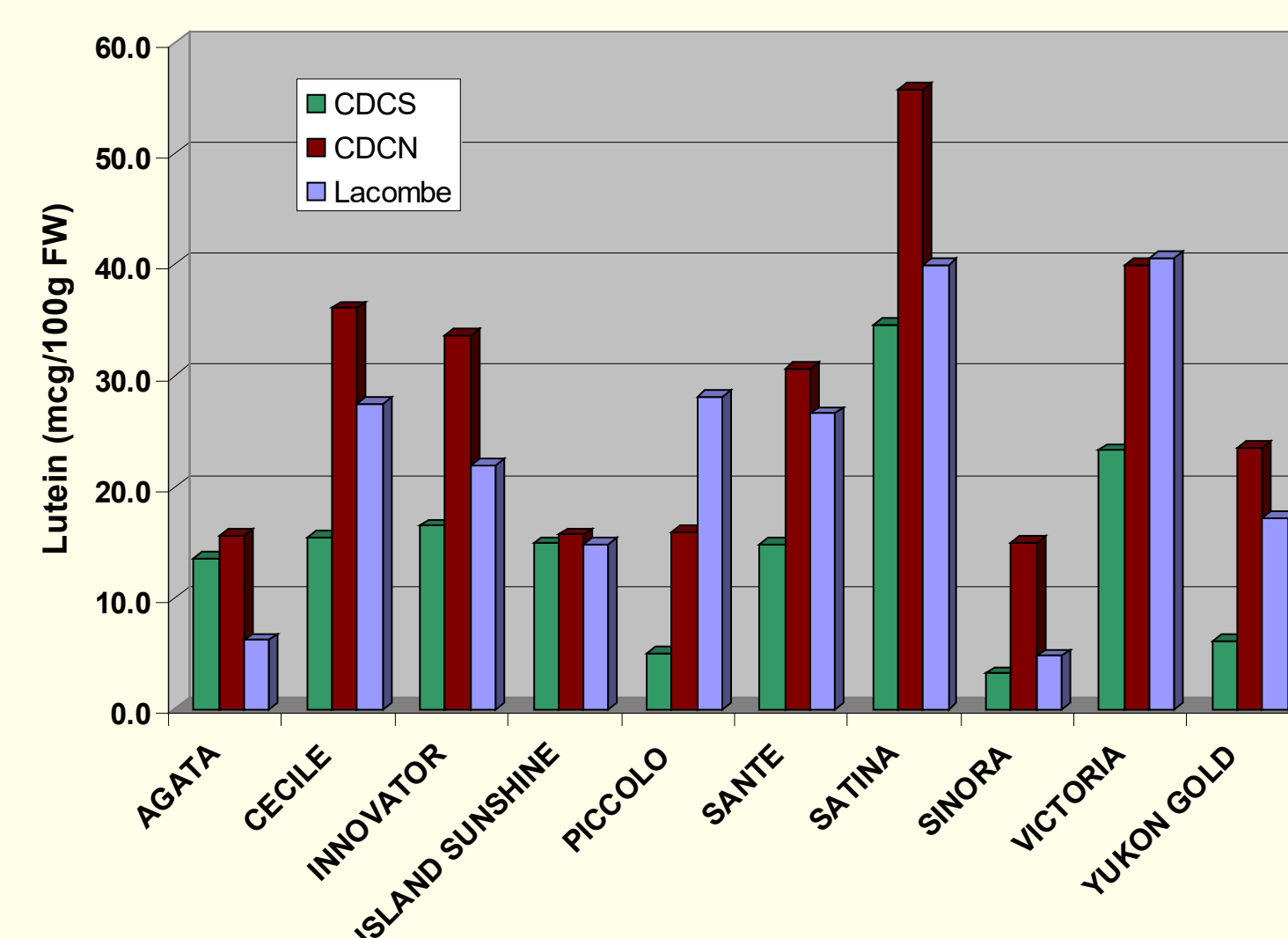


Figure 2: Concentration (µg / 100g FW) of lutein extracted from yellow-fleshed potatoes harvested at 100 days after planting (DAP) at CDCS in Brooks, AB, CDCN in Edmonton, AB, and in a commercial field in Lacombe.

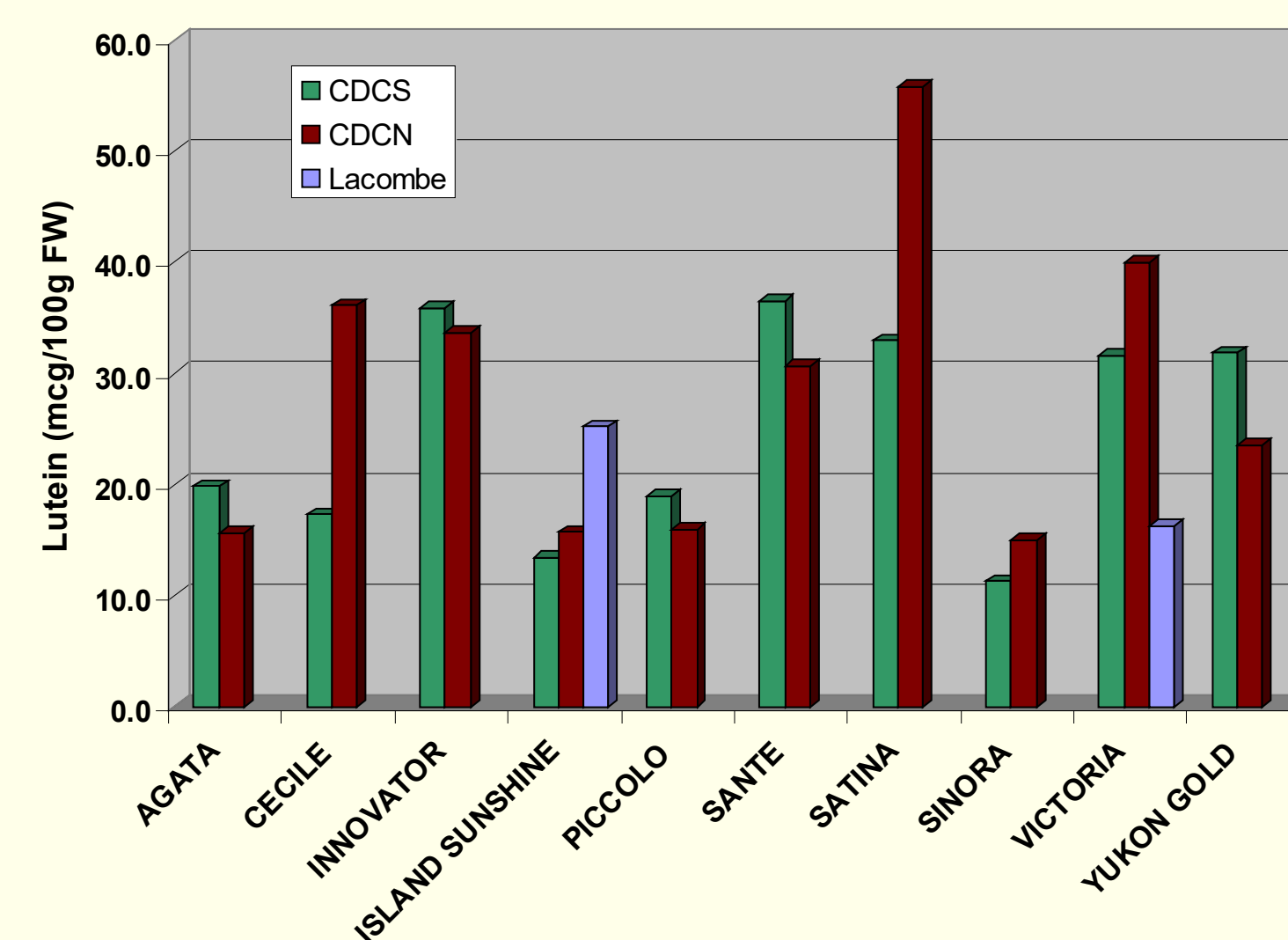


Figure 3: Concentration (µg / 100g FW) of lutein extracted from yellow-fleshed potatoes harvested at 130 days after planting (DAP) at CDCS in Brooks, AB, CDCN in Edmonton, AB, and in a commercial field in Lacombe.

Carotenoid Content

Table 4: Total carotenoid concentration of yellow-fleshed potato tubers grown at three locations in Alberta, harvested approximately 80 days after planting (DAP), 100 DAP and 130 DAP.

Variety	CDCS (Brooks)			CDCN (Edmonton)			Lacombe	
	80 DAP	100 DAP	130 DAP	80 DAP	100 DAP	130 DAP	80 DAP	100 DAP
Agata	97.9	69.1	79.1	38.6	63.6	40.4	158.0	34.9
Cecile	81.4	84.7	89.6	151.8	218.3	137.0		160.0
Innovator	130.2	94.9	139.2	78.8	156.4	58.6	58.9	103.5
Island Sunshine	196.2	77.9	64.3	102.8	86.7	58.2	132.6	90.9
Piccolo	84.7	34.4	107.6	112.3	116.2	85.2	283.3	126.3
Sante	112.3	108.2	157.8	128.6	202.3	100.9	179.7	163.0
Satina	160.9	192.5	140.1	186.1	257.4	173.9	187.2	192.4
Sinora	64.7	17.1	53.1	65.9	78.7	46.1	47.4	23.1
Victoria	186.1	179.7	177.3	202.8	242.5	136.8	220.6	240.9
Yukon Gold	113.7	38.3	124.3	69.1	136.8	80.1	116.8	95.9

Potential Processing Varieties



Conclusions

- Total carotenoid content in the yellow-fleshed potatoes studied ranged from 17 to 250 µg per 100 g FW and was influenced by variety, the growing location, and the time of harvest.
- The concentration of lutein in yellow-fleshed potatoes depended on the variety, the growing location and time of harvest, and ranged from 3.2 µg per 100 g FW to over 50 µg per 100 g FW in the varieties studied.
- Lutein accounted for approximately 25 % of the total carotenoid concentration depending on the time of harvest.
- Although lutein concentration can be influenced by growing location and time of harvest, chroma, total carotenoid and lutein are determined most through genetics.
- Satina and Victoria had consistently higher lutein than other varieties in 2005.