



# Quantification of Anthocyanins and other Phenolics in Native Andean Potatoes

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## ABSTRACT

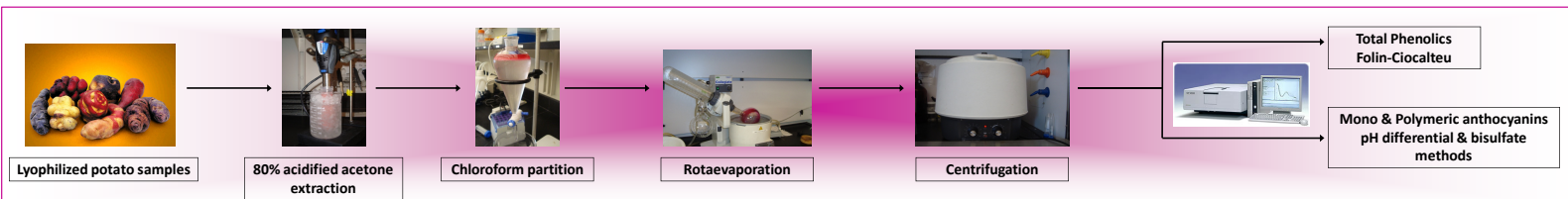
Potato is recognized as a good source of nutrients. Besides basic nutrients some colored potatoes contain significant amounts of anthocyanins and other phenolic compounds. The objective of this research was to identify potato varieties with increased phenolic content. This was achieved through quantification of total phenolics and anthocyanins in 20 varieties of native Andean potatoes provided by the International Potato Center (CIP). Potatoes of different colors (cream, yellow, pink, red and purple) were selected from different species: *Solanum tuberosum*, *S. stenotomum*, *S. phureja*, and *S. chaucha*. Phenolics were extracted from lyophilized potatoes with 80% acidified acetone and fractionated with chloroform. Total phenolics were quantified as Gallic acid equivalents (GAE) using the Folin-Ciocalteu method. Monomeric and polymeric anthocyanins were quantified using the pH differential and bisulfate methods, respectively. Phenolic composition was monitored by HPLC

Potatoes showed high variability in total phenolic content ranging from 100 (*S. stenotomum* subsp. *geniocalyx*) to 480 mg of GAE/100g DW (*S. tuberosum* subsp. *andigena*). High anthocyanin content was found in selected colored potatoes, of up to 150 mg (*S. stenotomum*) of cyanidin-3-glucoside/100g DW. Potatoes of select varieties could represent new rich sources of polyphenolics with antioxidant and potential health promoting properties.

## INTRODUCTION

Potato is the fifth most important crop worldwide after sugar cane, maize, wheat and rice with a production of >321 million tones in 2007 (FAO, 2008). Potato is recognized as a source of carbohydrates, high-quality proteins, vitamin C, vitamin B6, vitamin B3 and minerals such as potassium, phosphorus and magnesium (Andre, 2007). Besides these basic nutrients, some colored potato varieties contain significant amounts of phytonutrients like polyphenolic compounds. Polyphenolic have been associated with certain health benefits such as inhibition of cholesterol accumulation in blood, reduction in risk of coronary heart disease, prevention of some types of cancer, retardation of macular degeneration among others (Lachman, 2005, Jansen, 2006). Natural occurring polyphenolics are classified in three major groups; flavonoids (anthocyanins), phenolic acids and tannins. Anthocyanins are natural pigments responsible for the pink, red, violet, and blue coloration of many flowers, fruits and vegetables. Besides their antioxidant power and possible health benefits; anthocyanins have gain interest in the past years due to their possible use as natural colorants. Native Andean potato tubers show a wide variability in shape, flesh and skin color and size. The objective of this research was to identify native Andean potato varieties with increased phenolic content.

## MATERIALS AND METHODS



## RESULTS AND DISCUSSION

CIP code	Species name	Lyophilized sample color
700234	<i>S. tuberosum</i> subsp. <i>andigena</i>	red purple with brown and white spots
702464	<i>Solanum</i>	cream with brown spots
702556	<i>S. stenotomum</i> subs. <i>stenotomum</i>	purple pink
703640	<i>S. tuberosum</i> subsp. <i>andigena</i>	very bright purple with white spots
703695	<i>S. tuberosum</i> subsp. <i>andigena</i>	brown
703752	<i>S. tuberosum</i> subsp. <i>andigena</i>	red brown with brown spots
703782	<i>S. stenotomum</i> subs. <i>stenotomum</i>	yellow with brown spots
703862	<i>S. stenotomum</i> subs. <i>Gonioxalyx</i>	purple cream with dark purple spots
704133	<i>S. stenotomum</i> subs. <i>stenotomum</i>	grey purple with purple spots
704481	<i>S. stenotomum</i> subs. <i>Gonioxalyx</i>	bright yellow with brown spots
704537	<i>S. chaucha</i>	cream white with dark spots
704733	<i>S. tuberosum</i> subsp. <i>andigena</i>	dark purple grey
705500	<i>S. stenotomum</i> subs. <i>Gonioxalyx</i>	cream with brown spots
705534	<i>S. stenotomum</i> subs. <i>stenotomum</i>	very bright purple with white spots
705820	<i>S. phureja</i>	cream with brown spots
705841	<i>S. tuberosum</i> subsp. <i>andigena</i>	red purple with brown and white spots
705946	<i>S. chaucha</i>	cream purple with dark spots
706630	<i>S. tuberosum</i> subsp. <i>andigena</i>	pink purple
706726	<i>S. tuberosum</i> subsp. <i>andigena</i>	purple with black and white spots
706884	<i>S. stenotomum</i> subs. <i>Gonioxalyx</i>	yellow with brown spots

Table 1: CIP codification, species name and lyophilized sample color description

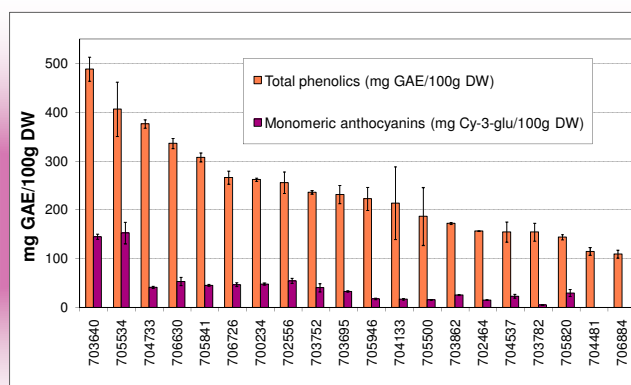
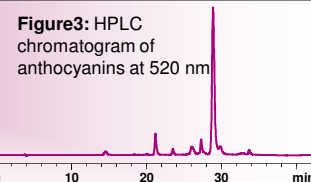
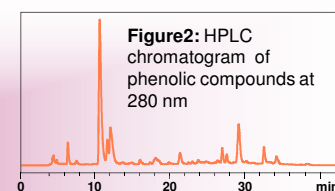


Figure 1: Total phenolics and Monomeric anthocyanin content



## CONCLUSIONS

- Samples analyzed showed a great variability in their polyphenolic and anthocyanin content.
- Total phenolic content ranged from 100 (*S. stenotomum* subsp. *geniocalyx*) to 480 mg of GAE/100g DW (*S. tuberosum* subsp. *andigena*).
- High anthocyanin content was found in selected colored potatoes, of up to 150 mg of cyanidin-3-glucoside/100g DW (*S. stenotomum*).
- Potatoes of select varieties could be significant sources of phytochemicals with potential health promoting properties.
- Selected colored potatoes could be of interest for their use as natural colorants.

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