

The Effect of the Variety and Harvesting Date on Polyphenol Composition of Haskap (*Lonicera caerulea* L.) and Anti-diabetic Properties of Haskap Polyphenols

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Abstract : Haskap (*Lonicera caerulea* L.), also known as blue honeysuckle, is a newly commercialized berry crop in Canada. Haskap berries are rich in polyphenols, including, anthocyanins, which are known for potential health-promoting properties. Cyanidin-3-O-glucoside (C3G) is the most abundant anthocyanin of haskap berries. The compound C3G has the ability to reduce the risk of type 2 diabetes (T2D), which has become an increasingly common health issue around the world. The T2D is characterized as a metabolic disorder of hyperglycemia and insulin resistance. It has been demonstrated that C3G has anti-diabetic effects through several ways, including inhibition of dipeptidyl peptidase-4 (DPP-4), reduction of gluconeogenesis, improvement in insulin sensitivity, and inhibition of activities of carbohydrate hydrolyzing enzymes, including α -amylase and α -glucosidase. The goal of this study was to investigate the influence of variety and harvests maturity of haskap on C3G, other fruit quality characteristics and anti-diabetic activities of haskap berries using in vitro studies. The polyphenols present in four commercially grown haskap cultivars, Aurora, Rebecca, Larissa, and Evie harvested at five harvesting dates (H1-H5) apart from 2-3 days, were extracted separately. High-performance liquid chromatography electrospray ionization mass spectrometry (HPLC-ESI-MS) analyzes of polyphenols revealed that haskap berries contain predominantly anthocyanins, flavonols, flavan-3-ols, and phenolic acids. The compound C3G was the most prominent anthocyanin, which is available in approximately 79% of total anthocyanin in four cultivars. The Larissa at H5 contained the highest C3G content. The antioxidant capacity of Evie at H5 was greater than other cultivars. Furthermore, Larissa H5 showed the greatest inhibition of carbohydrate hydrolyzing enzymes including alpha-glucosidase and alpha-amylase. In conclusion, the haskap variety and harvesting date influenced the polyphenol composition and biological properties. The variety Larissa, at H5 harvesting date, contained the highest polyphenol content and the ability of inhibition of the carbohydrate hydrolyzing enzyme as well as DPP4 enzyme in order to reduce type 2 diabetes.

Keywords : anthocyanin, Haskap, type 2 diabetes, polyphenol

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