



## EVALUATION OF MUTAGENESIS AT DL<sub>50</sub> TO GET RESISTANCE TO *Cercospora agavicola* IN AGAVE TEQUILERO (*Agave tequilana* var. azul)

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**Introduction.** The agave crop and tequila industry have cultural, economic and social impact since the employment offered under the Agro and industrial fields. Besides, the currencies obtained by exportation (González, 2007). The fungal agave disease by *C. agavicola* represents high risk at the Altos zone in Jalisco, since the environment allows spores germination. In fact the research focuses in chemical approaches; however there isn't a project to induce genetic resistance (CRT, 2005). Under this sight, a genetic breeding strategy must be applied to plants that have asexual reproduction, where an option is to generate mutants by radiation in order to achieve desirable genetic variation (Robles, 1986). The aim of this research was to determine the DL<sub>50</sub> in vitro-plants of agave tequilero in order to generate resistance to *C. agavicola*.

**Methods.** The explants were axillary buds from *in vitro* cultures; the medium was MS supplemented with 24.6 µM AIB and 46.46 µM KIN. The shoot were multiplied on MS medium supplemented with 0.5 µM AIB and 44.46 µM KIN. The radiation dosage treatments were by gamma rays Co<sup>60</sup>: 0, 10, 20, 30, 40 and 50 Gy, and 5 replicates each. The evaluation was the number of shoots and their length; the DL<sub>50</sub> was determined by lineal regression. The fungal material was collected from infected Agave plants, which was proliferated and purified onto PDA (reference) medium at 25°C. The fungus was inoculated directly into Agave leaves in a solution (20 000 spores/ml); all material was transferred onto sterile Petri dishes. The evaluation was done taking data of the percentage of infected leaf per treatment.

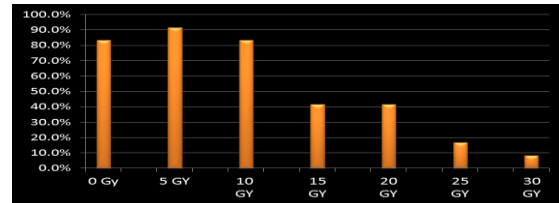
**Results.** The tissue show significant differences (p<1%) among radiation dosage treatment, it was observed the reduction of number of shoots and size of 60% of plants,

which was found in equal or more than 30 Gy (table 1). The DL<sub>50</sub> was established in 25 Gy for shoot development ( $y = -0.072x + 4.8$ ) as well as for size of plantlets ( $y = -0.0874x + 5.741$ ).

**Table 1. Effect of radiation dosage in shoot development and the size of Agave plantlets.**

Grays	Brotos/plántula			Tamaño de plántula		
	Promedio	Tukey	Depresión	Promedio	Tukey	Depresión
0	5.20	a	0.00%	5.82	a	0.00%
10	4.20	ab	19.23%	5.52	a	5.15%
20	2.60	bc	42.31%	3.3	b	43.30%
30	1.80	cd	65.38%	2.54	cd	56.36%
40	1.80	cd	65.38%	2.48	de	57.39%
50	1.60	cd	69.23%	1.68	e	71.13%
<b>Promedio</b>	<b>2.93</b>			<b>3.56</b>		
<b>Valor (W)</b>	<b>1.81</b>			<b>0.42</b>		

At dosage of 0, 5 and 10 Gy the infected leaves was more than 80%, in 15 and 20 Gy the infected leaves was 40%, diminishing at 25 and 30 Gy where was 20% and 10%, with a tendency (Gossal *et al.*1998) Fig. 1.



**Fig.1 Infection percentage in leaves of Agave tequilana by *C. agavicola***

**Conclusion.** The mutagenesis by radiation is an alternative to generate resistant genotypes to *C. agavicola*.

### References.

- Consejo Regulador del Tequila (CRT). 2005. Plagas y Enfermedades del *Agave tequilana* Weber var. Azul. Reporte del Comité Técnico Agronómico. Guadalajara, Jalisco. México.
- González, H., Del Real, J. y Solís, J. 2007. Manejo de plagas del Agave Tequilero. Colegio de Postgraduados-Tequila Sauza, S.A. de C.V. México. pp. 2-23.
- Gosal, S.S. *et al.* 1998. Induction of variability through radiations for late blight resistance and heat tolerance in potato. Proceedings of a final research Co-ordination Meeting. Shanghai, China. FAO/OIEA
- Robles S R (1986) Genética Elemental y Fitomejoramiento Práctico. Primera edición. Editorial Limusa Wiley. 475 p.