Goji berry (wolfberry), *Lycium barbarum*, potential export product from Nepal to Canada

Introduction

Goji berry, also known as wolfberry, is the fruit from two closely related perennials (Sidhu & Zafar, 2006), however this paper focusses on *Lycium barbarum L*. Although goji berries are grown in the wild in the Himalaya region, correspondence with Nepal experts revealed that the fruit is not native to Nepal and that knowledge on this particular fruit in Nepal is limited (Chapagain, Khadka & Gurung, 2015). Nevertheless, this paper will expand on the opportunities of cultivating goji berries in Nepal for export to Canada. The nutritional information and cultivation, its uses and values, market and export potential and limitations will be discussed.

Cultivation and nutritional information

Lycium barbarum is a perennial of 1-3 meters high that produces the red berries of 1 to 2 centimeters long (Sidhu & Zafar, 2006). The number of seeds in the fruit can vary from 10 to 60. The fruit can grow in warm regions, and ripens in the Northern Hemisphere from July to October (Sidhu & Zafar, 2006). *Lycium barbarum* needs a very alkaline soil with a pH of 8, and can grow in sandy, loam as well as clay soils (OMAFRA, 2012). It will produce fruits from the second year onwards with a maximum production in year 4 and 5. After 35-40 days of flowering the seeds can be harvested when the majority is ripe (OMAFRA, 2012). The fruits are dried after harvest, first in shady areas to shrink the skin and then in sunny areas to dry the outer skin but leaving the pulp soft (Amagase & Farnsworth, 2011). The dried fruit has a shelf life of a year, longer if refrigerated (OMAFRA, 2012).

Per 100 grams, goji berries consist of 21 grams carbohydrates (13 grams of sugar and 8 grams of dietary fibre), 11 grams protein and 1 gram of fat (Nutrition Data, n.d.). It is an excellent source of vitamin A and iron, and a good source of vitamin C, potassium, zinc, copper and riboflavin (Nutrition Data, n.d.).

Uses and Value

Goji berries have been used in traditional medicine formulas in ancient China (Sidhu & Zafar, 2006; Dharmananda, 2007). The berries are rich in polysaccharides and carotenoids, and used to improve vision and protection from, among others, cardiovascular diseases and

blood disorders (Sidhu & Zafar, 2006; Dharmanada, 2007; OMAFRA, 2012). Many research is being undertaken to the health benefits of this berry (Seeram, 2008; Gogoasa et al., 2014).

There have been concerns around the fruit's safety and toxicity, however this claim has been debunked (Sidhu & Zafar, 2006). The berries can however trigger an allergic reaction. Specifically, people that use the drug warfarin should remain cautious . Therapeutic claims are not recognized by the US Food and Drug Administration (FDA) and goji berries remain not yet 'generally regarded as safe' by this administration (Sidhu & Zafar, 2006).

Exported goji berries are mostly consumed in a dried form and often in combination with other products (Sidhu & Zafar, 2006). The product can be sold in large quantities or, to generate more income from this product, be used as an ingredient in granola bars or mixed nuts including only Nepali products. Juice is also produced from the goji berries and the concentrated product is then preserved to mix with other beverages (Dharmananda, 2007). The price of dried goji berries from mainland China on Alibaba.com ranges from 5$ to 14$ per kilo (Alibaba.com, n.d.).

Benefits to Nepal

The benefit of this plant to Nepal is that it can be cultivated in the Terai region, as it originated from hot climates (Sidhu & Zafar, 2006). Because *Lycium barbarum* is a freeze tolerant shrub it is possible to cultivate this in the hilly region and mountain region of Nepal as well (OMAFRA, 2012; Dharmananda, 2007). The benefits for Nepal can be the cultivation of goji berries by farmers in each of these regions. Drying and further processing can be done by the same farmers or a different actor in the value chain, ideally within Nepal so that additional benefits remain in the country.

As 62% of the farmers in Nepal are women, it is important to consider the benefits of growing goji berries for export to Canada to this gender (IFAD, 2014). Goji berries are a fruit and hence can function as a cash crop to subsistence farmers (Paolisso & Regmi, 1993). The shrubs grow until 1 to 3 meters, ideal for women to be able to pick them by hand rather than working on the knees to be able to harvest the fruit. Furthermore, the shrubs can have a secondary function as windbreakers, to prevent soil erosion.

Market

Superfoods and superfruits, loosely used marketing and promotion terms describing fruits with exceptional health qualities, saw an upward trend from 2006 onwards (Sidhu & Zafar, 2006; Donno et al., 2014).The category 'superfoods' to which goji berries belong is making

place for products that are not necessarily limited to products with an exotic image (FoodNavigator.com, 2015). Nevertheless, the Canadian consumer would be interested in this product since it is popular for its nutritional content, argued to have exceptional health qualities.

Nowadays, most of the goji berries that are exported to the West are from the autonomous regions of Ningxia Hui and Xinjiang Uyghur (Sidhu & Zafar, 2006). Therefore, goji berries from Nepal could be marketed as a niche product, as some geographic regions are able to demand higher prices for the fruit (Bondia-Pons et al., 2014).

Export potential to Canada

The bilateral relationship between Canada and Nepal can be described as longstanding (Government of Canada, 2013). Potentially exporting goji berries can be part of Canada's focus in this relationship on trade and investment rather than development aid (Government of Canada, 2013). Regulations around importing fresh and processed fruits are included in the Memorandum D19-1-1 (Canada Border Services Agency, 2011). Furthermore, the Canada Border Services Agency (2014) has published a checklist as well as a step-by-step guide for importing goods into Canada.

Companies potentially interested in distributing Nepalese goji berries to consumers in Canada are luxurious grocery chains that specialize in health products. Whole Foods operates in Ontario from its Midwest regional office and in British Columbia from its Pacific Northwest regional office:

Midwest
640 North La Salle Street, Suite 300
Chicago, IL 60654
312.799.5600

Pacific Northwest
15 Lake Bellevue Drive
Suite 100
Bellevue, WA 98005
425.957.6700
425.467.1441 fax

Conclusion and recommendations

Goji berries provide an opportunity for cultivation in Nepal and export to Canada. It can be a source of (extra) income to farmers in Nepal. It can serve the women of Nepal a more convenient crop to harvest and a potential lucrative investment.

Nevertheless, there are limitations to this opportunity. The tree is a perennial that reaches its optimum productivity in year 4 or 5. The fruit has been a topic of safety concerns. And then there is strong competition from China, which has intensive goji berry agriculture in certain regions. More research into the practicalities of goji berry cultivation in Nepal is needed, as well as an in-depth analysis to implications as a trade product.

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