

Super Gac

Bringing Nepal's super fruit to Canada's Juice
Industry

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Super Gac is a special, healthy juice blend made with Nepalese grown gac fruit. Super Gac is not currently in production, but there is high potential for Super Gac to be a beneficial export product for Nepalese farmers and the economy in general. Super Gac can come in two forms, a ready made juice blend, or a dried powder that can be added to juices or protein shakes as a supplement. Super Gac powder and Super Gac juice has many health benefits that make it appealing to consumers, and cultivation is relatively easy making it appealing to farmers.

Product Information

Momodica cochinchinensis is a fruit grown on vines in Nepal. It is usually grown outside households on lattices, reducing crop space. Though there is a short harvest period of about 2 months, there is always a high demand for the fruit. Gac can be cultivated from seeds or root tubers, and grows as dioecious vines.¹ This is often a challenge for cultivation as there is no way to identify male and female plants until flowering. There is research aimed at providing varieties with bisexual flowers. There is potential for it to be a high-yielding and high-quality crop. One plant can produce approximately 30-60 fruits per season, and this is while the plant is not being cultivated for optimum yield.² Gac is a tropical vine and loves heat and moisture. After about 2 years of root tuber formation, the plant is not easily killed and is very tolerant to dry seasons, and can go dormant. Gac is a non-invasive plant with vigorous growth. The potential of the plant is long over due and Nepalese producers must take advantage of the plant before foreign corporations or

¹ Parks, Sophie E., et al. "Propagation and production of gac (*Momordica cochinchinensis* Spreng.), a greenhouse case study." *Experimental Agriculture* 49.02 (2013): 234-243.

² Tuyen C. Kha, et al. "Gac fruit: nutrient and phytochemical composition, and options for processing." *Food Reviews International* 29.1 (2013): 92-106.

irresponsible profiteers take advantage of it. Gac fruit is not exported out to other countries in large quantities, but the benefits of the fruit have been recognized in Nepal. By getting Gac into the juice market, there is potential to create mass production in Nepal and export the product out to Canada, where the juice industry is blooming.

Nutritional Information:

Gac fruit is an excellent source of carotenoids. It has high alpha tocopherol, beta carotene, lycopene, flavonoids, and essential fatty acids. Gac fruit is known to have the highest concentration of beta carotene of all fruits and vegetables, in fact, it's beta carotene levels are 8 times higher than the level in carrots.³ All parts of the fruit can be utilized, thus not wasting anything. As shown in the figure below, all parts of the Gac fruit have very high beta-carotene, lycopene and lutein content. Concentrated Gac to be put in juices as supplements would require much less product than other fruits and vegetables used for the same nutrients.

³ Chuyen, Hoang V., et al. "Gac fruit (*Momordica cochinchinensis* Spreng.): a rich source of bioactive compounds and its potential health benefits." *International Journal of Food Science & Technology* 50.3 (2015): 567-577.

Carotenoid content of fresh Gac fruit (mg/100 g)⁴

Carotenoids	Skin	Pulp	Aril
<i>Beta Carotene</i>	38.4–141.6	24.0–43.2	160.0
<i>Lycopene</i>	38.4–81.6	14.4–49.6	154.6–305.4
<i>Lutein</i>	189.6–1248	16.0–144.8	N/A
<i>Zeaxanthin</i>	N/A	0.2	0.9
<i>Beta Cryptoxanthin</i>	N/A	0.4	0.2

Processing Gac fruit to produce it as a potential product in the Juice market can be done in a few ways. Currently, there is little information available on how the fruit can be processed to make full use of all the components, but it can be processed by drying, extraction of oil, encapsulation and incorporation into foods. This paper will focus on drying and incorporation into foods.

There are two ways to enter Gac into the juice industry. One is by processing the fruit into a powder that could potentially be sold to companies that have juice bars, using the properties of the Gac fruit to enhance their juices. The benefits of this are that powders are easy to store, handle and transport. Since Gac is only available fresh for such a short period of time, processing it into a powder can lengthen its shelf time. The aril, yellow pulp and skin of the Gac fruit can all be dried into a powder. There are two methods that Gac can be dried by which will retain the carotenoid content: freeze drying and air drying below 70

⁴ Tuyen C. Kha, et al. "Gac fruit: nutrient and phytochemical composition, and options for processing." *Food Reviews International* 29.1 (2013): 92-106.

degrees Celcius.⁵ The benefit of air drying is not only that it is inexpensive, but that it prevents environmental pollution from waste disposal and it increases the overall value of the Gac fruit. This value-added is beneficial for economic sustainability.

The other method is to produce the Gac fruit in Nepal, have local production sites and bottling factories, and then shipping the product to Canada. This can keep all the production local, increasing job opportunities for people living in Nepal, and ensuring full control of the distribution of the product. The draw back with this, however, is that the nutritional content of the fruit in a beverage can be maintained after storage for only 30 days under refrigeration.⁶ Drying the Gac fruit into a powder is more beneficial for both Nepalese exporters and Canadian importers.

Juice cleanses and juice diets are becoming more and more popular. Gac's many beneficial properties and vibrant colour make it an ideal choice for a juice startup. This is why Super Gac is an excellent product idea to export.

The juicing market in Canada is very new, and for that reason there are not many numbers up for statistical analysis as of yet. However, companies such as BluePrint Juice forged a 25 million partnership with natural foods giant Hain Celestial Group, and the company is not grossing more than 20 million annually. The mass celebrity endorsement by Gwyneth Paltrow and Salma Hayek has really opened up the market in North America for the nutritional juice market. The Gac fruits vibrant colour makes it look exotic and alluring.

⁵ Tuyen, C. Kha, et al. "A storage study of encapsulated gac (*Momordica cochinchinensis*) oil powder and its fortification into foods." *Food and Bioproducts Processing* 96 (2015): 113-125.

⁶ Nhung, Dang Thi Tuyet, et al. "Changes in lycopene and beta carotene contents in aril and oil of gac fruit during storage." *Food Chemistry* 121.2 (2010): 326-331.

For Canadian juice companies, implementing this new fruit juice with such high nutritional value will increase the popularity of the juice market. Through effective marketing, if all the benefits of the Gac fruit are effectively relayed to consumers, the demand for the product will increase naturally. The Gac fruit powder Super Gac can be added into existing juice blends or added in as a supplement to protein shakes.

Nepal's economy is highly dependent on the agriculture industry. Self-efficiency farming is widely practiced, and as a result, the cultivation of Gac fruit has been relatively low. Since over 80% of people in Nepal are involved in the agriculture industry, specifically subsistence farming, producing Super Gac is an excellent opportunity to help farmers out.⁷ Since farms in Nepal are generally quite small, the growth of the Gac fruit on vines that can be grown on lattices decreases the amount of room the plant may take up. Super Gac would be considered a niche product as it focuses on the Agriculture industry, but because the majority of the population is directly involved in agriculture in Nepal, a larger population also requires it. Post harvest, after drying the fruit, there is easy storage for the powder. Issues arise if the product has been made into a juice and needs to be refrigerated right away and during transportation. The benefits of drying it into a powder are that there are very little barriers in trading the product.

Potential Importers:

⁷ Gautam, Rajeeb, Sumit Baral, and Sunil Herat. "Biogas as a sustainable energy source in Nepal: Present status and future challenges." *Renewable and Sustainable Energy Reviews* 13.1 (2009): 248-252.

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Tuyen C. Kha, et al. "Gac fruit: nutrient and phytochemical composition, and options for processing." *Food Reviews International* 29.1 (201