

EVALUATION OF THE IMPACT OF WASHING PROCEDURE ON THE THIABENDAZOLE CONCENTRATION IN *SOLANUM TUBEROSUM*

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Abstract. Thiabendazole (2-(1,3-thiazol-4-yl)-1H-benzoimidazole) is a fungicide used to ensure potato stability during storage. That is way it is manly found in stored potatoes. To see the impact of potato washing on Thiabendazole concentration samples from different varieties were extracted using dichlometane and analyzed by HPLC with florescent detection. The samples were analyses before and after the washing operation. The potatoes were washed using the CALIPSO Root Washing Module in which the washing procedure is done in the washing drum and on ramp witch has nozzles for additional washing. The levels of Thiabendazole found in the samples before washing were low. There was a decrease of 42 % of the Thiabendazole concentration in all samples after washing.

Keywords: Thiabendazole, potato, washing, Liquid chromatography, florescent detection

INTRODUCTION

The Inca Indians in Peru were the first to cultivate potatoes around 8,000 BC to 5,000 B.C. The potato, from the perennial *Solanum tuberosum* (potato), is the world's fourth largest food crop, following rice, wheat, and maize [1]. In October 1995, the potato became the first vegetable to be grown in space. NASA and the University of Wisconsin, Madison, created the technology with the goal of feeding astronauts on long space voyages, and eventually, feeding future space colonies [2]. Potatoes are an important source of vitamin B6, of potassium are free of fat sodium and cholesterol [3]. One can find potatoes all year long in any market, vegetable store or super market from Romania but also from different countries like Holland, Poland, Germany. Often the potatoes contain different pesticides, fungicides and insecticides especially on the skin but these often migrate in to the potato pulp. [4]

The purpose of the study is to evaluate the impact of the washing operation of potatoes, on the concentration of Thiabendazole (2-(1,3-thiazol-4-yl)-1H-benzoimidazole), which is a fungicide and parasiticide.

MATERIAL AND METHODS

Samples and samples preparation. 2 samples of potatoes from Roclas and Laura variety were analyses before and after the washing procedure. The potatoes where analyzed as a hole. The laboratory samples were homogenized in a food processor and immediately divided into test portions. 10 g of homogenized sample were extracted using 25 ml of dichlometane for 15 minutes on an ultrasonic bath. The samples were centrifuged for 5 minute at 3200 rpm. The supernatant was evaporated to dryness under a nitrogen stream and, then brought back using 1 ml methanol.

Reagents and standards. Ammonium acetate, Dichlormetane, Methanol HPLC grade (Merk), ultra-pure water (EVOQVA), Thiabendazole, PESTANAL, analytical standard (Sigma Aldrich) were used. Standard solution was prepared in methanol at a concentration of 200 mg/L. A calibration curve was done in 5 point from 0,1 to 30 mg/L. samples where spiked with 10 mg/L for recovery calculation.

Liquid chromatography/fluorescence detection. The method was developed using a Perkin Elmer 200 Series High Performance Liquid Chromatograph (HPLC) with FLD detector. The method was adjusted from Moral & co [5]. System Parameters were: Flow Rate: 1,2 mL/min, Mobile 60:40 (v/v) 0,1 % ammonium acetate /methanol, Column Temp: 25°C, Injection Volume: 50 µL, Column: Synchronis C18 5µm, 4.6×150 mm column from Thermo Scientific, Wavelength: 300/350 nm for the FLD detector.

Experimental conditions. The potatoes were washed using the CALIPSO Root Washing Module, which was develop during the 9BG from 01/10/2016research financing contract. CALIPSO Root Washing Module can be attached to the AWETA Sorting system type G 2/6. The module consists of the following subassemblies: • Feed tray; • Washbasin; • Washing drum; • Feeder; • Drum and conveyor drive mechanism; • Ramp with nozzles for additional washing. 300 kg for each variety was washed.

RESULTS

The results obtained are presented in table 1.

Table 1

Thiabendazole concentration in potato samples

Crt.no.	Variety name	Thiabendazole concentration before washing (mg/kg)	Thiabendazole concentration after washing (mg/kg)
1.	Roclas	0,96	0,55
2.	Laura	0,88	0,52

The recovery was between 86,5 - 92,3 %. (Table 2). There was a decrease in the Thiabendazole concentration in the whole potato by 41 - 43%. A comparison of the results obtained for each variety is presented in figure 1.

Table 2

Thiabendazole recovery and concentration drop

Crt.no.	Variety name	Recovery (%)	Thiabendazole concentration drop after wash (%)
1.	Roclas	86,5	43
2.	Laura	92,3	41

A slightly higher concentration of Thiabendazole was found in Roclas variety, 0,96 mg/kg compared to 0,88 mg/kg found in the Laura variety, the concentration well below the EU set MRL's [6]. There was no significant difference between the percentages of Thiabendazole concentration drop after the washing procedure.



Figure 1 Compression results between the 2 varieties

CONCLUSION

The washing significantly reduced the concentration of Thiabendazole in the potatoes samples. There for it is a recommended operation before commercialization of potatoes to ensure that the consumers buy products with a low concentration of contaminants.

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