Int. Agrophysics, 1994, 8, 537-538

POTATO DAMAGE TEST. COMPARISON OF TWO MEASUREMENT METHODS

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A b s t r a c t. Impact damage to potato tuber on harvest and handling is very important, cause the losses in storage and decrease tuber quality. Result of potato tuber resistance to impact damage depends on test method. Research was done with two pendulum, solid and elastic keeping of potato tuber, with computer record of absorbed energy. Test parameters: impact velocity 2.3 m/s, im pact energy 0.3 J, diameter of impact head 10 mm. Three potato varieties where used two times (December, January) to impact test. A significant correlation was found between absorbed energy and shatter index on pendulum with solid keeping.

K e y w o r d s: potato, damage test, measurement methods

INTRODUCTION

Impact damage to potatoes is major economic problem for producers. Research reports indicate that damage relates to the magnitude of impact energy and to the susceptibility of a particular cultivar. At the last time more popular methods used by researches are dynamic methods [1-6]. Indicate bruise volume to estimate potato tuber resistance to mechanical damage is labour consuming method. The easiest and faster method is indicate absorbed energy by potato tuber. The main problem on this method is similarity between absorbed energy and bruise volume. The value of absorbed energy depends on potato variety and on a few other factors. One of them is clamping method on potato tuber.

METHODS

The comparison of two measurement methods was done using impact pendulum with two different potato tuber keeping devices: 'elastic' clamping with 20 N force and 'solid' with adjusting screw. General specifications for the pendulum are as follows: impact energy - 0.3 J; impact velocity - 2.3 m s^{-1}; impact head diameter - 10 mm.

Impact application was done two months after potato harvest on three potato varieties (Pilica, Irys, Janka). Each sample contained 90 randomly chosen tubers. Characteristics of tuber weight for each sample set is shown in Table 1.

RESULTS

Results of comparative study of two test methods are shown in Table 2. Correlation between shatter index and absorbed energy obtained from 'elastic' pendulum is weak and statistically insignificant. Correlation of results obtained from 'solid' pendulum is significant and values of correlation coefficient are presented in Table 3

Table 1. Characteristics of potato tuber weight

Tuber weight	Potato variety		
	Pilica	Irys	Janka
Minimum (g)	51	35	44
Maximum (g)	182	97	275
Average (g)	96.8	63.9	120.3
SD (g)	29.6	15.0	57.5

Shatter index was estimated by: SI=d*h, where d-diameter of shatter in mm, h-depth of shatter in mm. Absorbed energy was recorded by PC computer.

Table 2. Average value of shatter index and absorbed energy

Parameter	Potato variety		
	Pilica	Irys	Janka
Shatter index			
elastic	34.5	34.3	28.4
solid	29.7	38.8	40.6
Absorbed energy			
elastic	0.286	0.271	0.289
solid	0.254	0.264	0.262

Table 3. Correlation coefficients between shatter index and absorbed energy (solid method)

Variety	Cor. coefficient
Pilica	0.712
Irys	0.926
Janka	0.887

CONCLUSIONS

1. Values of shatter index and absorbed energy obtained from 'elastic' pendulum and from 'solid' pendulum are different.

2. Correlation between the results of shatter index and absorbed energy obtained from 'elastic' pendulum is weak and statistically insignificant.

3. Pendulum with 'solid' keeping devices is better than 'elastic' pendulum for testing potato tuber resistance to mechanical dama ge.

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