

**The potential of transporting Saskatoon seeds based on the nutrition value of  
the fruit from the seed and the benefits to Canada**

**Yang Jianxiong**

The thought of the product- Saskatoon seed scientific name amelanchier Alnifolia comes from Google where I searched Fruit that is native to Canada. Based on its' current marketing condition as well as its' nutrition value, I finally decided to choose this product- Saskatoon Seeds. The mature fruit is special in many aspect .In addition, the seed also is essential for Nepalese. In my view, I think it is extremely suitable for Nepalese to grow.

**Introduction of Nepal**

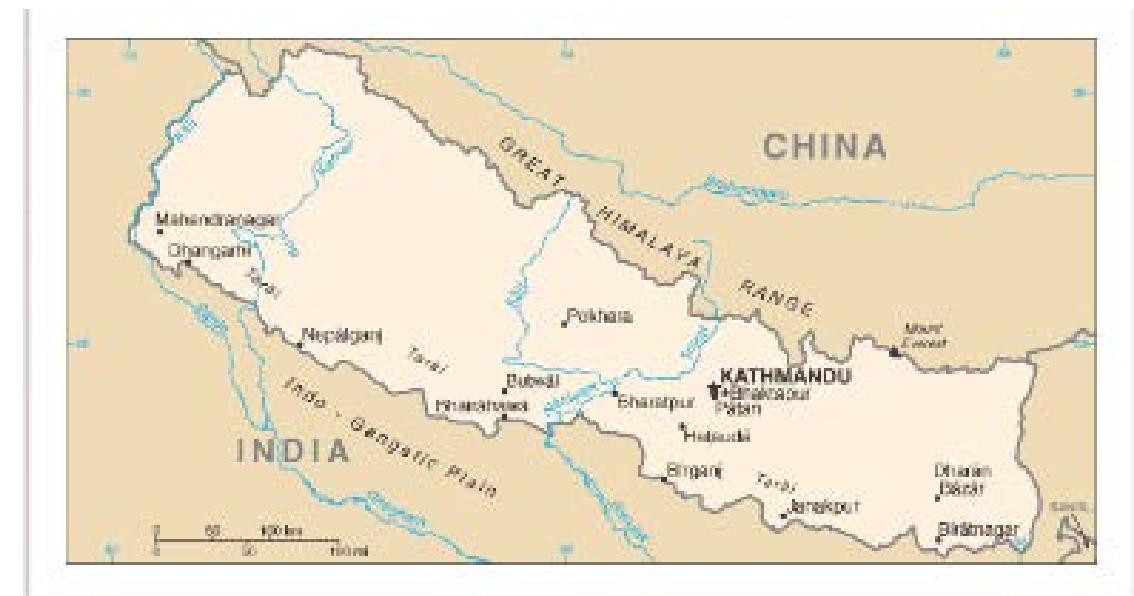
**(1) The geography location of Nepal**

Firstly, we are going to look at the geographic location of Nepal, Nepal is a small country with a total area of 147,181 square km. ( Central Intelligence Agency, 2016) The 2 neighboring Countries are China and India ( Central Intelligence Agency, 2016). Moreover, the percent of land use for farming occupied 28.8 percent of the total land region as well as the area of forest is about 25 percent( these statistics is the updated one in 2011) (Central Intelligence Agency, 2016)

**(2) The farming condition**

As is shown, the occupation for Nepalese is mainly subsistence farming (FAO, 2016), Two third of the Terrain is mountain. Also, the climate is wet in summer and dry in winter.(FAO, 2016)

Therefore, as we can see, Nepal is a considerably poor Country with a major group of subsistence farmers. In addition, there is some areas of farming land but the major part of them is on the mountain.



## Product

Now, here comes to the product, the Saskatoon berries, grown from the Saskatoon seed native to Canadian, scientific name Amelanchier Alnifolia, is a valuable product that is especially suitable for Nepal to grow and sell in their own Country. With fully-understanding of the nutritional value of the product as well as its' unique advantages, we know the reason why it should be transported to Nepal.

### (1)how it improve human's health

There is a lot of evidence shown that reactive oxygen species cause oxidative damage to macromolecules in human bodies and make people aging. As a result , numbers of chronic diseases, such as cancer, cardiovascular and neurodegenerative disorders may happen(C. Hu, B.H.L. Kwok, D.D Kitts, 2005). Antioxidants neutralizing reactive



oxidative species play an important role in the prevention of chronic diseases. Studies have shown that the consumption of fruits and vegetables is related to a reduced risk of cancer and cardiovascular disease. (C. Hu, B.H.L. Kwok, D.D Kitts, 2005). Besides the Saskatoon berry got those properties perfectly, this traditional food source for native people is full of antioxidant content.( C. Hu, B.H.L. Kwok, D.D Kitts, 2005) (Prairieberries , 2016), Specifically, the antioxidant content of the Saskatoon berry or in some other fruit such as blueberries is the Anthocyanin pigments and associated flavonoids which are demonstrated to have the ability of protecting people from myriad of human disease(J Biomed Biotechnol., 2004) . The recent research even shows that the antioxidant content of Saskatoon berries even outnumbered that of blueberries which is often considered to have high antioxidant content. ( Prairieberries, 2016) , with the high antioxidant content, it minimize he free radical mediated

oxidation by inhibiting the initiation or propagation of oxidative chain reactions and scavenging the free radicals. Butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT) are the most widely used synthetic antioxidants in food products. However, some studies have shown that BHA and BHT may have food safety concerns.<sup>4</sup> Antioxidants derived from natural sources, including fruits and vegetables, are considered safe and promising candidates of free radical scavenging activity.( Ruiqi Li, and etc., 2014). According to Dr. Champagain, the lifespan of Nepalese is averaging 9 years shorter than that of Nepalese due to severe malnutrition, the antioxidant content in the Saskatoon berries would mean a lot to them on making them living longer. In order to find exact how much antioxidant content amelanchier alnifolia have, the pomace , which is a by-product extracted from the juice, is used to show the ACY; phenolics and etc. in the berry.( Li Ruiqi ,etc., 2014). By doing a whole buch of professional

Experiment of determining the antioxidant content in it, we get the result as shown in the graph. ( Ruiqi Li, and etc., 2014).

TABLE 1. TOTAL PHENOLICS, ANTHOCYANINS, FLAVONOLS CONTENT, AND OXYGEN RADICAL ABSORBING CAPACITY OF SASKATOON BERRY POMACE EXTRACTS OBTAINED USING VARYING LEVELS OF METHANOL AND ETHANOL

Solvents	Organic solvent (%)	Total phenolics (mg CAE/g DW of pomace)	Total anthocyanins (mg C3GE/g DW of pomace)	Total flavonoids (mg of CE/g DW of pomace)	ORAC ( $\mu\text{mol TE/g DW of pomace}$ )
Methanol	60	34.5 $\pm$ 0.8 <sup>a</sup>	2.4 $\pm$ 0.1 <sup>a</sup>	9.6 $\pm$ 0.5 <sup>b</sup>	84.1 $\pm$ 5.1 <sup>d</sup>
	70	43.3 $\pm$ 0.5 <sup>a</sup>	2.8 $\pm$ 0.1 <sup>a</sup>	10.3 $\pm$ 0.7 <sup>a</sup>	119.4 $\pm$ 5.9 <sup>a</sup>
	80	39.5 $\pm$ 0.1 <sup>b</sup>	2.7 $\pm$ 0.1 <sup>a</sup>	8.2 $\pm$ 0.8 <sup>c</sup>	88.9 $\pm$ 3.2 <sup>e</sup>
	100	28.8 $\pm$ 0.9 <sup>b</sup>	1.8 $\pm$ 0.1 <sup>b</sup>	7.3 $\pm$ 0.5 <sup>b</sup>	54.2 $\pm$ 3.6 <sup>f</sup>
Ethanol	60	29.5 $\pm$ 0.7 <sup>b</sup>	2.4 $\pm$ 0.1 <sup>a</sup>	7.5 $\pm$ 0.5 <sup>d</sup>	92.7 $\pm$ 1.7 <sup>e</sup>
	70	39.9 $\pm$ 0.9 <sup>b</sup>	2.6 $\pm$ 0.1 <sup>a</sup>	8.4 $\pm$ 0.2 <sup>a</sup>	103.1 $\pm$ 4.7 <sup>b</sup>
	80	32.4 $\pm$ 0.9 <sup>d</sup>	2.2 $\pm$ 0.1 <sup>d</sup>	7.3 $\pm$ 0.7 <sup>b</sup>	75.7 $\pm$ 3.0 <sup>e</sup>
	100	22.8 $\pm$ 1.0 <sup>f</sup>	0.9 $\pm$ 0.0 <sup>f</sup>	4.1 $\pm$ 0.2 <sup>f</sup>	53.4 $\pm$ 6.7 <sup>f</sup>
Water	0	16.2 $\pm$ 0.1 <sup>a</sup>	1.2 $\pm$ 0.1 <sup>f</sup>	3.6 $\pm$ 0.1 <sup>a</sup>	30.4 $\pm$ 2.9 <sup>f</sup>

Values are means $\pm$ standard deviation of three determinations.

<sup>abcde</sup>Values in the same column with the same letter are not significantly different ( $P>.05$ ).

CAE, chlorogenic acid equivalents; ORAC, oxygen radical absorbing capacity; DW, dry weight; C3GE, cyanidin-3-glucoside equivalents; CE, (+)-catechin equivalents; TE, Trolox equivalents.

<http://online.liebertpub.com/subzero.lib.uoguelph.ca/doi/full/10.1089/jmf.2012.0278>

It is interesting that the antioxidant content in the berry grows dramatically from small to mature.( Alena L. Jin†, etc., 2015) which means it is not high in those content when they are small but when hey grow bigger, the antioxidant content also rockets up.

Moreover, the saskatoon berry( *Amelanchier alnifolia*) have been analyzed for some elements such as moisture ;soluble solid as well as proteins and minerals and etc. (G MAZZA, 1981) With comparison to blueberry which is also high in antioxidant content and some vital and essential minerals, it is shown that the protein, fibre, fat, calcium, magnesium, manganese, barium, and aluminum in Saskatoon berry all outnumber that in blueberries. (G MAZZA, 1981) while it has lower contents of phosphorus and sulfur in Saskatoon berries. (G MAZZA, 1981) Besides, there is no difference in the content of iron , zinc, sodium and carotene . There are 2 graphs illustrating the comparison between Saskatoon berries and blueberries, one is from Experimental journal and the other one is from the biggest Saskatoon berry Company- Prairieberries .

*Table 1—Composition of saskatoons and blueberries*

Nutrient (% or ppm D.W.B.)	Saskatoons	Blueberries
Water (%)	80.0 ± 1.5 <sup>a</sup>	83.3 ± 1.4
Protein (%)	9.7 ± 1.3	4.9 ± 0.9
Fat (%)	4.2 ± 0.5	2.4 ± 5.99
Fiber (%)	19.0 ± 3.0	8.8 ± 0.3
Calcium (%)	0.44 ± 0.06	0.08 ± 0.01
Phosphorous (%)	0.16 ± 0.02	1.44 ± 0.16
Potassium (%)	1.22 ± 0.16	0.54 ± 0.08
Magnesium (%)	0.20 ± 0.03	0.041 ± 0.011
Sulfur (%)	0.059 ± 0.021	0.034 ± 0.012
Iron (ppm)	67.03 ± 11.65	50.15 ± 12.51
Sodium (ppm)	31.83 ± 7.65	46.01 ± 8.38
Manganese (ppm)	67.50 ± 11.79	35.2 ± 4.7
Copper (ppm)	7.23 ± 0.70	11.4 ± 1.0
Zinc (ppm)	16.50 ± 2.78	20.6 ± 3.0
Barium (ppm)	34.76 ± 4.85	4.4 ± 0.2
Molybdenum (ppm)	0.38 ± 0.01	— <sup>b</sup>
Aluminum (ppm)	74.45 ± 13.22	26.72 ± 2.0
Carotene (ppm)	29.70 ± 5.00	29.30 ± 4.01

<sup>a</sup> Standard deviation

<sup>b</sup> Not detected

Saskatoon Berries		Blueberries	
<b>Nutrition Facts</b>		<b>Valeur nutritive</b>	
Amount Teneur	% Daily Value % valeur quotidienne	Amount Teneur	% Daily Value % valeur quotidienne
<b>Calories / Calories</b> 80			
Fat / Lipides 0.5 g	1 %		1 %
Saturated / saturés 0.1 g			
+ Trans / trans 0 g	1 %	0 %	
Cholesterol / Cholestérol 0 mg			
Sodium / Sodium 0 mg	0 %	0 %	
Potassium / Potassium 160 mg	5 %	3 %	
Carbohydrate / Glucides 18 g	6 %	5 %	
Fibre / Fibres 6 g	24 %	12 %	
Soluble Fibre / Fibres solubles 1 g			
Insoluble Fibre / Fibres insolubles 2 g			
Sugars / Sucrés 11 g			
Protein / Protéines 1 g			
Vitamin A / Vitamine A	2 %	2 %	
Vitamin C / Vitamine C	6 %	20 %	
Calcium / Calcium	4 %	0 %	
Iron / Fer	6 %	2 %	
Vitamin E / Vitamine E	10 %	10 %	
Thiamine / Thiamine	4 %	4 %	
Riboflavin / Riboflavine	0 %	4 %	
Niacin / Niacine	0 %	2 %	
Vitamin B6 / Vitamine B6	2 %	2 %	
Folate / Folate	2 %	2 %	
Biotin / Biotine	0 %	0 %	
Pantothenate / Pantothénate	4 %	2 %	
Phosphorus / Phosphore	2 %	0 %	
Magnesium / Magnésium	10 %	2 %	
Zinc / Zinc	2 %	2 %	
Manganese / Manganèse	70 %	15 %	
Chloride / Chlorure	2 %	0 %	

<http://www.prairieberries.com/nutrition.php>

As is shown, the great value of Saskatoon berries compared to blueberries is the main reason why it should be transported to Nepal.

## (2) Oil content

In addition, the oil content in the Saskatoon seed is very valuable, the oil content in the seed range from 9.7 percent to 18.7 percent (J. Agric. Food Chem., 2009). Also, The vitamin E content in the seed accounts for 87% of total tocopherols in the seed.

More importantly, Thirteen triacylglycerols (TAG) were identified in seed oils, among which LLL, LLO, LOO, LLP, LOP (L, linoleoyl; O, oleoyl; P, palmitoyl) represented 88% of the total TAG. (J. Agric. Food Chem., 2009) The TGA suggest

good oxidative stability of the seed oil. Therefore, the Saskatoon seed oil is very suitable for industrial purpose and due to the reason that it is very healthy, it should be produced in a large amount.

The contact info of the Company-Prairieberries is listed: Prairie Berries Inc.  
Keeler, SK, Canada  
S0H-2E0  
Phone:(306) 788-2018

Email: [prairieberries@sasktel.net](mailto:prairieberries@sasktel.net)

The products are various, some examples are fruit toppings or fruit syrup. Nevertheless, there is product that is just the berries in the jar.



[http://www.prairieberries.com/retail.php#fruit\\_topping](http://www.prairieberries.com/retail.php#fruit_topping)



[http://www.alibaba.com/product-detail/Saskatoon-Berries\\_111560495.html](http://www.alibaba.com/product-detail/Saskatoon-Berries_111560495.html)



[http://www.prairieberries.com/retail.php#fruit\\_topping](http://www.prairieberries.com/retail.php#fruit_topping)

### (1) Benefits to Canada

In terms of the benefits to Canada, it definitely increase the employment rate for Canadian as the marketing expands. As I predicted, Nepalese will have a large demand of this newly famous specie of fruit due to its' unique nutritional value. Right now , the Saskatoon berry is not as famous as blueberries; raspberries and strawberries. By expanding the market of selling this product to Nepal, the Company Prairieberries would have more ability and money to expand the market in Canada or to other nations in a short time. At that time, people worldwide will see the great value of this product. Then they will buy more Saskatoon berries than some berries like blueberries. As blueberries is now very famous, the employment rate in this product Industry will increase a lot because it will be as famous as blueberries.

At the same time as I mentioned before, the Saskatoon berries or the Saskatoon seed would benefit Nepal because it make Nepalese more healthy and get rid of dieaseases. Besides, it also prevent people from aging. In a such poor Country, if government get to know the great value of the Saskatoon berry when the product is sent to Nepal market, I believe they would put a lot of support and effort on building the Saskatoon berries market for the good of citizens health in the future. As a result, the offspring of Nepalese would be more healthy and strong just because of this one product( They cannot afford meat which provides protein(champagain, 2016).)

Right now, there is not a lot of Company that sell Saskatoon berries. On Alibaba.com, except the biggest Saskatoon berries Company- prairieberries, there is a company in Ontario and the market is 100 percent in North America. Besides, since the berry is native to Canada, there is no Company that sell this product in other Countries, there would be no competitive products from other nations. However, as I predicted, the thing is the berry can be grown also in other Countries. Therefore, as people in the future realize the value and market of it, there would be company from other nations buy the Saskatoon seeds and grow in their native land. Nevertheless, there is no competitive one in other nations.

The screenshot shows a product listing on Alibaba.com. At the top, there's a sidebar with various product categories like 'Saskatoon Berry', 'Frozen Saskatoon...', and 'Overhead Crop Netting'. The main content area has two sections: 'Saskatoon Berries' and 'Overhead Crop Netting, Saskatoon berry Netting'. The 'Saskatoon Berries' section includes a product image, price (CA \$2.25), quantity (1650 Pounds), and details like 'BAZHENGHUI FOOD...' and '1000 Pieces'. The 'Overhead Crop Netting' section includes a product image, price (US \$2.3-2.8 / Kilogram), quantity (1 Ton), and details like 'Color: green, blue, white etc' and 'Material: HDPE'. On the right side, there's a company profile for 'Dacon International Inc.' showing metrics like 11 Transactions/6 months, Response Rate 88.9%, and 180,000+ users. There are also buttons for 'Contact Supplier' and 'Leave Message'.

In terms of how it hurts Nepal people

I don't think it hurts in any aspect which means both mentally and physically, most people here believe in Hindu, and in Hindu, there is no say that people should not eat fruit. Also, physically, this fruit is so nutritious that it just do some good things to human body. Therefore, this product will be very welcomed by Nepalese.

Moving to the Company that will cooperate in Nepal in the future, currently, there is a Company called Kadambini Traders Pvt. Ltd.,/Scientec Trade Inc. It is a company that goes between Houston/USA and the Capital of Nepal Kathmandu/Nepal. I choose this Company because it is one of the few Agricultural Companies in Nepal that extent their branch to North America. The contact address is listed below: Contact Address:

Kadambini Traders Pvt. Ltd.,

Basant Sigdyal

Kathmandu, Nepal.

Phone No: 9771 4413295/44

32538

Fax No: 977 1 4442764

Email: bsigdyal@hotmail.com

USA Office:

Scientec Trade Inc.,

Sarad Sigdel,

Telephone No: 832 689 4545

Houston/USA.

Email: Scientec@gmail.com&nbs  
p; sigdelsarad@hotmail.com

What I consider is that as it is a Company that is already familiar with trading with North America, it can be opened to trading with Canadian Company to let Canadian Company- Prairieberries sell the products to Nepal.

Kadambini Traders Pvt. Ltd./Scientec Trade Inc.,

**Gyro Surveying in Canada**

Surveying on Mines & Projects Fast and Reliable Service Go to [idsdrill.com/Borehole-Surveying](http://idsdrill.com/Borehole-Surveying)



Map data ©2016 Google

Phone [977 - 1 - ...](tel:977-1-4442764)

Web [Visit website](#)

Country [Nepal](#)

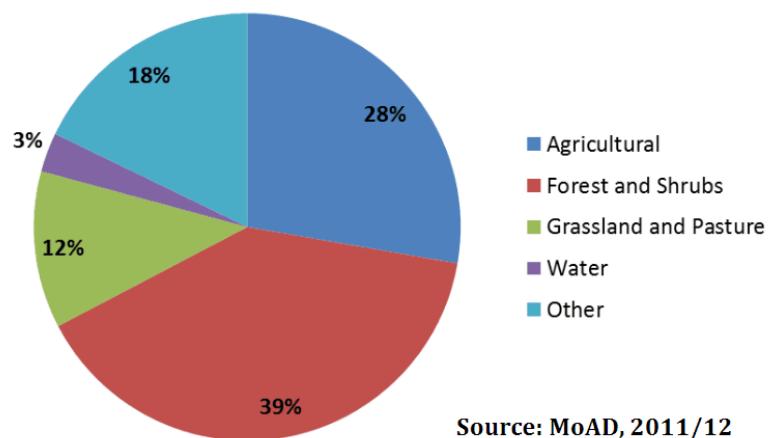
Address Lazimpat Kathmandu /Houston USA. Kathmandu/Houston 22020

[Is this your business? Update this listing ▶](#)

As is shown in the graph, the quantity of the transportation is huge-12,500 MT to 10m MT. Therefore, just by transporting once the seeds from Canada to Nepal, the amount is great for Nepalese to grow for a while.

Last but not least, in terms of growing it, since Nepal is in hill farming system, ( Dr chmpagain, 2016 ) there is not a lot place for people to grow Saskatoon berries. Fortunately, there a large share of area which is Forest and shrub. If government make some of them changed into farmland in order for crop farming, there will be enough farmland for growing Saskatoon berries.

## Land Use Statistics



To conclude, the product is suitable for transporting to Nepal and it has a huge potential to be developed greatly in the future as

(1) It's nutritional value.

The Nepalese, as a developing nation with poor economic situation ( GDP 656US Dollar ( Dr. Chmpagain, 2016) cannot afford great source of protein from meat, cannot obtain many other source of nutrition, either( they are probably worring about hunger). However, with amelanchier alnifolia which provides plenty sources of vitamins, minerals and proteins and more importantly, it helps Nepalese fight with disease due to its' antioxidant content which is even higher than that of blueberries( Prairieberries, 2016).

(2) Healthy seed oil

Besides, the oil content in the seed is very healthy for people to eat. If government wants their citizen to live longer and the nation to be prosper , this is definitely the

choice of where eating oil is extracted from.

By growing this blueberry-looklike fruit in Nepal and expanding the market in Nepal in the future, the body healthy for Nepalese will go to a very different stage in the future. Plus, just by changing an amount of forest area into farmland, there will be no pressure on land use for growing this plant in Nepal.

In addition, due to the reason that this is a newly developed fruit, if Nepal can buy a large amount of it in the future, it will promote the market of it to expand which will benefit Canadian on money income and future Marketing expansion.

Therefore, considering that this product is so useful for Nepalese to grow and eat and for helps Canadian Company, I strongly suggest to have this trading happen as soon as possible.



However, we need to let government really know how nutritious this product is as it is not as famous as some fruits such as blueberries or strawberries. I believe that if government knows how good this product is, they will sure make the trade happen and support it in a great power.

## Reference

Li, R., Hettiarachchy, N., Rayaprolu, S., Eswaranandam, S., Howe, B., Davis, M., & Jha, A. (2014). Phenolics and Antioxidant Activity of Saskatoon Berry (*Amelanchier alnifolia*) Pomace Extract. *Journal of Medicinal Food*, 17(3), 384–92. <https://doi.org/10.1089/jmf.2012.0278>, retrieved 2016/11/29

Bakowska-Barczak, A. M., & Kolodziejczyk, P. (2008). Evaluation of Saskatoon berry (*amelanchier alnifolia nutt.*) cultivars for their polyphenol content, antioxidant properties, and storage stability. *Journal of Agricultural and Food Chemistry*, 56(21), 9933–9940. <https://doi.org/10.1021/jf801887w> retrieved 2016/11/29

Anna M. Bakowska-Barczak\*†§, Andreas Schieber† and Paul Kolodziejczyk†

† Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta T6G 2P5 Canada

§ Department of Fruits, Vegetables and Grain Technology, Wroclaw University of Environmental and Life Sciences, ul. Norwida 25, 50-375 Wroclaw, Poland

J. Agric. Food Chem., 2009, 57 (12), pp 5401–5406

DOI: 10.1021/jf9006278

Publication Date (Web): May 18, 2009, retrieved 2016/11/29

Alena L. Jin†, Jocelyn A. Ozga\*†, James A. Kennedy‡, Jayma L. Koerner-Smith‡, Gabor Botar†, and Dennis M. Reinecke†

† Department of Agricultural, Food and Nutritional Science, University of Alberta, 4-10 Agriculture/Forestry Centre, Edmonton, Alberta, Canada T6G 2P5

‡ Department of Food Science and Technology, Oregon State University, Corvallis, Oregon 97331, United States

J. Agric. Food Chem., 2015, 63 (5), pp 1601–1614

DOI: 10.1021/jf504722x

Publication Date (Web): January 6, 2015

Retrieved 2016/11/29

C. Hu, B.H.L. Kwok, D.D Kitts,

Food, Nutrition and Health, Faculty of Agricultural Sciences, University of British Columbia, 6650 NW Marine Drive, Vancouver, BC, Canada V6T 1Z4

Retrieved 2016/11/29

Mazza, G. (1986). Anthocyanins and other phenolic compounds of saskatoon berries (*Amelanchier alnifolia* Nutt.). *Journal of Food Science*, 51(5), 1260–1264.

<https://doi.org/10.1111/j.1365-2621.1986.tb13100.x>, Retrieved 2016/11/29

Li Ruiqi, Hettiarachchy Navam, Rayaprolu Srinivas, Eswaranandam Satchithanandam, Howe Bruce, Davis Mike, and Jha Alok. *Journal of Medicinal Food*. March 2014, 17(3): 384-392. doi:10.1089/jmf.2012.0278.

Published in Volume: 17 Issue 3: March 20, 2014, retrieved 2016/11/29.

Tunde Juríková 1,\*, Stefan Balla 1, Jiri Sochor 2, Miroslav Pohanka 3,4, Jiri Mlcek 5 and Mojmir Baron 2

1 Institute for Education of Pedagogics, Faculty of Central European Studies, Constantine the Philosopher University in Nitra, Drazovska 4, SK-949 74 Nitra, Slovak Republic

2 Department of Viticulture and Enology, Faculty of Horticulturae, Mendel University in Brno, Valtická 337, CZ-691 44 Lednice, Czech Republic

3 Faculty of Military Health Sciences, University of Defence, Trebesska 1575, CZ-500 01 Hradec Kralove, Czech Republic

4 Karel English College in Brno, Sujanova namesti 356/1, 60200 Brno, Czech Republic

5 Department of Food Analysis and Chemistry, Faculty of Technology, Tomas Bata

University in Zlin, Namesti T. G. Masaryka 275, CZ-762 72 Zlin, Czech Republic

2013 / Published: 11 October 201, retrieved 2016/11/29