

1 INTRODUCTION

Fruit flies, specifically *A. obliqua*, represent a major constraint on mango production within Colombia (1). Finding sustainable and effective methods for pest management is crucial for the agricultural sector. To address this challenge, the entomopathogenic fungus *M. robertsii* Mt008 was selected for biocontrol development, as it has been shown to be effective against *A. obliqua* (2). Entomopathogenic fungi and their secondary metabolites, like destruxins, are key agents in biological control strategies.

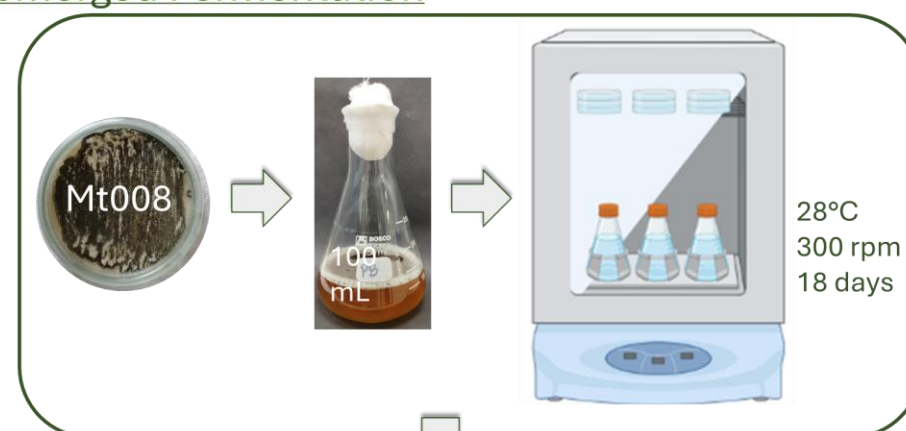


2 OBJECTIVES

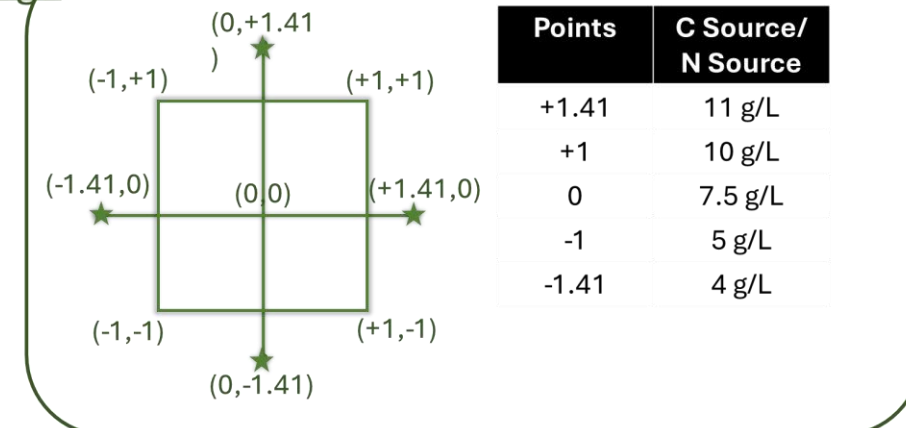
This study aimed to optimized the simultaneous production of fungal biomass (resistance structures) and insecticidal metabolites, particularly destruxins A and B, using submerged fermentation, an agro-industrial waste (as a carbon source), and a complex nitrogen source to optimize.

3 METHODS

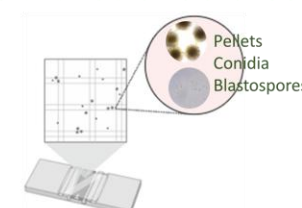
Submerged Fermentation



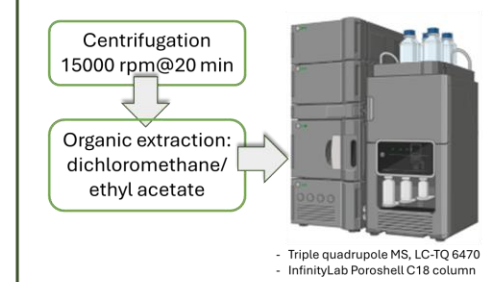
Central composite design



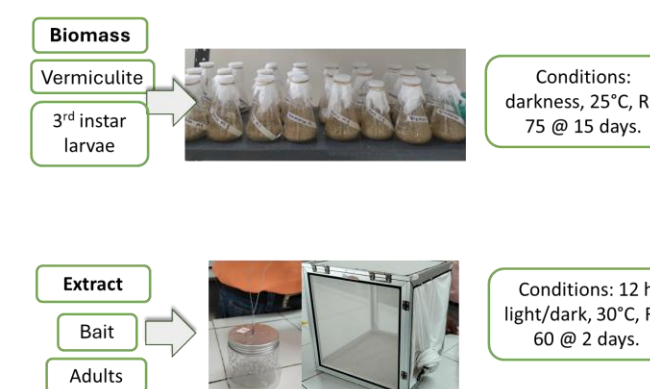
1. Total resistance structures



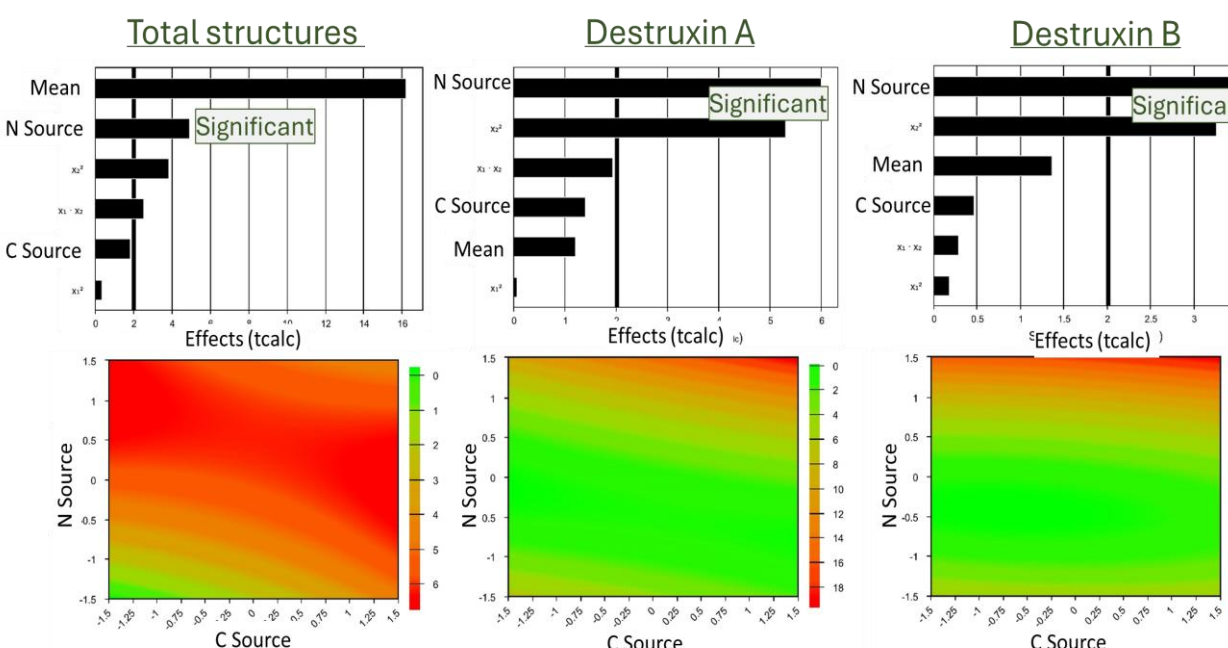
2. Concentration of destruxines



3. Insecticidal activity on *A. obliqua*

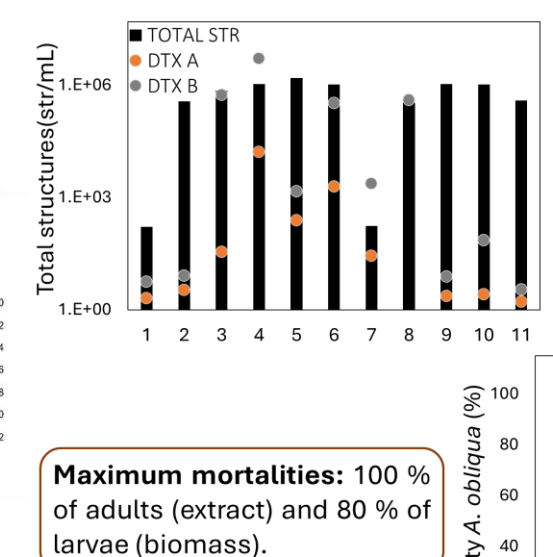


4 RESULTS



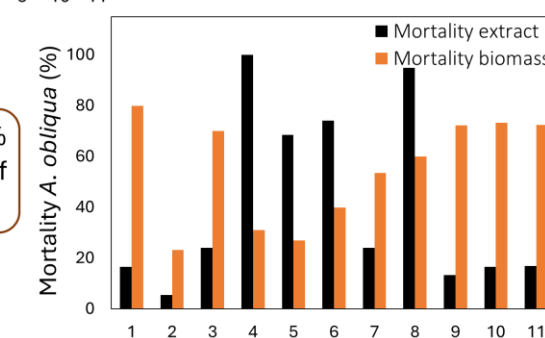
N source significant for total structures and destruxins.

Did not significant factor for mortalities.



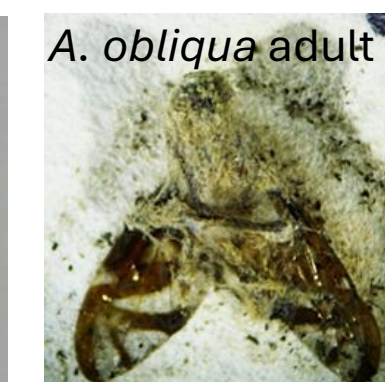
Maximum mortalities: 100 % of adults (extract) and 80 % of larvae (biomass).

Optimization: 6 g/L C source and 10 g/L N source
Prediction: 10⁵ conidia/mL, 10⁵ blastospores/mL, 160 pellets/mL, 4 ppm of DXT A, and 15 ppm of DXT B.



5 DISCUSSION AND CONCLUSIONS

- ★ The developed submerged fermentation process using agroindustrial residues is a promising and cost-effective strategy for the efficient large-scale production of fungal biocontrol agents and established optimal conditions for the co-production of biomass and metabolites.
- ★ High extract mortality was strongly linked to high destruxin levels: 100% adult mortality (in experiments 4 and 8) was associated with extract concentrations of destruxins exceeding 12 ppm.
- ★ *Metarhizium robertsii* Mt008 possesses significant potential for sustainable pest management, demonstrating effective control of preimaginal and adult stages.



REFERENCES

- Zambrano R (2015) In: La República. http://www.larepublica.co/mosca-de-la-fruta-genera-perdidas-de-40-de-la-producción_223906
- Lozano MD et al (2023) Study on the insecticidal activity of entomopathogenic fungi for the control of the fruit fly (*Anastrepha obliqua*), the main pest in mango crop in Colombia. Arch Microbiol 205:83