

### INTRODUCTION

Potato has been used as a food for humans for more than 10,000 years, starting in South America where it originated. In the Andes Mountains, you can still find potato prepared as chuño today. In this process, tubers are piled on the ground and repeatedly frozen over several nights. Skin removal is done by trampling, then soaking or leaching in river water removes the bitter flavors of glycoalkaloids. Finally, sun-drying preserves chuño for up to several years. Another dry product is papa seca, which is produced by boiling, peeling, slicing, sun-drying and then grinding. Both chuño and papa seca are used in stews and soups. In the 1500's potato were spread to European countries, including Spain and England. Early consumers, including sailors, may have benefited from the relatively high vitamin C content of potato, which helped to prevent scurvy. Potato became so widely distributed in Europe that it is often called the "Irish potato" or "European potato". Nowadays, potato are grown in 160 countries and eaten fresh or following storage in most countries. In some countries where people have insufficient food, improved potato cultivars that deliver more nutrients, or better potato preparation and processing to increase micronutrient availability, is needed. In some countries where food is widely available, as in Canada, consumer demand is for food that is more convenient to eat, better tasting or novel, and healthier, such as organically-grown produce or cultivars with greater vitamin or mineral composition.

In many countries of the world, humans are getting heavier, and succumbing to a wide range of metabolic disorders that accompany overweight and obesity. Although many factors are to blame for this, including genetics and sedentary lifestyle, carbohydrate-rich foods such as potato are often blamed. On the other hand, potato has an important nutritional role to play in areas of the world where they are an important staple crop – for their great nutritional value.

The following pages outline:

- Where potato is grown and eaten
- Potato nutritional value and health properties
- Role of potato in disease prevention

### WORLD POTATO GROWING AREAS

Potato has tremendous yields per unit area compared with many other food crops. Yields are greatest in North America (averaging 40.6 tha-1), where they are double that of Europe, Latin America, or Asia, and much greater than in Africa. This is due to the cool North American climate,

ample rainfall, mechanization and economies of scale, relatively high inputs, longer growing season for which the longer season, higher yielding cultivars are suited, and better production systems that rotate cereals and forages with potato; these discourage disease and improve soil structure.

While potato growing areas have declined over the past 20 years in North America, Europe, and the former Soviet Union, growing areas have doubled in developing areas that include Africa, Asia, and Latin America. The top three world leaders in potato production are China (# 1) and India (# 3), both with a steep trajectory for increasing potato growing areas of around 6% per annum, and the Russian Federation (# 2). Asian production is increasing so rapidly because of increasing numbers of potato consumers in both areas of production and non-production, increasing interest in processed potatoes, and use as animal feed for an expanding livestock industry. Half the global potato supply is now eaten in Asia. The relatively low per capita consumption indicates lots of room for increased demand, which could double or triple in the next few years. Recent soaring food prices in Asia and Africa resulted from diversion of grain from animal feed to biofuels, as well as shortages of fuel and fertilizers. Potato is increasingly important to world food security in developing countries, where it supplements or has replaced grain-based diets.

Global climate change is already impacting agricultural production. Major adaptations will involve planting time and cultivar choices (particularly more heat tolerant cultivars) and will vary with geographic areas. Least affected will be high latitudes (Canada, China, Russia, Scandinavia) and high altitudes in the tropics (Altiplano of Peru and Bolivia) where production area may increase. Most affected areas will be lower latitudes (Europe, Russia, and Kazakhstan) where yield is predicted to decline and subtropical areas (India, Bangladesh) where potato is already grown during the coolest season offering little scope to maintain growing area and yields.

## **POTATO NUTRITIONAL VALUE & HEALTH PROPERTIES**

Potato is higher in dry mass and protein per unit growing area than cereals! However, consumers are often under the impression that potatoes make you fat; that they are high in calories and fat compared with other carbohydrate sources such as rice, pasta, or bread. This is incorrect as potato has negligible fat and a low energy density similar to legumes. Potato and potato products could replace cereal or cereal products in many cooked and processed food items.

### **Carbohydrates**

Carbohydrates, primarily starch, make up 10-30% of the total fresh mass of the tuber. The later maturing cultivars achieve the largest size and greatest starch yield compared with the earlier maturing cultivars. Starch is packed into starch granules that contain two forms of starch; amylose (long chains of glucose residues) and amylopectin (branched chains of glucose residues). On average, cultivated potato have a ratio of about 1 : 3 amylose : amylopectin. However, the range among cultivars is 22-43% amylose. It is generally agreed that cultivars with greater amylose content would be healthier. One reason for this relates to the speed at which potato starch is digested to sugars which enter the bloodstream. The crystal-like properties of starch granules make them resistant to starch-digesting enzymes, with amylose more resistant to enzymatic cleavage than amylopectin. The cooking process causes starch to gelatinize and lose its crystalline properties.

This makes the starch more readily solubilized. From the human health point of view amylose is more resistant to digestion than amylopectin. When we eat starches with relatively greater amylose content, the digestion is slowed so the blood glucose raising response is lower than when amylose content is less. When potato is cooked and then cooled, as when potato salad is made, starch retrogrades (resumes its crystalline properties). Potato salad is therefore a healthier product than hot boiled or mashed potato (depending upon what you eat it with). Potato that is fried in oil tends to absorb less fat if the starch content is greater in amylose than amylopectin as the strong film-forming characteristics of amylose are known to inhibit oil pick-up in fried foods. Since higher amylose starches reduce oil penetration they are favored for use in snack foods to reduce consumer fat intake.

As a starch item, potato should be consumed in moderation and without excess lipid additions. It is not necessary to restrict potato from the diets of people attempting weight control or weight loss. In addition to the important food benefits of the potato, a meal containing potato contributes to a feeling of fullness (satiety). This is a good thing in preventing over-eating. Potato servings do not in themselves promote overweight or obesity; this is a complex problem with many contributing factors, particularly inactivity and consumption of starchy food with additions of high calorie lipids.

In storage, the equilibrium between starch and their sugar break-down products can change with time. The more sugars are present, the darker the fry colour as these sugars caramelize in the hot oil. Quebecers love their dark-coloured French fries! However, the industry for frozen fry products is geared towards a very pale product. Why is this? When carbohydrate-rich food is heated, reducing sugars and the amino acid asparagine can combine to form a toxic product called acrylamide. The amount of acrylamide present in some commonly eaten foods, such as toast, coffee, and French fries is worrying. It appears prudent to limit acrylamide in heat processed potato products, although no studies have yet supported a link between dietary acrylamide exposure and human neurotoxicity. This has been related in part to human exposures to dietary acrylamide being from 50-300 times lower than in animal experimental toxicity studies. Moreover, since acrylamide is found in a wide variety of regularly consumed foods, large changes in acrylamide concentration either for a single food or categories of foods is unlikely to impact significantly on overall intake or health risk for the population. The advice from the US Food and Drug Administration is to eat a balanced and varied diet low in trans and saturated fat and rich in whole grains, fruits, and vegetables.

## **Protein**

Potato protein generally ranges from 1-1.5% of tuber fresh mass. Compared with other raw vegetables, potato is not typically thought of as a good dietary protein source. However, the quality of potato protein is exceptionally good. On a scale of biological value (BV) compared to whole egg (BV 100), potato had a BV of 90-100. In contrast, soybean was 84 and beans 73. Compared with the cereal proteins, potato has more lysine and less sulfur-containing amino acids (methionine and cysteine). Patatin is the major storage protein, but there are others of importance. One of these, proteinase inhibitor 2, has been incorporated into a weight loss supplement (Slendesta ®) as this protein acts as an appetite suppressant to increase satiety.

At various points in history, such as in Europe at the time of the “Potato Famine” people were able to sustain themselves on a diet of potato alone, or with few other dietary items, such as cow’s milk. There are individuals today who subsist on a diet of potato alone, sometimes for a very long time, without apparent illness. This is largely attributed to the high energetic value of potato carbohydrates in combination with the high quality of potato protein.

### **Lipids and Dietary Fibre**

Only a tiny fraction of potato weight (0.15 g/150 g FM) is composed of lipids; less than cooked rice (1.95 g) or pasta (0.5 g). The dietary fiber is supplied by cell walls, particularly the thick cell walls of the peel (periderm) which makes up 1-2% of the tuber. These fibers are believed to play a dietary role in reducing cholesterol levels. This is one very good reason to eat your potato peels!

### **Minerals**

Minerals are important to maintaining health through their function as electrolytes, enzyme constituents, antioxidants, and structural components for bones and teeth. Mineral deficiencies are common around the world because of the relatively low content of bioavailable minerals in many staple crops. Globally, calcium, iron, selenium, iodine, and zinc deficiencies are the most widespread forms of mineral malnutrition. Depending on the age range and gender, many Canadians do not appear to be meeting their dietary needs for calcium, magnesium, phosphorus, zinc, copper, and iron.

A recent study done in our lab, with help from local industry, compared the mineral content of 16 cultivars grown at 5 sites in Canada. The Quebec site grew ‘Chieftain’, ‘Goldrush’, ‘Russet Burbank’, and ‘Yukon Gold’. We determined that a consumer who eats one serving of potato per day could receive from 30-48% of the recommended daily intake (%RDI) for macrominerals except for calcium and sodium and from 6-82% of the RDI for trace minerals. Across all 5 growing sites, ‘Russet Burbank’ ‘Freedom’ and ‘Yukon Gold’ had the greatest contribution of minerals per serving (150 g fresh mass). In one serving a day, these supply 30-62% of the RDI for the macrominerals magnesium, phosphorus and potassium (twice the overall average) and 12-82% of the RDI of the trace minerals copper, iron, selenium, and zinc (1.3-3.4 times the overall average).

So potato, as a major staple food crop, could play an important role to combat mineral deficiencies through its relatively high mineral content. Also, potato is high in compounds that promote mineral bioavailability, such as ascorbate,  $\beta$ -carotene, organic acids, and cysteine-rich polypeptides. Furthermore, potato is relatively low in anti-nutrients that decrease mineral bioavailability, such as oxalates and phytates.

This study highlighted the very important contribution of potato to the Canadian diet in terms of mineral content, particularly due to the substantial estimated consumption of potatoes in the Canadian diet (190.66 g/person/day); more than one serving. It also showed that some potato contribute more minerals than others, so using cultivar names would help consumers request specific high-mineral cultivars. On a cautionary note, none of the potato examined were high in calcium, and many Canadians are deficient in this mineral. A potato with a significantly greater calcium content would be desirable.

## **Vitamins and Other Useful Phytochemicals**

Potatoes are an important source of vitamin C (ascorbic acid) in many areas of the world. Levels range from 84-145 mg per 100 g dry mass, depending on cultivar, planting site, and storage conditions. Vitamin C is important to the availability of iron, a mineral that tends to be limiting in our diet. Also present are several B vitamins (folic acid, niacin, pyridoxine, riboflavin, and thiamin). In particular, potatoes are described as a good dietary source of pyridoxine (vitamin B6).

Carotenoids, and their derivative xanthophylls are diverse lipid-soluble pigments. Xanthophylls are the most abundant carotenoids in potato. Two of these pigments ( $\beta$ -carotene and lutein) are important in eye health. Vitamin A deficiency is widespread globally. This leads to various ailments, including blindness and premature death.  $\beta$ -carotene is a potent dietary source of vitamin A (pro-vitamin A). Lutein is an oxygenated xanthophyll that protects against one of the leading causes of visual impairment and blindness in older North American adults, called macular degeneration. Yellow-fleshed potatoes are the best source of lutein, with a trace of  $\beta$ -carotene. However, you'd have to eat a lot of yellow potato to meet your  $\beta$ -carotene and lutein requirements for maximum eye health. It is best to supplement with root vegetables such as carrot and sweet potato, as well as brightly coloured fruit including bell pepper and tomato.

## **ROLE OF POTATO IN DISEASE PREVENTION**

As noted above, potato contains energy-rich carbohydrates, high-value protein, is low in fats, and is important as a source of vitamins and minerals. As such, potato has an important role in maintaining our health. Potatoes also contain a diverse number of compounds, including vitamin C, carotenoids, some minerals, and various phenolic substances that are important as antioxidants.

Most antioxidants are invisible to us, including phenolic acids and polyphenols that occur in relatively high concentration and diversity in potato tubers. These include chlorogenic acid, caffeic acid, ferulic acid, and others. Polyphenolic compounds are responsible for a large part of the antioxidant capacity of potatoes. Other antioxidants are pigments that are highly visible, and brightly coloured, such as anthocyanins and carotenoids. Usually cultivars high in anthocyanins are low in carotenoids, and vice versa, but breeding efforts may overcome this. Anthocyanins occur as red, blue, and purple pigments in skin and flesh of many wild species and some cultivars. These highly coloured potatoes are more widely grown in Canada now than in previous years. Some are for use in cooking or processed into chips.

Antioxidants are compounds that protect cells and tissues from the damaging effects of reactive oxygen species (ROS). These ROS are linked to the initiation and progression of many important age-related and inflammatory disease conditions, including arthritis, atherosclerosis, cancers, cardiovascular diseases, diabetes, gastrointestinal disorders, and neurodegenerative diseases. Consumption of foods high in antioxidant content is expected to increase antioxidant levels in the body. Studies have repeatedly shown that people who eat more servings of fresh fruit and vegetables have reduced incidence of a wide range of metabolic diseases. There is no consensus on the role of vegetable consumption in prevention of cancer. Little has been published on the long-term cancer related health effects of potato in diets of consumers around the world.

However, short term studies have implicated potato anthocyanins, glycoalkaloids, and lectins as anti-tumor agents. Little has been published on the role of potato in preventing cardiovascular disease. It is known that for maximum heart health, potato should be prepared with few fat additions and the peels should be eaten for their fiber content. There is some evidence that potato protein, resistant starch, and phosphorylated starch contribute to cholesterol-lowering properties. Phytochemicals, particularly antioxidants, are implicated in reducing inflammation, a risk for cardiovascular disease. Diabetes is increasing world-wide and is characterized by insulin resistance and often associated with obesity. The combination within potato of readily absorbable carbohydrate that rapidly raises blood glucose versus anti-diabetic factors such as antioxidants complicates the role of potato in prevention and management of diabetes. Some antioxidants increase insulin sensitivity, which can be important in diabetes prevention. Two phenolics (caffeic and chlorogenic acids) found in high concentrations in potato, were implicated in prevention of type-2 diabetes (Paynter et al., 2006) but more studies are needed to confirm the link between potato dietary fiber and polyphenolic content in prevention or management of diabetes.

***This summary was abstracted from the following:***

Camire, M.E., S. Kubow and D.J. Donnelly. 2009. Potatoes and Human Health. Critical Reviews in Food Science and Nutrition. 49:823-840.

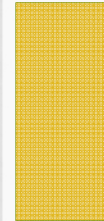
Nassar, A.M.K., K. Sabally, S. Kubow, Y.N. Leclerc and D.J. Donnelly. 2012. Some Canadian-Grown Potato Cultivars Contribute to a Substantial Content of Essential Dietary Minerals. Journal of Agricultural and Food Chemistry. 60:4688-4696.





## RÔLE DE LA POMME DE TERRE EN SANTÉ HUMAINE ROLE OF POTATO IN HUMAN HEALTH

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STAN KUBOW SCHOOL OF DIETETICS & HUMAN NUTRITION  
MCGILL UNIVERSITY – CRAAQ NOV 23, 2012



## ESPÈCES SAUVAGES DE POMMES DE TERRE COMME ALIMENT WILD POTATO SPECIES AS FOOD

- Potato originated in the Andes Mountains of South America, > 10,000 years ago.
- Tremendous genetic variation at the center of diversity.
- Wild species – small tubers, bitter tasting and full of toxic glycoalkaloids.
- Early consumers had to learn to safely prepare these.
- *Chuño*, *papa seca* are two potato products used in soups and stews even today.



<http://nissa.ger-nis.com/2010/10/07/peruvian-potatoes-indigenous-varietyals/>



Chuño

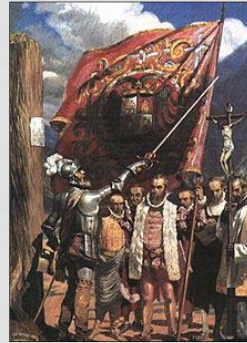


Papa seca

Reader, 2009. Untold History of the Potato.

## POMME DE TERRE VA VERS L'EUROPE POTATO GOES TO EUROPE

- Pizarro's armies conquered the Inca civilization in the 1500's.
- Potato fed the Spanish armada and the captive Inca minors who dug for gold, silver, and cinnabar.
- Potato sustained the Peruvian exploitation by the Spanish who sent gold and silver by the hundreds of tons back to Spain each year for decades.
- Potato, with its high vitamin C content improved the lives of sailors by preventing scurvy.



Pizarro in  
Lima 1535



Peruvian potato farmers

## POMME DE TERRE UNE PLANTE DOMESTIQUÉE POTATO AS A DOMESTICATED CROP

- Potato became widely distributed in Europe by the 1700's.
- Early breeders improved tuber size, taste, and safety.
- Today potato is grown in 160 countries and eaten all over the world.
- Cultivated tubers are huge compared to their wild relatives, with better taste, and low glycoalkaloids levels.
- Eaten in a plethora of recipes from fresh or stored potato.





## POMMES DE TERRE EN CULTURE POTATO AS A STAPLE CROP

- As a staple crop, even small changes in nutrient composition could impact population health.
- Where food is scarce, better cultivars could deliver more nutrients, or better preparation and processing could increase micronutrient bioavailability.
- Where food is plentiful (Canada) consumers want: convenience, taste, novelty, healthier product (organically grown, greater mineral or vitamin composition).



## VALEUR NUTRITIVE DES POMMES DE TERRE POTATO NUTRITIONAL VALUE

- Potato is higher in dry mass and protein per unit growing area than cereals!
- Consumers often think that potatoes make you fat; that they are higher in calories and fat than other carbohydrate sources such as rice, pasta or breakfast cereal. **Not true!**
- Potato has almost no fat and an energy density similar to legumes.
- Potato and potato products could replace cereal or cereal products in many cooked and processed food items.

*Santé*

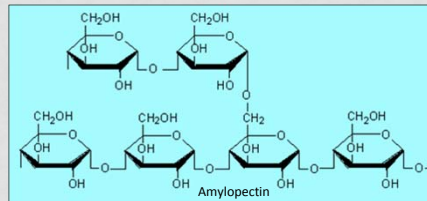
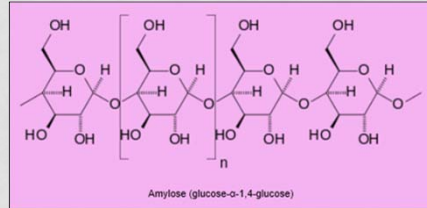
White potato, roasted, fat not added in cooking Serving: large (3" to 4-1/4" dia, raw)

Grams:	140.00	Calories (kcal):	198.21
Protein (gm):	5.19	Fat (gm):	0.25
Carb (gm):	45.11	Fiber (gm):	4.01
Water:	87.21	Saturated Fat (gm):	0.07
Polyunsat Fat (gm):	0.11	Monounsaturat Fat (gm):	0.01
Cholesterol (mg):	0.00	Alcohol (gm):	0.00
Vitamin A (RE):	0.00	Vitamin A (IU):	0.00
Carotene (mg):	0.00	Vitamin E (mg:IU):	0.15
Vitamin C (mg):	39.54	Thiamin (mg):	0.19
Riboflavin (mg):	0.08	Niacin (mg):	3.54
Vitamin B6 (mg):	0.62	Vitamin B12 (mg):	0.00
Calcium (mg):	17.56	Phosphorus (mg):	115.41
Magnesium (mg):	52.69	Iron (mg):	1.91
Zinc (mg):	0.98	Copper (mg):	0.65
Sodium (mg):	15.05	Potassium (mg):	1362.37

Camire et al., 2009. Critical Reviews in Food Science and Nutrition 49:823-840.

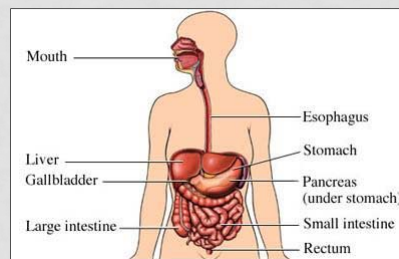
## LES GLUCIDES CARBOHYDRATES

- 10-30% of tuber fresh mass is starch.
- Starch is made of:
  - Amylose** – long chains of glucose residues (**resistant starch**)
  - Amylopectin** – branched chains of glucose residues
  - Amylose : Amylopectin** average **1:3** (**33%:66%**)
- Potato cultivars contain from 22-43% amylose.
- Foods with low Glycemic Index have high amylose content.



## McGILLRECHERCHE SUR L'AMIDON RÉSISTANT RESEARCH ON RESISTANT STARCH

- Higher amylose starches are healthier:
  - Starch digestion slowed
  - Consumer fat intake less in fried foods
- Our McGill lab is currently working to identify cultivars and parental breeding lines with greater % amylose.



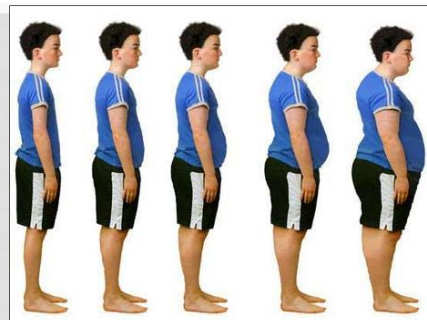
## CUISSON L'AMIDON COOKING CARBOHYDRATES

- Cooking causes starch to gelatinize = loses its crystal-like properties that resists digestion.
- When potato is cooked and then cooled starch resumes its crystal-like properties and becomes a healthier food item (unless fatty dressing is added).
- Acrylamide is found in foods with high carbohydrate content that are heated (toast, coffee, fries).



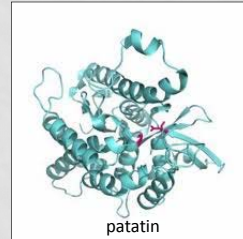
## SATIÉTÉ ET PRÉVENTION DE LA SURCONSOMMATION SATIETY AND PREVENTION OF OVER-EATING

- Potato contributes to satiety, the feeling of fullness that you get from eating.
- This is a good thing in preventing over-eating.
- In a healthy diet, potato should be consumed in moderation and without excess lipid additions.



## PROTÉINE PROTEIN

- Potato protein ranges from 1-1.5% of tuber fresh mass.
- High protein quality on scale of biological value (BV)
  - whole egg (BV 100),
  - potato is 90-100,
  - soybean 84
- Major storage protein is patatin.
- Another, is proteinase inhibitor 2, ingredient of a weight loss supplement (Slendesta®) used as an appetite suppressant to increase satiety.



## POUVEZ UNE PERSONNE VIVRE SEULE CONSOMMATION DE POMMES DE TERRE ? CAN A PERSON LIVE ON POTATO ALONE?

- At various points in history, such as in Europe at the time of the "Potato Famine" people were forced to live on potato alone, or with a few other dietary items such as cow's milk.
- With excellent protein and sufficient energy source, potato can sustain health.

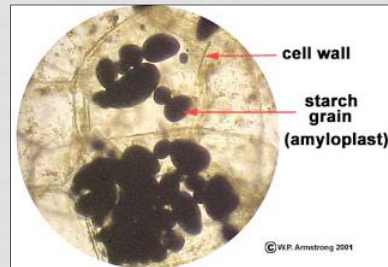


**Chris Voigt** challenged himself to live on a potato-only diet for 60 days. He's cooked them every way but no butter, sour cream or any of the usual high-calorie toppings. Voigt, Exec. Dir. Washington Potato Commission, wanted to make a point about the humble spud's rich nutrients. He ate 20 potatoes a day, or 1,200 potatoes (400 pounds). He stayed healthy and actually lost weight.



## LIPIDES ET FIBRES ALIMENTAIRES LIPIDS & DIETARY FIBER

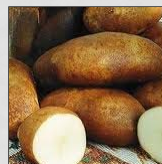
- Only a tiny fraction of potato weight (0.15 g/150 g FM) is lipids.
  - < cooked rice (1.95 g) or pasta (0.5 g).
- Dietary fiber is in the cell walls of peel, which makes up 1-2% of the tuber.
  - These dietary fibers have an important role in preventing intestinal diseases.
- Eat your potato peels!



## MCGILL RECHERCHE SUR MINÉRAUX CHEZ LES CULTIVARS DE POMMES DE TERRE CULTIVÉES AU CANADA MCGILL RESEARCH ON MINERALS IN POTATO CULTIVARS GROWN IN CANADA

- Many Canadians do not meet their dietary needs for **magnesium, potassium**, phosphorus, copper, iron, and zinc.
- Our lab at McGill University, with help from local industry, recently compared the mineral content of 16 cultivars grown at 5 sites in Canada.<sup>1</sup>

<sup>1</sup>Nassar et al. (2012) J Agric Food Chem  
60:4688-96





MCGILL RECHERCHE SUR MINÉRAUX CHEZ LES CULTIVARS DE POMMES  
DE TERRE CULTIVÉES AU CANADA  
MCGILL RESEARCH ON MINERALS IN POTATO CULTIVARS GROWN IN CANADA

- Across all 5 growing sites, ‘Russet Burbank’ and ‘Yukon Gold’ had the greatest contribution of minerals per serving.
- **In one serving a day**, these potatoes supply
  - 30-62% of the RDI for magnesium, potassium, and phosphorus
  - 12-82% of the RDI of the trace minerals copper, iron, selenium, and zinc
- Potato makes a very important mineral contribution to the Canadian diet **on a daily basis**.
  - Canadians eat approx. 191 g/person/day; > one serving.

MCGILL RÉSULTATS DE L'ÉTUDE MINÉRALE  
MCGILL MINERAL STUDY OUTCOMES

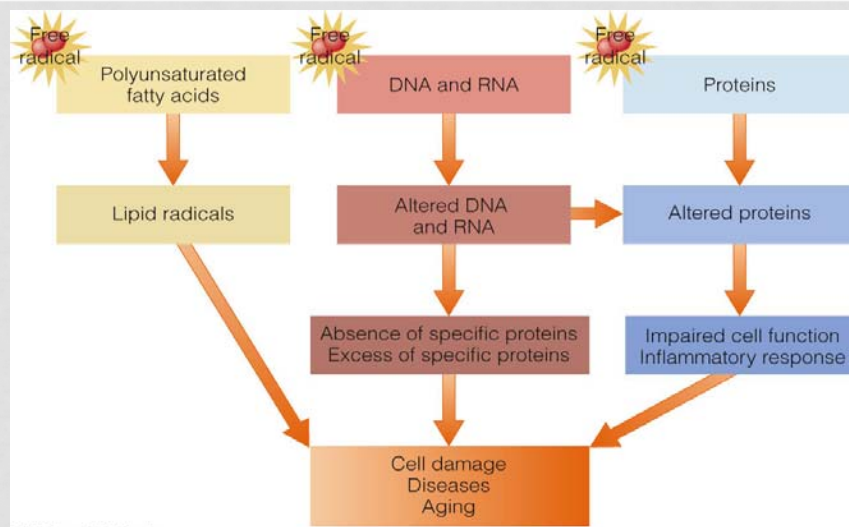
- **Industry could advertise the high mineral content of potato to promote specific high-mineral cultivars to consumers.**
- Potato is high in compounds that promote mineral bioavailability
  - ascorbate,  $\beta$ -carotene, organic acids, cysteine-rich polypeptides.
- Potato is low in anti-nutrients that decrease mineral bioavailability
  - oxalates, phytates

## VITAMINES VITAMINS

- Potatoes are one of the highest contributors of vitamin C to the diet in many parts of the world
  - **single 148 g serving of baked potato provides approx. 45% of the recommended daily intake of vitamin C**
  - Vitamin C is important to availability of iron, which tends to be limiting in our diet.
- Provides significant amounts of several B vitamins (folic acid, niacin, pyridoxine, riboflavin, thiamin). Potatoes are a good dietary source of pyridoxine (vitamin B6).



## RÔLE DE LA POMME DE TERRE DANS LE MAINTIEN DE LA SANTÉ ROLE OF POTATO IN MAINTAINING HEALTH



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RÔLE DE LA POMME DE TERRE DANS LA PRÉVENTION DES  
MALADIES  
ROLE OF POTATO IN DISEASE PREVENTION

- Antioxidants are compounds that protect cells and tissues from the harmful effects of reactive free radical species.
- Consumption of foods high in antioxidant capacity improves antioxidant defenses in the body.
- Studies have repeatedly shown that people who eat more servings of fresh fruit and vegetables have reduced incidence of a wide range of metabolic diseases including cancer, heart disease, diabetes and neurodegenerative diseases.

RÔLE DE LA POMME DE TERRE DANS LE MAINTIEN DE LA SANTÉ  
ROLE OF POTATO IN MAINTAINING HEALTH

- Potato contain diverse antioxidants including
  - Vitamin C
  - Polyphenols
    - Anthocyanins - Highly coloured potatoes are more widely grown in Canada now than in previous years. Some are for use in cooking or processed into chips.
    - Phenolics - Colorless compounds that are responsible for a large part of the antioxidant capacity of potato. These include chlorogenic acid, caffeic acid, ferulic acid, and others.

## POMME DE TERRE PEUT PRÉVENIR LES MALADIES MÉTABOLIQUES

### POTATO MAY PREVENT METABOLIC DISEASES

- **Diabetes** – this is an increasing problem world-wide that is characterized by insulin resistance and often associated with obesity.
- Potatoes has readily absorbable carbohydrate that rapidly raises blood glucose but also contains anti-diabetic factors such as **polyphenols** and minerals such as **magnesium** – complicates the role of potato in diabetes.
- Some polyphenols and magnesium can improve insulin sensitivity, which can be important in diabetes prevention.

## VALEUR NUTRITIVE DES POMMES DE TERRE POTATO NUTRITIONAL VALUE

- **There is no doubt that potato contributes to global health. The potato industry should confidently promote this healthy food.**



Research and development are important to further optimize the nutritional characteristics of the potato:

Increase resistant starch, protein, mineral content, diversity of vitamins, polyphenols, and other antioxidants (anthocyanins, carotenoids).

## REMERCIEMENTS

### ACKNOWLEDGEMENTS

- **This summary was prepared from the following sources:**

- Camire, M.E., S. Kubow and D.J. Donnelly. 2009 Potatoes and Human Health. *Critical Reviews in Food Science and Nutrition*. 49:823-840.
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## ACKNOWLEDGEMENTS

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- NSERC Discovery Grants Program (DJD, SK)
- NSERC Strategic Grants & Industry partners McCain Foods Canada, Province of NB, Wicklow Station (SK, DJD, and others.)
- MITACS Acceleration Québec, Internship support (AMKN and AE)
- MAPAQ & Industry partners Fédération des Producteurs de Pommes de Terre du Québec, Patates Dolbec, Centre de Research Les Buissons, Association des Emballeurs de Pommes de terre du Québec (SK, DJD).