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Agave salmiana and *Chinicuil*: A Relationship that Promotes the Production of Bioactive Compounds

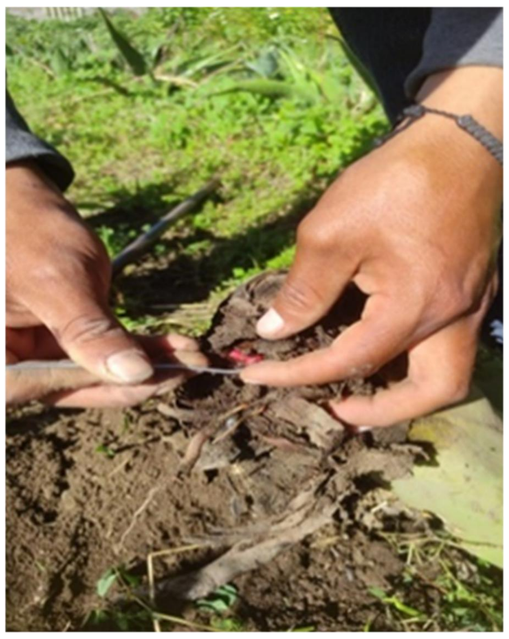
Zamora-Ortega N.,[1], Ramos-de León[1] A., Bernardino-Nicanor A.,[1*]González-Cruz L[1]., Juárez-Goiz J[1].

•Department of Biochemical Engineering, National Technological Institute of Mexico – Celaya Institute of Technology, Antonio García Cubas Pte. 600, Celaya, Gto. 38010, Mexico

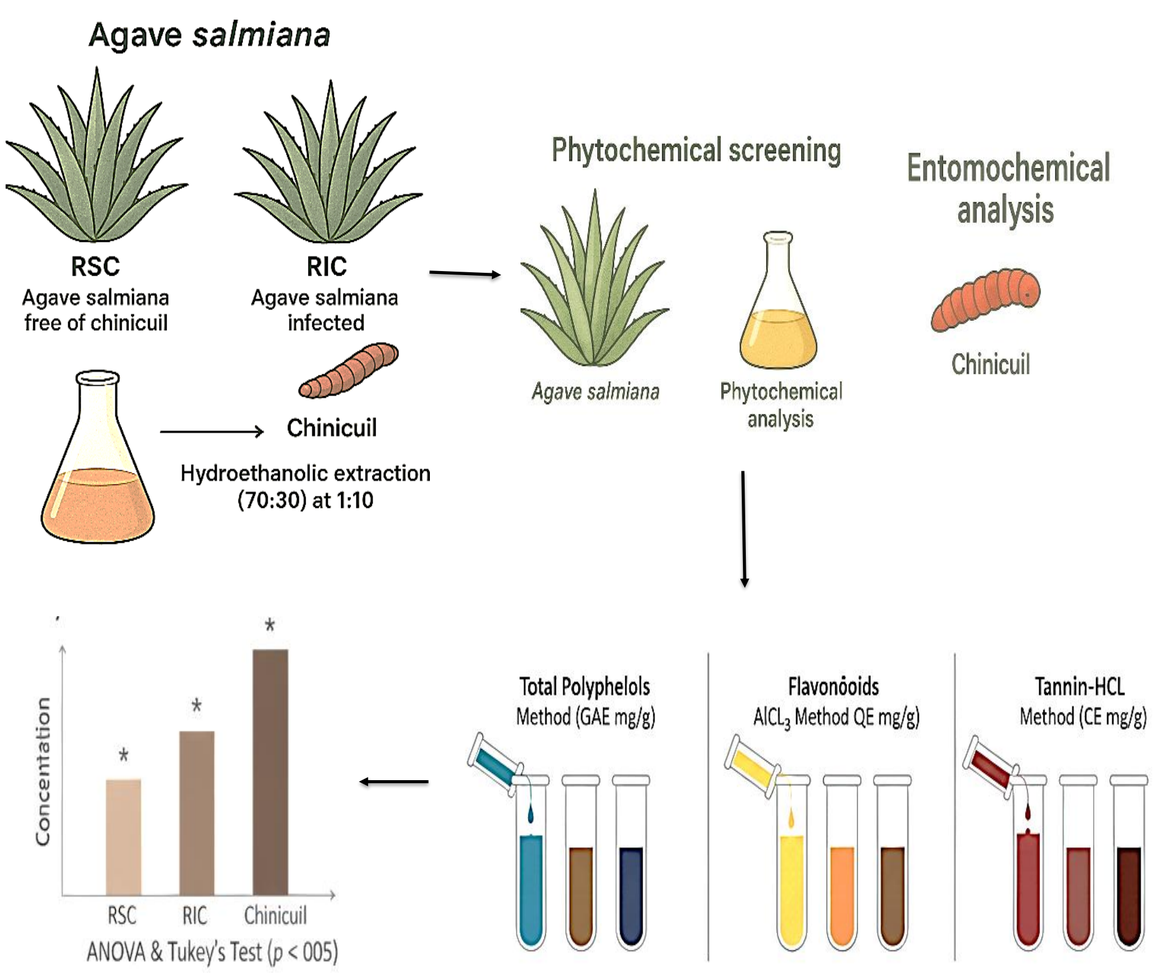
Phone: +52 (461) **662-5141** ***aurea.bernardino@itcelaya.edu.mx***

INTRODUCTION & AIM

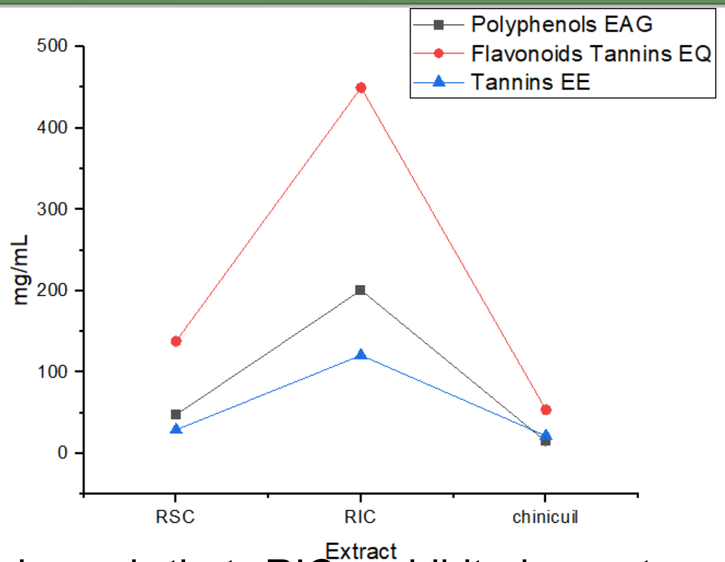
Agave salmiana is a plant of significant economic and cultural value in Mexico. Its interaction with the **chinicuil** (***Comadia redtenbacheri***), an insect traditionally consumed in regional gastronomy, and which feeds on and develops within the plant's root system, represents a relevant example of a plant–insect relationship. This study aimed to identify and correlate the bioactive compounds present in both *A. salmiana* and the chinicuil, to gain a deeper understanding of this interaction.



METHOD



RESULTS & DISCUSSION



The results showed that RIC exhibited greater diversity and concentration of compounds than RSC, including flavonoids, tannins, terpenes, glycosides, quinones, and coumarins, with up to a fourfold increase in polyphenol, flavonoid, and tannin content. These behaviours could be attributed to the plant's activation of metabolite production as an induced defence response to the biotic stress caused by the chinicuil. In contrast, the chinicuil extract showed significant concentrations of polyphenols (14.801 ± 0.310 mg/g), tannins (53.574 ± 0.131 mg/g), and flavonoids (21.600 ± 0.086 mg/g), though lower than in RIC. .

CONCLUSION

Infestation by *chinicuil* triggers a marked defensive response in *Agave salmiana*, characterised by increased diversity and accumulation of secondary metabolites in the roots. Concurrently, the insect exhibits selective bioaccumulation of these compounds mediated by an intestinal transporter, indicating a specialised metabolic adaptation. These findings highlight a highly specific plant–insect interaction and provide a scientific basis for its sustainable agri-food utilisation, as well as for the biotechnological valorisation of the identified bioactive metabolites.

FUTURE WORK / REFERENCES

Heckel, D. G. (2014). Insect Detoxification and Sequestration Strategies. In *Annual Plant Reviews: Insect-Plant Interactions* (Vol. 47). https://doi.org/10.1002/9781118829783.ch3

Singh, S., Kaur, I., & Kariyat, R. (2021). El papel multifuncional de los polifenoles en las interacciones planta-herbívoro. *Revista Internacional de Ciencias Moleculares* , 22(3), 1442. https://doi.org/10.3390/ijms22031442

Mostafa, S., Wang, Y., Zeng, W. y Jin, B. (2022). Respuestas de las plantas a la herbivoría, las heridas y las infecciones. *Revista Internacional de Ciencias Moleculares* , 23. https://doi.org/10.3390/ijms23137031

Soltani, A., Zouali, Y., Haoual-Hamdi, S., Saadouni, D., Amri, M., Carapelli, A., & Jemâa, J. M. Ben. (2021). Relationship between secondary metabolites and infestations caused by chickpea leafminer Liriomyza cicerina (Diptera: Agromyzidae). International Journal of Tropical Insect Science, 41(1). https://doi.org/10.1007/s42690-020-00200-0