

Sorting of Potato Tubers Based on A-Solanine Toxicant By Single Layer Perceptron Neural Networks

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Abstract: Potato tubers may contain high levels of α -solanine and α -chaconine, two glycoalkaloids which occur together and are usually discussed under one heading, “solanine”. The admissible concentration of solanine is about 200 mg kg⁻¹ (fresh weight) of potato. The overall objectives of this research are to check the ability of a non-destructive technique such as RGB digital imaging on detection of only α -solanine toxicant in potatoes and sorting of them by single layer perceptron neural networks. **Materials & Methods:** Image preparation of potato tubers cv. ‘Donald’ and ‘Ceasar’ was done in an imaging chamber under LED light. A digital camera equipped with CCD sensor was used for this purpose. Due to quantify α -solanine in potato tubers, high performance liquid chromatography (HPLC) has been used at 2.6 min retention time. Then, Potatoes had been classified in healthy and toxic categories by single layer perceptron (SLP) networks. The features, which had been extracted from the images by MATLAB software, were the percentage of green parts of potato in total parts of potato and mean values of red, green, and blue components of green parts. **Results:** The results of classification showed that ANN has the ability to classify potatoes by using digital images with the accuracies of 98.51% and 96.17% for ‘Ceasar’ and ‘Donald’ potatoes, respectively. **Conclusions:** It can be concluded that RGB digital imaging can detect α -solanine in potato tubers, accurately. So, the development of this technique is needed in agriculture and food industry

Keywords: Potato, α -solanine, digital imaging, artificial neural network, HPLC