

Sensory Quality and Mineral and Glycoalkaloid Concentrations in Organically and Conventionally Grown Redskin Potatoes (*Solanum Tuberosum*)

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Organic markets are thriving, as a growing number of consumers worldwide prefer organic products. Growth in the industry is fueled in part by consumers' attitudes toward food production systems and product quality. With respect to product quality, surveys indicate that consumers consider organic foods to be more positive for the environment and human health and more flavorful than their conventionally-grown counterparts.

Pre- and post-harvest management affect plant biochemistry and physiology and, therefore, product quality. These relationships are discussed at length within the scientific literature and many texts and proceedings. Specific soil management is central to organic production, making potato a potentially ideal system for exploring management effects on crop quality. In previous studies with potato, P, Mg, Na, and Mn levels, but not vitamin C content, were influenced by production system (organic, conventional). Also, tuber N content (expressed as crude protein nutritive value) was positively related to the N available to crops, regardless of N form as initially supplied by various fertilizers, including manure. Among ten crop fertility treatments, organic N-treated potatoes contained higher levels of nitrate, although lower nitrate levels in potatoes fertilized with composts versus mineral fertilizers have also been reported.

However, recent reports and reviews concerning management system effects on product quality emphasized the need for additional research using well-controlled, well-defined experimental systems. With this in mind, we employed conventional and certified-organic field plots differing primarily in parameters related to management system (i.e., soil type, variety and other factors were consistent across plots) to assess cumulative system effects on potato quality with few confounding factors, as encouraged by previous works. Our objectives were: 1) to determine if sensory panelists could distinguish (by tasting) cooked wedges of potatoes grown organically, either with (+) or without (-) compost, and conventionally, and 2) to measure the mineral and glycoalkaloid levels in the skin and flesh of tubers taken from the same plots.

Triangle tests were used to determine if panelists could distinguish (by tasting) cooked wedges of potatoes grown organically, either with (+) or without (-) compost, and conventionally. Mineral and glycoalkaloid analyses of tuber skin and flesh were also completed. When the skin remained on the potatoes, panelists detected differences between conventional potatoes and organic potatoes, regardless of soil treatment. However, they did not distinguish between organic treatments (\pm compost) when samples contained skin or between any treatments if wedges were peeled prior to preparation and

presentation. Glycoalkaloid levels tended to be higher in organic potatoes. In tuber skin and flesh, potassium, magnesium, phosphorus, sulfur, and copper concentrations were also significantly higher in the organic treatments, while iron and manganese concentrations were higher in the skin of conventionally grown potatoes.

Publications Resulting From This Work

Ernst, M. The secrets to your tastiest harvest. *Organic Gardening*, April/May 2005, 45-47.

Wszelaki, A.L., J.F. Delwiche, S.D. Walker, R.E. Liggett, J.C. Scheerens and M.D. Kleinhenz. 2005.

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Wszelaki, A.L., J.F. Delwiche, S.D. Walker, R.E. Liggett, J.C. Scheerens and M.D. Kleinhenz. 2005.

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