

Abstract

Analysis of the Phytochemical Patterns Present in the ‘Monty’s Surprise’ Heritage Apple Cultivar: Implications for Cancer Prevention [†]

Linda Nezbedova ^{1,2,*} , Tony McGhie ³ , Mark Christensen ⁴, Julian Heyes ¹ , Noha Ahmed Nasef ² 
and Sunali Mehta ^{5,6} 

¹ School of Food and Advanced Technology, Massey University, Palmerston North 4442, New Zealand; j.a.hey@massey.ac.nz

² Riddet Institute, Massey University, Palmerston North 4442, New Zealand; n.nasef@massey.ac.nz

³ The New Zealand Institute for Plant and Food Research Limited, Palmerston North 4474, New Zealand; tony.mcghie@plantandfood.co.nz

⁴ Heritage Food Crops Research Trust, Whanganui 4501, New Zealand; mark@heritagefoodcrops.co.nz

⁵ Pathology Department, Dunedin School of Medicine, University of Otago, Dunedin 9016, New Zealand; sunali.mehta@otago.ac.nz

⁶ Maurice Wilkins Centre for Biodiscovery, University of Otago, Dunedin 9016, New Zealand

* Correspondence: l.nezbedova1@massey.ac.nz; Tel.: +64-02041925283

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Abstract: Apples are a commonly consumed fruit linked with reducing the risk of several chronic diseases, including cancer. Some of the health benefits of apples are related to their secondary metabolites, known as phytochemicals. The type of phytochemicals and their distribution differ within the various parts of an apple (skin vs. flesh) and are affected by cultivar type and food processing methods. Several studies have reported higher content of apple phytochemicals in the skin compared to the flesh, but the skin only makes up 10% of the weight of the apple. Only a few studies have reported on differences in the phytochemical content relative to the weight of the skin compared to the whole apple. In this comparative study, we used liquid chromatography–mass spectrometry (UPLC-QTOF-MSLC-MS) to identify phenolics (flavonoids and phenolic acids) and triterpenoids as the main phytochemicals in the skin and flesh of a New Zealand (NZ) heritage apple cultivar known as ‘Monty’s Surprise’. We further evaluate the effect of two simple household processing techniques, puree and air dehydration, on phytochemical concentration. Our preliminary analysis showed that ‘Monty’s Surprise’ contained a higher concentration of catechin, epicatechin, total procyanidins and chlorogenic acid when compared to the commercial apple cultivars ‘Red Delicious’ and ‘Braeburn’. Furthermore, flavonols (quercetin glycosides) were present mainly in the skin, whereas chlorogenic acid levels were higher in the flesh. Moreover, our data showed that apple puree retains a phytochemical concentration similar to that of fresh apple, whereas air dehydration appears to be more destructive to apple phytochemicals. The findings from this study point out that, to obtain the greatest health benefits from apples, it is important to consume the whole apple, including skin. Additionally, an apple’s health effects vary in relation to the phytochemical profile of the apple that is consumed. Furthermore, this study identifies a simple household processing method for long-term storage that preserves the apple’s phytochemical profile to achieve maximum health benefits.

Keywords: fruit; apples; phytochemicals; cancer; prevention; antioxidants; phenolics; triterpenoids



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