

Part 1: Product Information

Introduction to Nepal

Nepal is an Asian country landlocked between India and China that is located 28 degrees North and 84 degrees West. In the northern regions the climate will vary from cool summers to severe winters while in the southern regions there are subtropical summers and wild winters. These different climates are a result of the large mountain range that is home for Mount Everest, the highest mountain on earth above sea level. There is about 28.8% agricultural land; 15.1% is arable land, 1.2% are permanent crops and 12.5% are permanent pastures.

Nepal's geography, social issues, and economic standpoint was greatly influenced by the civil war that carried out from 1996 to 2006. The deaths from this time period is related to the increase in poverty throughout the country (Q. Do, L. Iyer., 2010). Nepal has had a changing government over the past eight years as leaders step down frequently, changing the parties in lead. The constant changes have restricted and badly impact the country's development and economic growth.

Chia Seeds Background

Chia seeds (*Salvia hispanica L.*) is also known as chia sage and Spanish sage. It is from the Lamiaceae family and was originally discovered in between Mexico and Guatemala. When first founded by the Mesoamericans in Pre-Colombian times, they did not only use the seeds for consumption but also took advantage of its high oil content and medical properties. Some of the medical uses of the chia seed was for eye wounds, infections, and respiratory diseases. Chia seed oil has a high concentration of polyunsaturated fatty acids and is beneficial to industries in a variety of ways (Taga, Miller, & Pratt, 1984). The oil yield in an average sized seed is around. Caffeine, flavonol glycosides and chlorogenic acid are the main components present in the seed that create high antioxidant levels. The average moisture content is 7.0% and the common size is approximately 2.11 mm in length, 1.32 mm in width and 0.81 mm in thickness, as seen in Figure 1. And the density is commonly between 0.667 and 0.722 g/cm⁻³ (Vanessa, Nolasco, & Mabel, 2008). And the protein content in chia seeds is higher than most common cereals like wheat, rice and oats.

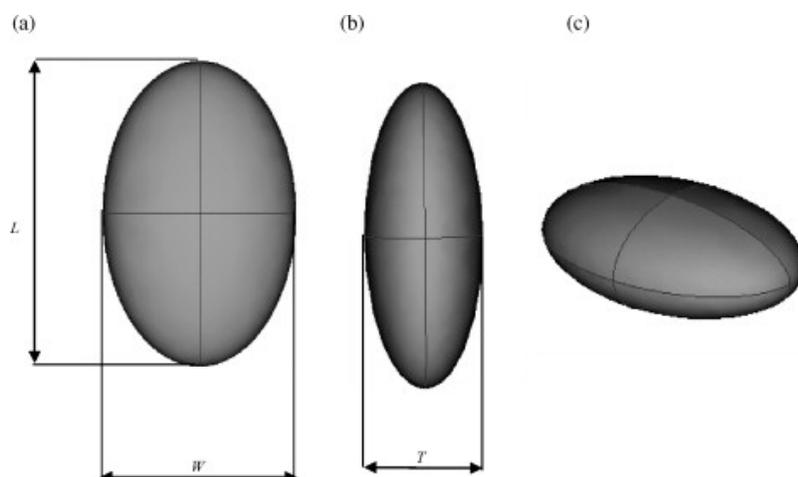


Figure 1: a) length and width b) thickness c) overall shape

Growth and Production

S. hispanica originates from a yearly-herbaceous plant, called a chia plant, that is often grown commercially in Mexico (Reyes-Caudillo, Tecante, & Valdivia-López, 2008). The chia plant grows to about one meter in height and has a large mass of leaves growing on each stem. On top of the stem are flowers that enclose and house the chia seeds. Once the flower has dried, it can be crushed to release the seeds from the enclosure (A. Mohd, N.Yeap, S.K. Ho, W.Y Beh, B.Ke Tan, S.W Tan, S.Guan., 2012). Commonly the seeds are released by pounding/breaking the dried flowers with a stick then collecting the seeds in a bucket or basket once they have fallen. This processing is ideal for economically developing countries like Nepal due to the lack of resources like electricity. For commercially grown chia seeds, a grain. Bean or seed cleaning machine may be used to clean the seeds from and flower residue. For example, from SYNMEC in mainland China, they sell this machine for \$4400 to \$5000 US dollars and it uses about 10.1 kw (kilowatts) of electricity to clean 7.5 tones of product in an hour. Table 1 provides more details about the chia seed cleaning machine. The chia seed cleaning machine would cost over 301,840 rupees for a Nepalese which is not realistic for many of the farmers. *S. hispanica* can be easily dried and is non-perishable since there is a low moisture contents within the seed. Therefore, transportation costs are lower in comparison to perishable products.

Table 1: Working Principles of Chia Cleaning Machine (https://www.alibaba.com/product-detail/American-Quality-Chia-Seed-Cleaning-Machine_60341176728.html)

Model	Capacity (t/h)	Power (kw)	Weight (metric tons)	Sieve Size L×W (mm)	Dimension L×W×H(mm)	Remarks

5XZF-7.5F	7.5	10.1	1.8	2400×1250	5600×2100×3200	Double air cleaning, stone removing and grading, all in one. 1 year warranty.
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Benefits to Nepal

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From each region a Nepal a survey was performed to determine the nutritional status of the citizens and what they are their daily consumptions. According to the results, most citizens are deficient in protein, calcium, vitamin A, ascorbic acid, and riboflavin (People, 1968). These deficiencies within the Nepalese population are from an assortment of causes like a lack of variation in crops, climate, and shortage of arable land. With these issues at hand, the introduction of chia seeds to Nepal can help lower the undernourishment rate since it contains the highest percentage of alpha-linolenic fatty acid (about 60%), has a protein content of 21.69%, carbohydrate portion of 45.30% due to its high dietary fiber content (S.C Sargi, B.C. Silva, H.M.C Santos, P.F Montanher, J.S Boeing, O.O Santos Jr, N.E Souza, J.V Visentainer,. 2013). Through clinical trials, chia seeds have been observed to decrease risk of cardiovascular disease and increase α -linolenic acid and eicosapentaenoic acid levels in post-menopausal women (Mohd Ali et al., 2012). The various health benefits that is within a chia seed will help benefit Nepal to increase their health status and prevent undernourishment and malnutrition.

The seeds can be a benefit to the population of Nepal as there is very little restrictions due to religious beliefs or allergies. The most common religion in Nepal is Hinduism that prevents the consumption of pork and beef; chia seeds are a suitable replacement for essential vitamins and minerals that are present in these met products. Chia seeds are also gluten free while still providing a high percentage of fiber needed in an average adult diet, as seen in Figure 2 (Muñoz, Cobos, Diaz, & Aguilera, 2013).

Nutrition Facts

Serving Size 1 ounce (28g)

Amount Per Serving **Figure 2:**

Calories 137 Calories from Fat 72

Total Fat 9g 13%
Saturated Fat 1g 4%

Trans Fat

Cholesterol 0mg 0%

Sodium 5mg 0%

Total Carbohydrate 12g 4%

Dietary Fiber 11g 42%

Sugars

Protein 4g

Vitamin A 0% • Vitamin C 0%

Calcium 18% • Iron 0%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

NutritionData.com

<http://nutritiondata.self.com/facts/nut-and-seed-products/306172>

Benefits to Canada

The selected supplier of chia for this proposal is Cambrian Solution Incorporation. Cambrian is a well achieving ingredient manufacturer based out of Oakville, Ontario, this company discovers and provides new niche products to a variety of industries like food, pharmaceutical and nutraceutical, and animal feed (Cambrian Solutions Inc., 2016). It has been in business for 20 years with 600 satisfied customers that are helped by their 50 team members. There is a large selection of food items on offer, including chia seed. The company

Figure 3:
<http://cambrian.com/>

communicates globally online to discover their products in another country then wholesales it to North American customers or businesses (Cambrian Solutions Inc., 2016).

The products are not grown in North America, Cambrian provides the service of purchasing the product in bulk and then transporting it into North America per their customer's request. To export chia seed to Nepal, Cambrian Solution Incorporation would be an ideal business partner as they have well established manufacturers of the product and provide transportation of the chia seed under one cost. Once the chia seed have been imported to Canada by Cambrian then methods of transportation of the product to Nepal is to be determined.

This idea can benefit the 50 Cambrian employees on their team and give the company the ability to expand their employment. There is an opportunity to make a division within the company dedicated to the Nepal export. Increasing their employment could possibly allow up to 100 new job opportunity for Canadian citizens that have sufficient computer and business skills. And for Cambrian Solutions, this export



idea could lead to positive reviews of the company as possible partnerships with the University of Guelph and the IDRC (International Development Research Centre)



Figure 4: Twin Otter DHC-6 owned by Adlair Aviation Ltd.

<http://www.adlairaviation.ca/our-fleet>

and bring public awareness of their company. For more inquiries regarding Cambrian Solutions Inc. contact information is provided in Table 2.

This proposal can also benefit transportation companies such as Adlair Aviation Ltd. Adlair is a small scale, family owned flight company that owns three different aircrafts for specific requests (Adlair Aviation Ltd., 1983). They are known for travelling to the Arctic and Northern Canada but are also available for harder trips such as Nepal. For shipping products, like chia seed, the aircraft model Twin Otter DHC-6 (shown in Figure 4) would be ideally used by the airline. Due to chia seeds small size and mass, this small aircraft will have the ability to export a substantial amount of chia seeds. But due to the plane's smaller fuel storage to complete a trip to Nepal it would need to refuel in between the trip. This export idea can allow enough business for the Adlair Aviation company to expand the number of aircrafts they own and possibly obtain a larger aircraft to avoid a refuel while travelling to countries like Nepal. For further inquiries regarding Adlair Aviation Ltd. Contact information is provided in Table 2.

Part 2: Export Potential to Nepal

Transportation

To successfully export chia seeds into Nepal there are three main stages of transportation. First, through Cambrian Solutions, the chia seed will be transported out of Southern Mexico (city of origin not released by the company) by a truck. The chia seed are already dried and harvested

Company	Address	Phone Number	Email	Website
Cambrian Solutions Inc.	627 Lyons Lane Suite 300 Oakville, Ontario L6J 5Z7	(905) 338- 3172	accessibility@cambrian.com	http://cambrian.com/
Adlair Aviation Ltd.	Cambridge Bay Base and Hangar P.O. Box 111 Cambridge Bay, Nunavut X0B 0C0	(867) 983- 2569	cambridgebay@adlair.ca	http://www.adlairaviation.ca/

then stored in 1 meter by 55 cm grain bags for transportation. The proper Canadian importing documents should be completely correctly by Cambrian. Once crossed into Canadian borders, it will proceed to travel to Adliar Aviation's Cambridge Bay Hanger, located in Nunavut, to be prepared for export to Nepal. When the product has reach Cambridge, an employee from Cambrian will be required to verify the chia seed and ensure the correct amount purchased has been accounted for. All Canadian export documentations and Nepal documentations must be completed and carried with the product as it travels to Nepal.

Figure 5: Path of chia seed export.



Chia seed is a non-perishable food product so it does not need to be kept at a specific temperature while being transported. The main concern for transportation will to prevent pests like rodents from corrupting the seeds and lead to a profit loss.

The target market of Nepal is new farmers or entrepreneurs in Dhankuta. It is ideal to export chia seed to Dhankuta due to its location close to the boarder of China where it will be easier to transport. Farmers in valley or higher elevated regions would have a greater interest of this proposal as chia plant can utilize this land that is not commonly used for crops due to crops failure to survive under the conditions. Once the seed has been successfully exported to Nepal there is an opportunity for sales and trade in Nepal to sell the seeds across the country.

An estimated time frame to export chia seed to Nepal can be around 26-31 days. The transportation from Southern Mexico to Canada then Nepal will be long as two different methods of transportation is needed and three different boarders are to be crossed. Prices for transporting the seed will vary depending on the weight of the chia seed being shipped and the currency exchange. Also, importing duties or exporting duties will be added cost to the shipping depending on the value of the chia seed once passing through the boarders. Due to the current

economic status of Nepal, this proposal for transportation seem unrealistic for Nepalian farmers or entrepreneurs.

Environmental Benefits

Chia can be commonly found in mountain regions as it is not temperamental to soil or weather conditions. It thrives in drier soils like clay or sand. It can also survive in acidic soils which is usually present in mountain regions. Chia plants are lenient to high temperatures or drought but cannot develop below 0°C or in shade for long periods of time (Muñoz et al., 2013). The growing period for a chia plant is about 125-135 days and can yield up to 1325 kg/ha in valley regions (Ayerza & Coates, 2009). This means that the chia plant can have a high yield at high elevations, therefore, its chances for success in Nepal's environment is also high. A large amount of Nepal's land are mountain regions that prevents the growth of many crops due to the higher altitude, colder temperatures and soil preference. Being able to utilize the valley lands for agriculture can increase the overall agricultural land percentage.

Global Competition

In India and China there are a number of manufactures of chia seed that is lower in cost and more accessible for Nepal's population compared to exporting the product from Canada. The main competitor to Nepal is India since the two countries share a very similar culture, religion and politics. Although India has a much higher GDP (Gross Domestic Product), tourism is high in Nepal which helps its economy (Karanth & Nepal, 2012). A few companies found on Alibaba.com, like Marias Five Elements, sell whole and pure chia seed in metric tons for \$3000 to \$4000 US dollars (Marias Five Elements, n.d.). This price is lower than the estimated costs to purchase, transport and export chia seed from Canada to Nepal. If Canadian agriculture and farmers were to grow chia crops in Canada the costs to export it would be reduced greatly and also bring a greater increase to Canada's benefits.

Loans for Proposal Start Up

The Canadian Agricultural Loans Act Program (CALA) is a program created to help farmers establish or improve their farms and also help expand the market of their products of farming. The object is to help seize better market opportunities for farmers and their products ("Canadian Agricultural Loans Act program - Agriculture and Agri-Food Canada (AAFC)," n.d.). This program could possibly grant Canadian farmer to start a chia plant crop in Canada with \$500,000 from the government to purchase land and equipment. Growing chia plant in

Canada gives this proposal a higher chance of becoming a realistic business since it will lower overall costs.

Overall, Nepal's human consumption rate is increasing with its rapid population but their agriculture is not keeping up with this fast rate. With the introduction of chia seeds, exported out of Canada and into Nepal, this seed can be a small step to helping the country thrive while creating a bi-lateral trade between the two countries. There are a number of challenges to overcome but there is a possibility for success.

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