

Short communication

RADIO STIMULATION OF GERMINATION IN *Stevia rebaudiana* IAN VC-142 (EIRETÉ) VARIETY USING ^{60}Co GAMMA RAYS

Comunicación corta

Radioestimulación de la germinación en *Stevia rebaudiana* cultivar KH-IAN VC-142 (Eireté), mediante el empleo de rayos gamma ^{60}Co

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ABSTRACT. This study aimed to evaluate the effect of low doses ^{60}Co gamma rays on the seeds germination *Stevia rebaudiana*. For this purpose seed of VC-KH-142 IAN (Eireté) were irradiated with doses of 10 to 90 Gray (Gy). It was determined that all doses used increased the number of germinate seeds, but the dose of 10 Gy was the one that caused the greatest stimulation of seeds germination.

Key words: species, ionizing radiation, magnetic field, laser, radiosensitivity

RESUMEN. El presente trabajo tuvo como objetivo evaluar el efecto de bajas dosis de rayos gamma ^{60}Co en la germinación de las semillas de *Stevia rebaudiana*. Para ello se irradiaron semillas del cultivar KH-IAN VC-142 (Eireté), con dosis de 10 a 90 Gray (Gy). Se determinó que todas las dosis empleadas incrementaron el número de semillas germinadas pero la dosis de 10 Gy fue la que provocó la mayor estimulación en la germinación de las semillas.

Palabras clave: especies, radiación ionizante, campo magnético, laser, radiosensibilidad

INTRODUCTION

Stevia rebaudiana, commonly known as sweet leaf, it is natural sweetener considered sweeter than sucrose and lacking in calories (1), but presents difficulties for reproduction by seeds by low multiplication rate thereof (2).

In the past decade they have intensified research in the field of science related to the application of physical methods to stimulate certain physiological processes in several species. These methods include ionizing radiation, magnetic fields, low-power laser, microwave and other (3, 4, 5, 6).

Ionizing radiations have been widely used to increase the genetic variability (7, 8); however, low doses have shown stimulatory effects in several species without causing genetic variations (9).

Radiosensitivity is an intrinsic property of living beings varies widely among organisms, species and genotypes (10) and in no case doses obtained can be extrapolated in other studies for other crops and varieties (11), so this work has as objective to assess the effect of low doses of ^{60}Co gamma rays on the germination of seeds of *Stevia rebaudiana* cultivar KH-IAN VC-142 (Eireté).

MATERIALS AND METHODS

Seeds of *Stevia rebaudiana*, cultivar KH-IAN VC-142 (Eireté) were irradiated at the Center for Technological Applications and Nuclear Development (CEADEN), with gamma rays ^{60}Co in a MPX25 irradiator, with a dose rate of 0,517 kGy/h. Doses were used between 10 and 90 Gy with intervals of 10 Gy. Seeds irradiated and unirradiated control, were placed in petri plates with paper filter moistened with distilled water and after 15 days, the number of germinated seeds was evaluated. 100 seeds per treatment were used. To determine differences between treatments the method of comparison of proportions by independent samples was used.

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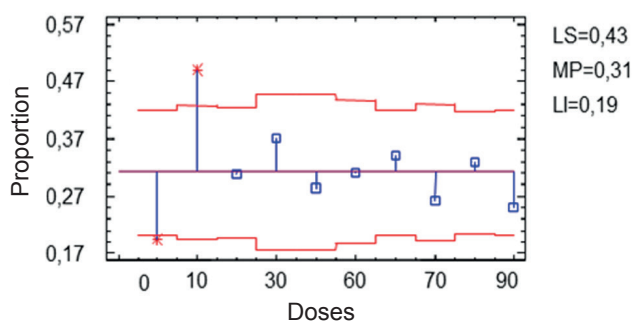
RESULTS AND DISCUSSION

It was found that there was an increase in the number of germinated seeds in all irradiation doses used; however, only in the dose of 10 Gy and control, there were significant differences in relation to the average since the seeds irradiated with 10 Gy, which was the lowest dose, the germination was significantly stimulated with 52 % germinated seeds while control unirradiated germinated only 19 % of the seeds as shown in figure.

It is proposed that stimulation of seed germination is usually achieved when the same ones have low germination due to dormancy, or be subjected to stressful conditions which delay or inhibit the same (12).

With the use of radiation low doses, metabolic processes may have stimulated that favored the germination of seeds. It notes that ionizing radiation can increase the metabolic activity of cells, to increase cell division, induce dedifferentiation of cells, affect protein synthesis, hormonal balance, gas exchange and enzyme activity (13).

Some authors relate the stimulating effect of radiation low doses with the activation of several enzymes such as polyphenol oxidase, catalase, peroxidases and esterases, which lead to the formation of physiologically active substances at low concentrations accelerate cell division, together with morphogenesis in cells important organelles such as mitochondria and chloroplasts (14, 15); however, the biological effect of ionizing radiation varies depending on the type of radiation, the absorbed dose and genotype (16).



LS: upper limit of confidence interval M: Average proportion LI: lower limit of the confidence interval
* Significant differences 95% of confidence

The radiation effect results with low doses of gamma rays ^{60}Co , (10, 20, 30, 40, 50, 60, 70, 80, 90 Gy) in seed germination, by comparing of proportions.

CONCLUSION

From the results, it was found the stimulatory effect of low doses of ^{60}Co gamma rays in germinating seed of *Stevia rebaudiana*, cultivar KH-IAN VC-142, resulting in the dose of 10 Gy which caused greater stimulation.

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