Agriculture Research and Development

The Functional and Quality Indices of Wild and Hybrid Newfoundland Blueberries

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Project Objectives

- Determine the functional and quality indices of wild blueberries hybridized with cultivated blueberry varieties;
- Optimize the recovery of functional compounds from blueberry hybrids;
- Determine if the functional components in the enhanced blueberry extracts have neuro-protective properties against brain cells following exposure to environmental toxins.

Abstract

Agronomic, functional, qualitative and sensory traits were determined for 32 hybrid Newfoundland half-high blueberry cultivars using spectrophotometric, mass spectrometric and chromatographic techniques to assist in selecting the cultivars most suitable for commercial development in the province. The total antioxidant activities of the berry cultivars were significantly correlated with total phenolic content ($p < 0.05$). Principal component analysis confirmed there is clear separation of the varieties based on qualitative and sensory indices, and that total soluble solids (TSS), color (l*), and sweetness were the major contributors to overall consumer preference of the top varieties.

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Background

Newfoundland and Labrador is globally recognized for its pristine landscape and flora and fauna with unique chemical fingerprints. Chief among the floras are the berries, with distinct flavors and excellent antioxidant/phenolic content. Variations in chemical fingerprints are natural defense or response strategies used by plants to survive the challenging climatic conditions present in Newfoundland and Labrador.

Epidemiological studies have shown that consuming foods, including fruits and vegetables, rich in functional ingredients had strong protective effects against major disease risks such as cancers, cardiovascular and neurodegerative diseases. Taking into consideration that Newfoundland and Labrador berries are known to have very rich chemical signatures and bioactive properties, we are interested in exploring the potential of screening selected hybrids of native berries having high agronomic, qualitative, functional and sensory traits for the development of a commercial cultivated blueberry industry in the province.

Technical Details

Qualitative indices were used to select blueberry cultivars based on fruit quality, and served as indicators to help with the assessment of cultivars with high consumer preferences. Some of the parameters measured included sweetness (measured by total soluble solids), sourness (measured by titratable acidity), flavor volatiles (measured by ketone/aldehyde and ester content), surface color (measured by color of fruits using a chroma meter) and sensory perception as determined by consumer preferences for the best blueberries.

Preliminary Results

- The quality parameters that drive consumer preference for the different half-high blueberry cultivars are fruit taste, fruit color and fruit acidity.
- Four out of the 32 half-high blueberry cultivars evaluated have the greatest consumer preference based on taste, color and acidity of fruits.

Recommendations

A clear picture is starting to emerge of the top hybrid cultivars to target. Once all of year-one data is analyzed, we will continue to evaluate this trend over subsequent years to see if the same cultivars consistently outperform the others based on sensory, qualitative, and functional indices.

Agriculture Industry Benefit

Data collected so far appears to be very promising and could assist in the selection of the half-high blueberry cultivars most suitable for commercial development in Newfoundland and Labrador based on agronomic, functional, sensory, and qualitative outputs. Additionally, blueberry varieties selected could be used to develop functional foods for a niche market worth an estimated US $16.4 billion in Canada (Canada Trade and Commission Service).

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