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Research on the analysis of the influence of potato variety, *in vitro* plant density and sucrose on the number and weight of micro tubers

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ABSTRACT

The research conducted at NIRDPSB Brașov aimed to evaluate the influence of variety, density of vitroplants and sucrose concentration in the nutrient medium on the potato micro tuberization process, analyzing two elements: the number of micro tubers/plantlet and weight of micro tubers/plantlet. The experiment included four varieties (Azaria, Brașovia, Cosiana and Cezarina – control), two densities of vitroplants (15, as control and 10 plantlets/container,) and two concentrations of sucrose (80, as control and 90 g/l). The analysis of variance revealed that variety had a very statistically significant influence on both number of micro tubers/plantlet and the weight of micro tubers/plantlet. The sucrose concentration significantly influenced the weight of micro tubers, but did not cause significant changes for micro tubers number. The density of the vitroplants did not have a statistically significant influence on the analyzed parameters, although a tendency for micro tubers weight to increase was observed at lower densities. The best results regarding micro tuberization capacity were obtained for Brașovia variety, which recorded the highest number of micro tubers/plantlet and the highest values of micro tubers weight/plantlet were observed for Brașovia and Cosiana varieties, especially at the concentration of 90 g/l sucrose. The results highlight the importance of the genetic factor in the micro tuberization process, as well as the role of sucrose concentration in increasing micro tubers weight.

1. Introduction

In vitro plantlets and micro tubers are used for the rapid multiplication of disease-free material in elite seed potato production (Refaie, 2020). Micro tuberization is the formation of small tubers under controlled, soil-less, and *in vitro* conditions, offering an effective alternative for precise monitoring of tuber development stages. Micro tubers are valuable as disease-free seed propagules and essential for germplasm conservation, supporting the preservation and propagation of genetic resources (Vishal et al., 2025).

The current conventional seed potato production includes the following phases: propagation of pathogen-free plant material (microplants, microtubers) under aseptic conditions *in vitro*, acclimation and cultivation of pathogen-free plant material on a substrate in insect-free greenhouses to produce

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minitubers (pre-basic seed potato), and field planting of the minitubers to increase the volume of seed material (basic seeds and other categories of seeds) (Broćić et al., 2021, quoted by Broćić et al., 2022). Minitubers are usually defined as the progeny tubers produced on *in vitro* derived plantlets or microtubers (Rykaczewska, 2016).

The micro tuber has become an important mode of rapid multiplication for pre-basic stock in seed tuber multiplication as well as germplasm exchange (Zakaria et al., 2008).

2. Literature review

In the study conducted by Melyan et al. (2025) the number of microtubers at 80 g/l sucrose concentration was 1.9 micro tubers/plantlet. Melyan et al. (2025) mention that number of micro tubers per plant increased with sucrose concentration, with the highest number (1.9 micro tubers per plant) observed at 80 g/L. A noticeable decrease in micro tuber number was observed at both lower (20 g/L, 1.03 micro tubers) and higher concentrations (120 g/L, 1.13 micro tubers). This suggested that intermediate sucrose concentrations (around 80 g/L) were most favourable for micro tuber formation, promoting tuber initiation. In contrast, both insufficient (20 g/L) and excessive (120 g/L) sucrose concentrations appeared to inhibit micro tuber formation, indicating the importance of optimal carbohydrate availability for effective tuber development.

In other research made by Sadek Hossain (2017), number of micro tubers/plantlets was between 0,66 and 0,95 for different genotypes. The weight of micro tuber/plantlet (mg) at harvest were between 174.24 and 196.88 mg/plantlet.

Aslam and Javed (2010) specify that the results of micro tuber induction for Diamant and Red Norland cultivars on MS medium supplemented with different concentrations of sucrose (4, 6, 8, 10 and 12%) without any growth regulator showed that the medium containing 8% sucrose proved to be optimal in terms mean number (1.4 & 1.8) and fresh weight (0.04 & 0.10 g) of micro tuber per single and multinode explant.

In vitro tuberization of potato was highly dependent on sucrose and genotype interaction (Fufa and Diro., 2013). Murashige and Skoog (MS) medium supplemented with 60-gram liter-1 exhibited better mean number (2.90 ± 0.031/1.97 ± 0.02) and fresh weight (0.06 ± 0.001/0.08 ± 0.002 gram) of micro tubers for two varieties Hunde and Ararsa.

3. Material and methods

Micro cuttings from virus-free potato vitroplants multiplication were inoculated immediately after micropropagation on Murashige Skoog (1962) nutrient medium. The micro tuberization medium was applied after vitroplants were well developed, respectively 30 days after micro cuttings inoculation. The micro tuberization medium contained a concentration reduced to half the composition of the Murashige Skoog medium, compared to the multiplication medium, and coumarin and kinetin were used as growth regulators. After the application of the micro tuberization medium, the culture containers with the biological material were kept for 3 months in the dark, after which the formed micro tubers were harvested. A multifactorial experiment was conducted, with 3 repetitions, in which the factors analysed were:

- factor a: variety with 4 graduations: Azaria, Brașovia, Cosiana and Cezarină (control);
- factor b: density of vitroplants/culture vessel, with 2 graduations: 15 (control) and 10 vitroplants;
- factor c was constituted by sucrose concentration with 2 graduations: 80 (control) and 90 g/l.

The experiment was carried out in Research Laboratory of Vegetal Tissue Culture of National Institute of Research and Development for Potato and Sugar Beet (NIRDPSB), Braşov. Statistical analysis was performed using the ANOVA program.

4. Results and discussion

The analysis of variance shows that variety has a very significant influence on micro tubers number formed per plantlets. The calculated F value (32.032) far exceeds the critical values (4.76; 9.78), which indicates significant statistical differences between the analyzed varieties. For the element number of micro tubers/plantlet, the determining factor is the variety, while plantlet density, sucrose concentration and interactions between factors did not produce significant differences. For the second element analyzed, weight of micro tubers/plant, variety had a very statistically significant influence, the calculated F value (21.479) being much higher than the critical values (4.76; 9.78). This indicates important differences between varieties in for micro tubers weight. Sucrose concentration (factor c) had a statistically significant effect on micro tuber weight, this result indicating that the sucrose level in the culture medium significantly influences micro tuber weight (Table 1).

Table 1. Analysis of variance on the number of harvested micro tubers/plantlet and their weight (g) (NIRDPSB Braşov, 2026)

Cause of variability	Sum of squares	DF	Square average	F sample
For micro tubers number/plantlet				
Variety (a)	2.08871	3	0.69624	32.032 ** (4.76; 9.78)
Plantlets density/container (b)	0.0285	1	0.00285	0.070 (5.32; 11.26)
a*b	0.11046	3	0.03682	0.906 (4.07;7.59)
Sucrose concentration (c)	0.04877	1	0.04877	1.523 (4.49 ;8.53)
a*c	0.08277	3	0.02759	0.862 (4.49 ;8.53)
b*c	0.01802	1	0.01802	0.563 (4.49; 8.53)
a*b*c	0.06186	3	0.02062	0.644 (3.24; 5.29)
For micro tuber weight/plant				
Variety (a)	0.60002	3	0.20001	21.479 ** (4.76; 9.78)
Plantlets density/container (b)	0.05333	1	0.05333	1.801 (5.32; 11.26)
a*b	0.05675	3	0.01892	0.639 (4.07;7.59)
Sucrose concentration (c)	0.10453	1	0.10453	10.887** (4.49 ;8.53)
a*c	0.06778	3	0.02259	2.353 (4.49 ;8.53)
b*c	0.04563	1	0.04563	4.752 *(4.49; 8.53)
a*b*c	0.09502	3	0.03167	3.298 * (3.24; 5.29)

df, degrees of freedom; * Significant at the 0.05 probability level ** Significant at the 0.01 probability level.
Source: elaborated by A. Tican, using ANOVA

The analysis of results highlights the existence of significant statistical differences between the analyzed varieties in terms of both micro tubers number/plantlets and their weight (Table 2). The highest number of micro tubers was recorded for Brașovia variety (1.44 micro tubers/plantlet), which achieved a positive difference of 0.30, distinctly statistically significant ($p \leq 0.01$) compared to the control. The highest weight value was recorded for the Brașovia variety (0.45 g/plantlet), the difference from the control being 0.27 g, very statistically significant ($p \leq 0.001$). Similar results were also obtained for the Cosiana variety (0.43 g/ plantlet), with a difference of 0.25 g, also very statistically significant. Regarding the micro tubers weight, the literature indicates variable values, generally between 0.05 and 0.40 g/micro tuber under normal culture conditions, but which can increase significantly depending on nutrient medium composition and culture duration (Seabrook, 2005; Ranalli, 2007). Some research has highlighted the fact that high levels of sucrose in culture medium favor the accumulation of reserve substances and lead to the formation of micro tubers with a higher weight (Wang and Hu, 1982). The results obtained in the present study, where weight of micro tubers/plant varied between approximately 0.29 and 0.45 g (for the Azaria and Brașovia varieties), are comparable to those reported in the literature, the highest values being recorded for the Brașovia and Cosiana varieties, especially at a sucrose concentration of 90 g/l. The results obtained in the experiment confirm the data reported in the literature regarding potato micro tuberization under *in vitro* conditions. Numerous authors have highlighted that micro tubers number/plantlets depend mainly on genotype and the conditions of the culture medium (Hussey and Stacey, 1981; Wang and Hu, 1982). Studies show that the micro tubers number varies between 1 and 3 micro tubers/plantlet under standard *in vitro* culture conditions (Ranalli, 2007; Seabrook, 2005). In the experiment conducted, the values obtained for this parameter ranged between approximately 0.94 and 1.44 micro tubers/plantlet (table 2), which falls within the ranges reported by other authors. Also, the superior micro tuberization capacity observed in some varieties, such as Brașovia, confirms the major influence of the genetic factor on this character (Ranalli, 2007). The analysis of results highlights the existence of significant statistical differences between the analysed varieties in terms of both micro tubers number/plantlets and their weight. The highest number of micro tubers was recorded for Brașovia variety (1.44 micro tubers/plantlet), which achieved a positive difference of 0.30, distinctly statistically significant ($p \leq 0.01$) compared to the control.

Table 2. Influence of variety on micro tubers/number plantlet and their weight (NIRDPSB Brașov, 2026)

Variety (a)	Micro tubers number/plantlet	Diff./Sign.	Weight of micro tubers/pl. (g)	Diff. (g) /Sign.
Azaria (a_1)	0.94 C	-0.20 o	0.29 B	0.11 *
Brașovia (a_2)	1.44 A	0.30 **	0.45 A	0.27 ***
Cosiana (a_3)	0.93 C	-0.21 o	0.43 A	0.25 ***
Cezarina (a_4) (Ct)	1.14 B	-	0.18 C	-
	LSD (p 5%) = 0.15; LSD (p 1%) = 0.22; LSD (p 0.1%) = 0.36.		LSD (p 5%) = 0.10; LSD (p 1%) = 0.15; LSD (p 0.1%) = 0.23.	

Means found in the same columns, followed by the same letters, are not significant, according to Duncan's test ($p \leq 0.05$).

Source: elaborated by A. Tican, using ANOVA

The results show that reducing the density of vitro plants from 15 to 10 plantlet/container does not cause statistically significant changes in number or weight of micro tubers/plantlet. However, a trend towards an increase in micro tuber weight is observed at lower densities, which can be explained by the reduction of competition for nutrients and space in the culture vessel (Table 3).

Table 3. Influence of vitroplants density/culture vessel on micro tubers number/plantlet and on their weight (NIRDPSB Brașov, 2026)

In vitro plant density/culture vessel (b)	Micro tubers number/plantlet	Diff./Sign.	Weight of micro tubers/pl. (g)	Diff. (g) /Sign.
15 (b_1) (Ct)	1.11 A	-	0.30 A	-
10 (b_2)	1.12 A	0.02 ns	0.37 A	0.07 ns
	LSD (p 5%) = 0.13; LSD (p 1%) = 0.20; LSD (p 0.1%) = 0.29.		LSD (p 5%) = 0.11; LSD (p 1%) = 0.17; LSD (p 0.1%) = 0.25.	

Means found in the same columns, followed by the same letters, are not significant, according to Duncan's test (p≤0.05).

Source: elaborated by A. Tican, using ANOVA

Values obtained for micro tubers number/plantlet were relatively close for the two sucrose concentrations tested (Table 4). For the control variant (80 g/l sucrose) an average number of 1.08 micro tubers/plantlet was recorded and at 90 g/l sucrose concentration the value was 1.14 micro tubers/plantlet, the positive difference of 0.06 micro tubers/plantlet being statistically insignificant. The increase in sucrose concentration contributed to the formation of micro tubers with a higher weight and a distinctly significant positive difference (0.09 g/plantlet).

Table 4. Influence of sucrose concentration in nutrient medium on micro tubers number/plantlet and their weight (NIRDPSB Brasov, 2026)

Sucrose concentration (g/l)	Micro tubers number/plantlet	Diff./Sign.	Weight of micro tubers/pl. (g)	Diff. (g) /Sign.
80 (c_1) (Ct)	1.08 A	-	0.29 B	-
90 (c_2)	1.14 A	0.06 ns	0.38 A	0.09 **
	LSD (p 5%) = 0.11; LSD (p 1%) = 0.15; LSD (p 0.1%) = 0.21.		LSD (p 5%) = 0.06; LSD (p 1%) = 0.08; LSD (p 0.1%) = 0.11.	

Means found in the same columns, followed by the same letters, are not significant, according to Duncan's test (p≤0.05).

Source: elaborated by A. Tican, using ANOVA

The results from table 5 highlight that variety has a higher influence than the density of vitroplants on the number of micro tubers/plantlets. Among the varieties analyzed, Brașovia stood out for the highest micro tuberization capacity at both planting densities, recording statistically significant differences compared to the control (0.28 and 0.32 micro tubers/pl for 15 pl/recipient and 10 pl/recipient, respectively). There are no statistically significant differences in the number of micro tubers/plantlets between the 2 planting densities, regardless of the variety cultivated.

Table 5. Combined influence of variety and *in vitro* plant density on micro tubers number/plant (NIRDPSB Brașov, 2026)

Variety (a)/ Density (b)	15 pl./recipient (Mt) (b_1)		10 pl./recipient (b_2)		b_2-b_1/ Sign.
	Micro tubers number/plantlet	Diff./ Sign.	Micro tubers number/plantlet	Diff./ Sign.	
Azaria (a_1)	0.90	-0.22 ns	0.98	-0.18 ns	0.08 ns
Brașovia (a_2)	1.40	0.28 *	1.48	0.32 *	0.08 ns
Cosiana (a_3)	1.00	-0.12 ns	0.85	-0.32 ns	-0.15 ns
Cezarina (a_4) (Ct)	1.12	-	1.17	-	0.04 ns
LSD (p 5%) = 0.24; (p 1%) = 0.35; (p 0.1%) = 0.55.			LSD (5%) = 0.27; (p 1%) = 0.39; (p 0.1%) = 0.59.		

Source: elaborated by A. Tican, using ANOVA

As with the number of micro tubers/plantlets, the weight of micro tubers/plantlets is mainly influenced by variety, while the density of vitroplants in the culture vessel does not determine statistically significant differences between the analyzed variants. For the variant with 15 plantlet/container, the highest value was recorded for Cosiana variety (0.42 g/plantlet), the difference from the control being 0.24 g, statistically significant at the 5% threshold; close results were obtained for the Brașovia variety (0.37 g/plantlet), with a positive difference of 0.19 g, also statistically significant. For the second density (10 plantlets/container), the highest value was recorded for the Brașovia variety (0.53 g/plantlet), the difference from the control being 0.35 g, distinctly statistically significant positive ($p \leq 0.01$). Also, Cosiana variety recorded a weight of 0.43 g/plantlet, with a difference of 0.26 g, positive, statistically significant ($p \leq 0.05$). Comparing the two densities (10 and 15 plantlets/container) shows that the differences between them are statistically insignificant for all analyzed varieties. (Table 6)

Table 6. Combined influence of variety and *in vitro* plant density on micro tubers weight of micro tubers/pl. (g) (INCDCSZ Brașov, 2026)

Variety (a)/ Density (b)	15 pl./recipient (Mt) (b_1)		10 pl./recipient (b_2)		b_2-b_1 (g)/ Sign.
	Weight of micro tubers/pl. (g)	Diff. (g) /Sign.	Weight of micro tubers/pl. (g)	Diff. (g) /Sign.	
Azaria (a_1)	0.23	0.05 ns	0.34	0.16 ns	0.11 ns
Brașovia (a_2)	0.37	0.19 *	0.53	0.35 **	0.16 ns
Cosiana (a_3)	0.42	0.24 *	0.43	0.26 *	0.01 ns
Cezarina (a_4) (Mt)	0.18	-	0.18	-	0.00 ns
LSD (p 5%) = 0.18 (p 1%) = 0.28; (p 0.1%) = 0.42.			LSD (5%) = 0.23; (p 1%) = 0.33; (p 0.1%) = 0.50.		

Source: elaborated by A. Tican, using ANOVA

The results highlight that the number of micro tubers/plantlets is mainly influenced by the variety, while increasing the sucrose concentration from 80 to 90 g/l does not cause statistically significant changes in this character. The Brașovia variety stands out for its highest micro tuberization capacity at both sucrose concentrations, recording positive, statistically significant differences compared to the control variety (Table 7).

Table 7. The combined influence of variety and sucrose concentration in the nutrient medium on the number of microtubers/plant (NIRDPSB Brașov, 2026)

Variety (a)/ Sucrose concentration (g/l) (c)	80 (Ct) (c_1)		90 (c_2)		c_2-c_1/ Sign.
	Micro tubers number/plantlet	Diff./ Sign.	Micro tubers number/plantlet	Diff./ Sign.	
Azaria (a_1)	0.88	-0.27 o	1.01	-0.13 ns	0.13 ns
Brașovia (a_2)	1.46	0.31 *	1.43	0.29 *	-0.03 ns
Cosiana (a_3)	0.84	-0.31 oo	1.01	-0.13 ns	0.16 ns
Cezarina (a_4) (Ct)	1.15	-	1.14	-	-0.01
LSD (p 5%) = 0.21; (p 1%) = 0.31; (p 0.1%) = 0.45.			LSD (5%) = 0.22; (p 1%) = 0.30; (p 0.1%) = 0.42.		

Source: elaborated by A. Tican, using ANOVA

At concentration of 80 g/l sucrose, varieties Brașovia (0.41 g/pl.) and Cosiana (0.34 g/pl.) significantly exceeded the control variety Cezarina (0.19 g/pl.), the differences being distinctly positive significant (0.22) and positive significant (0.15). The variety significantly influences the weight of micro tubers, and the response to the concentration of sucrose differs between genotypes. At the concentration of 90 g/l sucrose, the highest values were obtained, especially for Cosiana variety (0.52 g/pl.) and Brașovia (0.49 g/pl.), which presented very significant differences compared to the control Cezarina. The comparison of the two sucrose concentrations indicates a significant increase in micro tuber weight for the Azaria variety (0.14 g/pl.) and a distinctly significant positive increase for the Cosiana variety (0.18 g/pl.), while for the Brașovia and Cezarina varieties the differences were insignificant (Table 8).

Table 8. Combined influence of variety and *in vitro* plant density on micro tuber weight (g)/pl. (NIRDPSB Brașov, 2026)

Variety (a)/Sucrose concentration (g/l) (c)	80 (Ct) (c_1)		90 (c_2)		c_2-c_1 (g)/ Sign.
	Weight of micro tubers/pl. (g)	Diff. (g) /Sign.	Weight of micro tubers/pl. (g)	Diff. (g) /Sign.	
Azaria (a_1)	0.22	0.02 ns	0.35	0.19 **	0.14 *
Brașovia (a_2)	0.41	0.22 **	0.49	0.33 ***	0.09 ns
Cosiana (a_3)	0.34	0.15 *	0.52	0.35 ***	0.18 **
Cezarina (a_4) (Ct)	0.19	-	0.16	-	-0.03 ns
LSD (p 5%) = 0.13 (p 1%) = 0.19; (p 0.1%) = 0.28.			LSD (5%) = 0.12; (p 1%) = 0.17; (p 0.1%) = 0.23.		

Source: elaborated by A. Tican, using ANOVA

The analysis of influence of vitroplants density and sucrose concentration on the number of micro tubers/pl. indicates small differences between the studied variants. At the concentration of 80 g/l sucrose, the density of 10 plants/container recorded a slightly higher value (1.11 micro tubers/pl.) compared to the density of 15 plants/container (1.06 micro tubers/pl.), but the difference of 0.05 micro tubers/pl. was statistically insignificant (under LSD 5% = 0.17). At the concentration of 90 g/l sucrose, the values obtained were close, respectively 1.16 micro tubers/pl. at the density of 15 plants and 1.13 micro tubers/pl. at the density of 10 plants, the difference of –0.02 micro tubers/pl. being also

statistically insignificant. Comparing the effect of increasing the sucrose concentration from 80 to 90 g/l shows a slight increase in the number of micro tubers at a density of 15 plantlets (+0.10 micro tubers/pl.), respectively a very small variation at a density of 10 plantlets (+0.02 micro tubers/pl.), but these differences are statistically insignificant (Table 9).

Table 9. The combined influence of *in vitro* plant density and sucrose concentration in the nutrient medium on the number of micro tubers/plant (NIRDPSB Brașov, 2026)

Plantlet density (b)/Sucrose concentration (g/l) (c)	80 (Mt) (c_1)		90 (c_2)		c_2-c_1/ Sign.
	Micro tubers number/plantlet	Diff./ Sign.	Micro tubers number/plantlet	Diff./ Sign.	
15 pl (b_1)	1.06	-	1.16	-	0.10 ns
10 pl (b_2)	1.11	0.05 ns	1.13	-0.02 ns	0.02 ns

LSD (p 5%) = 0.17; (p 1%) = 0.25; (p 0.1%) = 0.36.

LSD (5%) = 0.15; (p 1%) = 0.21; (p 0.1%) = 0.29.

Source: elaborated by A. Tican, using ANOVA

The effect of increasing sucrose concentration on micro tuber weight is more evident at lower *in vitro* plant density (10 plantlets/container). Comparing the effect of increasing sucrose concentration from 80 to 90 g/l indicates a reduced increase in micro tuber weight at a density of 15 plants (+0.03 g/pl.), a statistically insignificant difference, while at a density of 10 plants a more pronounced increase was recorded (+0.16 g/pl.), this being distinctly significant (0.16 g/pl) compared to the variant with 80 g/l sucrose. The results obtained confirm the observations of other authors, according to which genotype is the main factor determining the micro tuberization capacity, influencing both the number and size of micro tubers. Sucrose concentration plays an important role in the accumulation of reserve substances and in increasing the weight of micro tubers, while seedling density usually has a lesser influence on these characters (Table 10).

Table 10. The combined influence of *in vitro* plant density and sucrose concentration in the nutrient medium on micro tuber weight (g)/pl. (NIRDPSB Brașov, 2026)

Plantlet density (b)/Sucrose concentration (g/l) (c)	80 (Mt) (c_1)		90 (c_2)		c_2-c_1 (g)/ Sign.
	Weight of micro tubers/pl. (g)	Diff. (g) /Sign.	Weight of micro tubers/pl. (g)	Diff. (g) /Sign.	
15 pl (b_1)	0.29	-	0.32	-	0.03 ns
10 pl (b_2)	0.29	0.00 ns	0.45	0.13 ns	0.16 **

LSD (p 5%) = 0.13; (p 1%) = 0.19; (p 0.1%) = 0.27.

LSD (5%) = 0.08; (p 1%) = 0.12; (p 0.1%) = 0.16.

Source: elaborated by A. Tican

The correlation coefficient between weight of microtubers and their number is significantly positive (r = 0.3369*) for the 5% significance level, being represented by an ascending regression line (Figure 1).

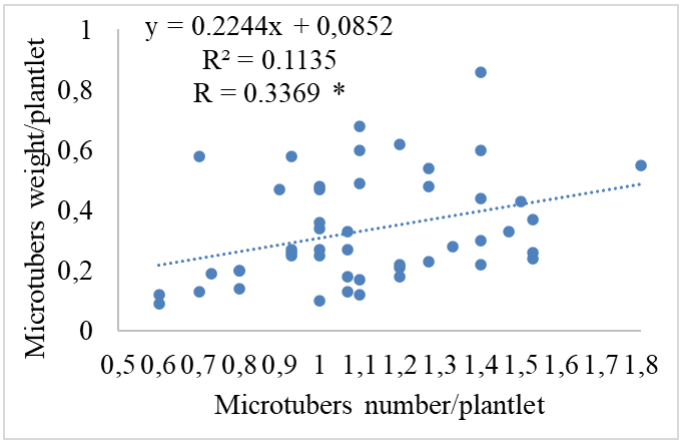

Figure 1. Regression line for the correlation between the number of minitubers and their weight (g)

Source: elaborated by A. Tican

5. Conclusions

Variety is the main factor influencing the micro tuberization process, determining statistically significant differences in both the number of micro tubers/plantlet and their weight. Brașovia variety stood out for its highest micro tuberization capacity, achieving the highest number of micro tubers/plantlet and high values of micro tuber weight. Cosiana variety recorded high values of micro tuber weight, comparable to those obtained with the Brașovia variety, especially at the concentration of 90 g/l sucrose. Increasing the sucrose concentration from 80 to 90 g/l did not significantly influence the number of micro tubers/plantlet but determined a significant increase in micro tuber weight. The density of vitroplants (10 or 15 plantlet/container) did not determine statistically significant differences in terms of the number or weight of micro tubers/plantlet. Reducing the density of vitroplants to 10 plantlet/container favoured a tendency to increase the weight of micro tubers, probably due to reduction of competition for nutrients and space in the culture vessel. The interactions between the experimental factors did not determine statistically significant differences for the number of microtubes/plantlet. The highest values of micro tuber weight were obtained at the concentration of 90 g/l sucrose, especially in the varieties Brașovia and Cosiana.

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