

Assessing *Centella asiatica* (L.) as a possible Nepalese export to Canada.

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Product Information and Benefits to Nepal

Product Description

Centella asiatica (L.), also known as “Brahmi-Buti”, is a perennial creeping herb commonly found in the wetlands of South-East Asia (Brinkhaus, Lindner, Schuppan, & Hahn, 2000). This product would be exported from Nepal in the form of loose-leaf tea. It is widely known to have many beneficial medicinal properties in the areas of venous circulation and skin care (Brinkhaus et al., 2000). The secondary metabolites contributing to *C. asiatica*'s medicinal properties are primarily madecassoside, asiaticoside, madecassic acid, and asiatic acid (Devkota, Dall'Acqua, Comai, Innocenti, & Jha, 2010). Generally the leaves grow to be 2 to 5 cm in diameter (Brinkhaus et al., 2000). Flowering usually occurs between August and September, producing light violet coloured flowers (Brinkhaus et al., 2000).

Impact on Preserving Local Culture

C. asiatica has been a part of Nepalese traditional medicinal practices to treat fever, reduce uric acid levels, and high blood pressure. In mountainous and rural areas where health services are limited, herbal medicine is the primary treatment of most illnesses (Kunwar, Shrestha, & Bussmann, 2010). Medicinal herbs are heavily used in traditional medicine and are considered to have fewer side effects, better patient tolerance, and lower associated costs, as compared to western medicine (Kunwar et al., 2010). In Nepal, it is estimated that there is one physician for every two thousand people, whereas there is one healer for every one hundred people (Kunwar et al., 2010). Thus, traditional

medicine practices stay relevant in Nepalese society due to its accessibility and low associated costs. By promoting the export of *C. asiatica*, traditional medicinal knowledge and practice will continue to be passed down through generations.

Growing Conditions of Product

C. asiatica grows in moist habitats at altitudes between 0 and 2500m above sea level (Brinkhaus et al., 2000). This plant is tolerant of dense shade but is very susceptible to drought stress (Devkota & Jha, 2011). Drought causes an inability of plants to get all available nutrients in the soil, and consequently causes low water and nutrient levels in plants. Low soil moisture contents greatly affect *C. asiatica* during its vegetative stage, resulting in decreased leaf and chlorophyll a content (Devkota & Jha, 2011). Chlorophyll a is a pigment found in most plants that is responsible for the absorption of photons from the violet-blue light spectrum. A decrease in chlorophyll a ultimately reduces the production of ATP and NADPH in the plant resulting in lower amounts of energy available for growth (Reece et al., 2010). At present, most *C. asiatica* is spontaneously collected from the wild rather than cultivated (Devkota et al., 2010). Cultivated varieties have been found to reduce levels of secondary metabolites as compared to wild variations (Devkota et al., 2010). But there is also a variation of secondary metabolite levels within cultivated varieties due to changes in watering, light exposure, soil composition (Devkota et al., 2010).

Sustainability

C. asiatica can be propagated in small plots and transplanted within 1-2 weeks, which allows more land to be accessible for other crops (Brinkhaus et al., 2000). Since this plant

is a creeping plant it can be intercropped with other crops such as maize. This intercropping method would act as a weed control and would generate more income for farmers since they would be able to more efficiently use plots to grow more crops. This crop also does not require additional fertilizers, which reduces the costs associated with cultivation (Brinkhaus et al., 2000). But as mentioned in growing conditions *C. asiatica* is very intolerant to drought, so maintaining soil moisture content above 30% is very important (Devkota & Jha, 2011). If access to water is limited in a particular region this crop will not be sustainable. As a perennial plant, *C. asiatica* could be harvested numerous times throughout the year generating a steady income for farmers. Harvesting can begin six months after the initial planting and can take place at any time during the year (Brinkhaus et al., 2000). This gives farmers more flexibility in when they will harvest and allows them to focus on the more specific harvesting requirements of their other crops. The costs associated with the harvesting of this crop are relatively low since only the leaves are being sold. But picking leaves is more labour intensive than most crops and would have to be done numerous times throughout the year. Production costs would also be fairly low since the areal portion of the plant can be dried outside in the sun after being collected (Brinkhaus et al., 2000). Due to the low moisture content of the product storage would be easy since the dried leaves are not prone to moulding.

Economic Impacts

The transition to a cropping system of *C. asiatica*, from sporadic collection, provides a steady income to Nepal's rural communities (Devkota et al., 2010). As mentioned above, *C. asiatica* can be intercropped with other crops providing fixed nitrogen to the soil

environment, as it is a legume. It would support more marginalized groups as it does not require livestock or fertilizer and is easily accessible (Brinkhaus et al., 2000). According to Mishra *at el.* the growing popularity of tea cash crops has helped reduce rates of poverty among small-scale farmers, which make up 62% of the total tea production in Nepal (2014).

Export Potential

Growing consumer interest in health and wellness has led to increased awareness of teas functional benefits (TAC, 2014). According to a report commissioned by Agriculture and Agrifood Canada, tea consumption is expected to increase 40% by 2020 (TAC, 2014).

The Tea Association of Canada is a non-profit association that acts as a representative for the tea industry in Canada (TAC, 2014). In 2014, Canadians consumed almost 10 billion cups of tea, which is equivalent to (TAC, 2014). Tea production in Nepal has increased by 10 fold in the past twenty years, playing a large role in the Nepalese economy (Mishra 2014). The production of *C. asiatica* as a dried loose leaf to be incorporated into tea blends presents a niche export opportunity for Nepal due to its low associated production costs and increasing demand in Canada. Exporting *C. asiatica* could be difficult due to the tariff and non-tariff barriers, such as minimum price regulations and export subsidies that encourage over production (Adhikari & Adhikari, 2005). As a least developed country, Nepal has increased market access. However, this access is usually unilateral and unpredictable (Mishra 2014). The specialty tea market in North America is expanding rapidly with the opening of chains such as David's Tea and Teavana. Both of these

companies would provide Nepal with an inlet into the high demand market of specialty tea, and increase the awareness and popularity of *C. asiatica*.

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