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The impact of macroelements on the mineral and amino acid content of coloured flesh potato

Bożena Bogucka and Elżbieta Tońska

University of Warmia and Mazury, Poland

Statement of the Problem: One of the primary sources of potassium, phosphorus and magnesium as well as vitamin C and good quality protein in everyday diet is the potato. A rising interest is being observed in the potato cultivars with purple-blue peel and flesh, as these contain high levels of polyphenols. The purpose of this study has been to determine optimal doses of soil fertilisation with macronutrients in the cultivation of the potato cultivar Blue Congo, a variety with purple-blue peel and flesh, which have an effect on the qualitative composition of potato tubers.

Methodology & Theoretical Orientation: In the first part of the experiment (I) nitrogen was applied as urea fertiliser. The doses of nitrogen: 40 kg ha⁻¹ and 80 kg ha⁻¹ were sprayed before potato planting. The dose of 120 kg N ha⁻¹ was split in two: 100 kg N ha⁻¹ was applied before potato planting and then supplemented with 20 kg N ha⁻¹ before the final earthing-up. In the second part of the experiment (II) potassium was applied as potassium sulphate at doses of 120 kg K ha⁻¹, 150 kg K ha⁻¹ and 180 kg K ha⁻¹.

Conclusion & Significance: The study proves that the optimal doses of fertilisers applied to soil under the potato cultivar Blue Congo are: 80 kg N ha⁻¹ and 150 kg K ha⁻¹. Application of the dose of 120 kg N ha⁻¹ caused a decrease in the content of all macro- and micronutrients. The limiting amino acid in the cv. Blue Congo potato tubers was isoleucine, which reached the highest content at the fertilising dose of nitrogen equal 80 kg ha⁻¹. The nutritive value of protein measured by the EAAI was around 47.2% relative to the reference value. The CS calculated for the cv. Blue Congo potato exceeded traditional potato cultivars for such amino acids as methionine+ cystine and phenylalanine-tyrosine.

Recent Publications

1. Brown CR (2005). Antioxidants in Potato. American Journal of Potato Research 82:163-172.
2. Michalska A, Wojdyło A, Bogucka B (2016) The influence of nitrogen and potassium fertilisation on the content of polyphenolic compounds and antioxidant capacity of coloured potato. Journal of Food Composition and Analysis 47:69-75.
3. Lachman J, Hamouz K, Čepel J, Pivec V, Šulc M, Dvořák P (2006) The effect of selected factors on polyphenol content and antioxidant activity in potato tubers. Chemické Listy 100:522-527.
4. Westermann DT (2005) Nutritional requirements of potatoes. American Journal of Potato Research 82:301-307.
5. White PJ, Wheatley RE, Hammond JP, Zhang K (2007) Minerals, soils and roots. In: Vreugdenhil D (ed) Potato biology and biotechnology, advances and perspectives. Elsevier, Amsterdam:739-752.

Biography

Bożena Bogucka, since 2002, she has worked as a doctor of agricultural science at the University of Warmia and Mazury in Olsztyn (Poland, Europe). Her scientific activity has been concentrated on research related to the impact of macro- and microelements on quantitative and qualitative characteristics of potato for the food and processing industry for over 14 years. She has published over 30 works in this field. Her area of interest also includes root food plants storing starch and an additional polysaccharide - inulin.

Research work presented at conference: 4th International Conference and Exhibition on Food Processing and Technology, 2015 London, United Kingdom, "The impact of macroelements and microelements on the size of starch granules in potatoes".

bozena.bogucka@uwm.edu.pl