

## Bioefficacy and biochemical responses to *Acorus calamus* essential oil-based nanoemulsions in *Sitophilus oryzae*

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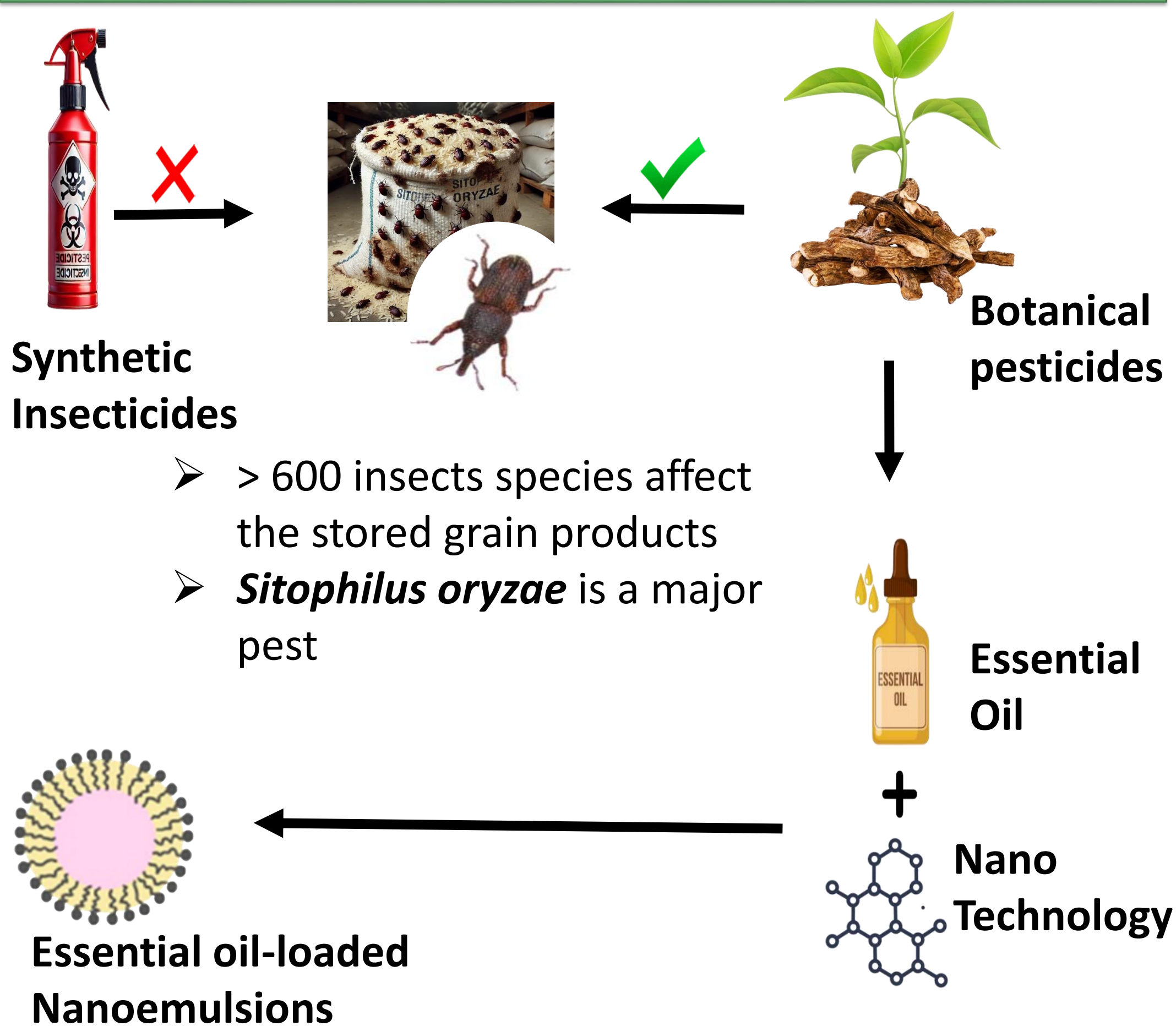
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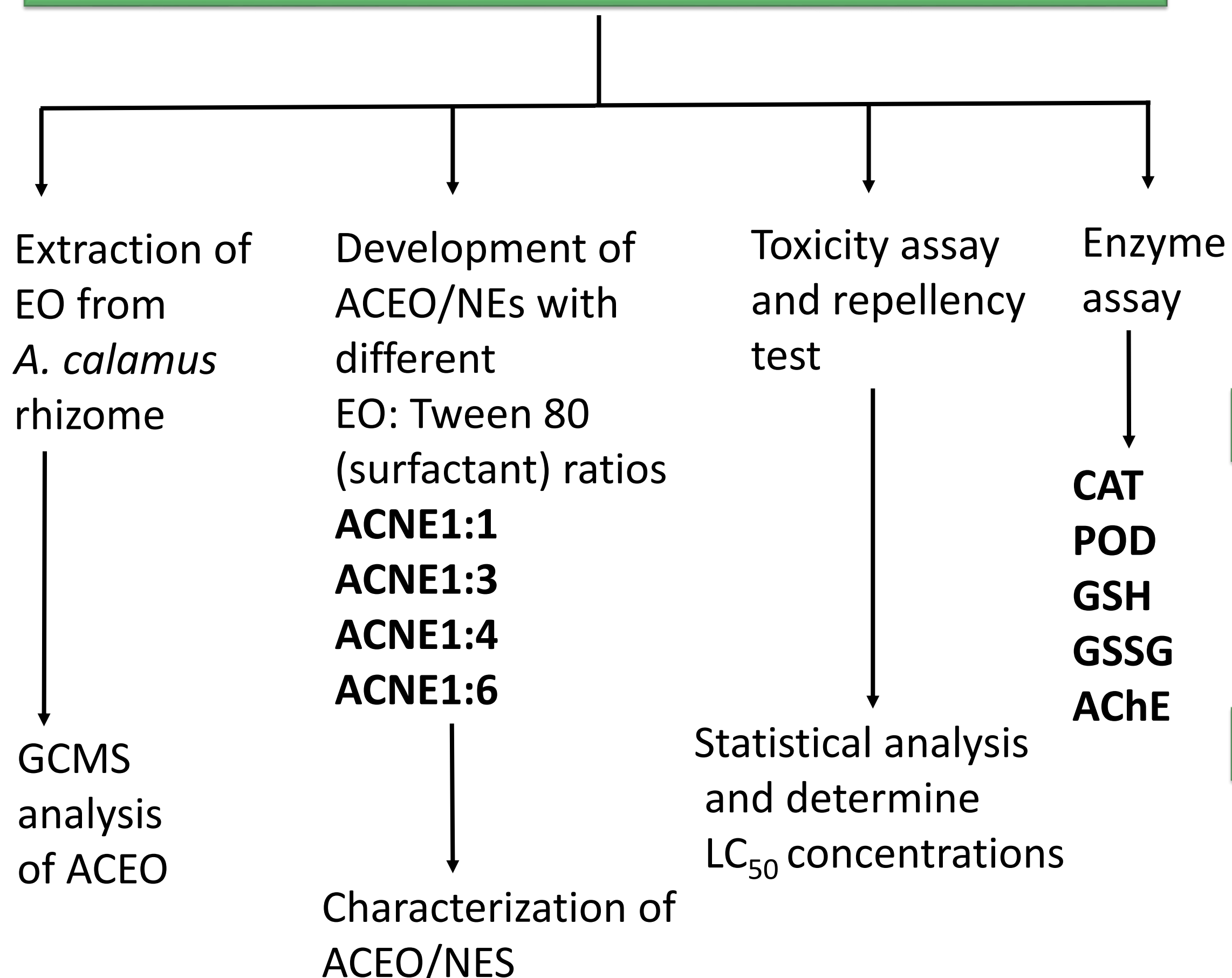
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### INTRODUCTION & AIM



### METHOD

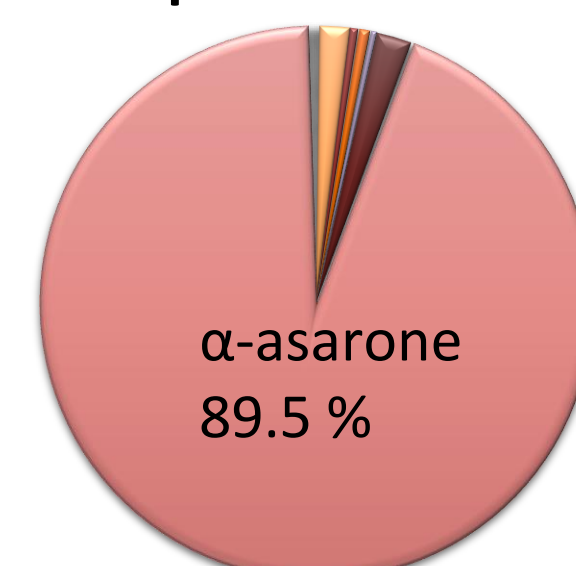


### RESULTS & DISCUSSION

#### ACEO



#### Chemical profile of ACEO



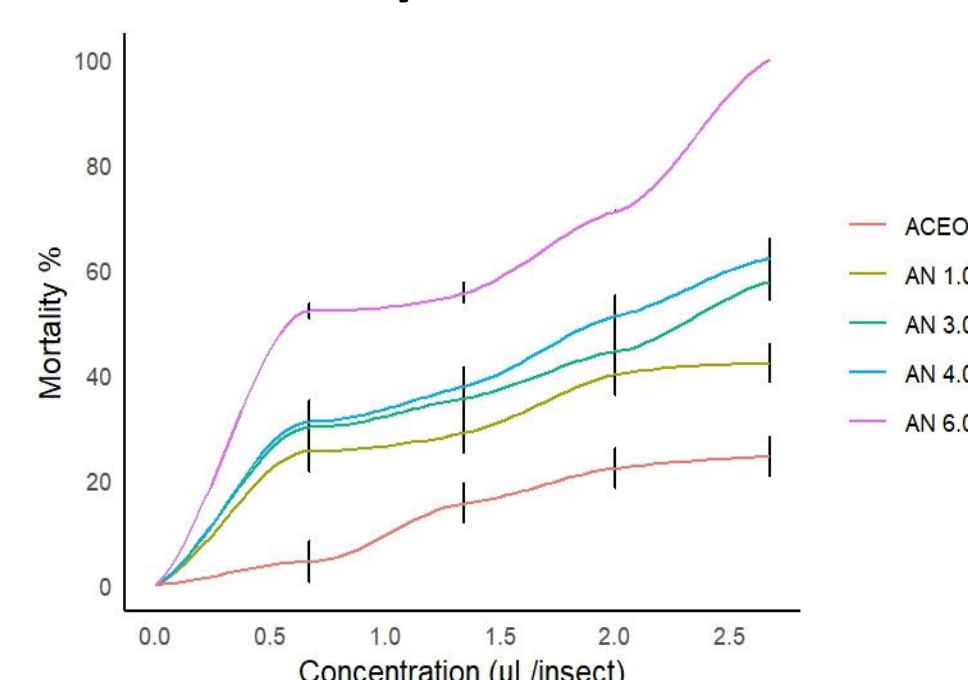
- Total 24 compounds were identified

#### Chemical characterization of ACEO/NEs

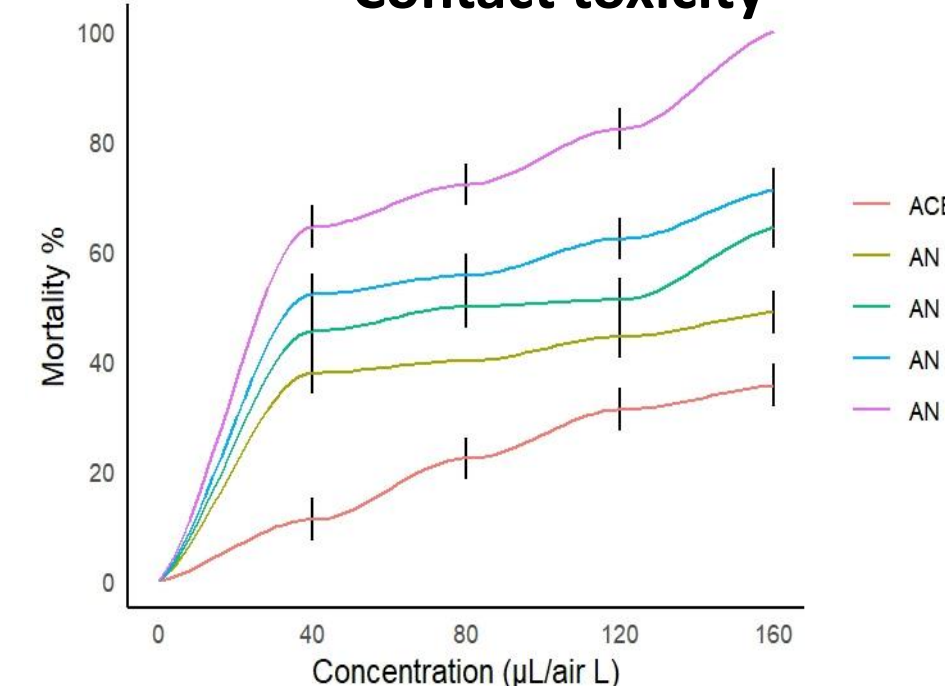
ACNE ID	Droplet Size (nm)	PDI	Zeta potential (mV)
ACNE1	329.62±72.75	0.231	-12.60
ACNE3	270.20±41.82	0.124	-11.58
ACNE4	162.5±14.44	0.215	-7.07
ACNE6	30.49±6.34	0.121	-17.42

Tween 80 ratio ↑ Droplet size ↓

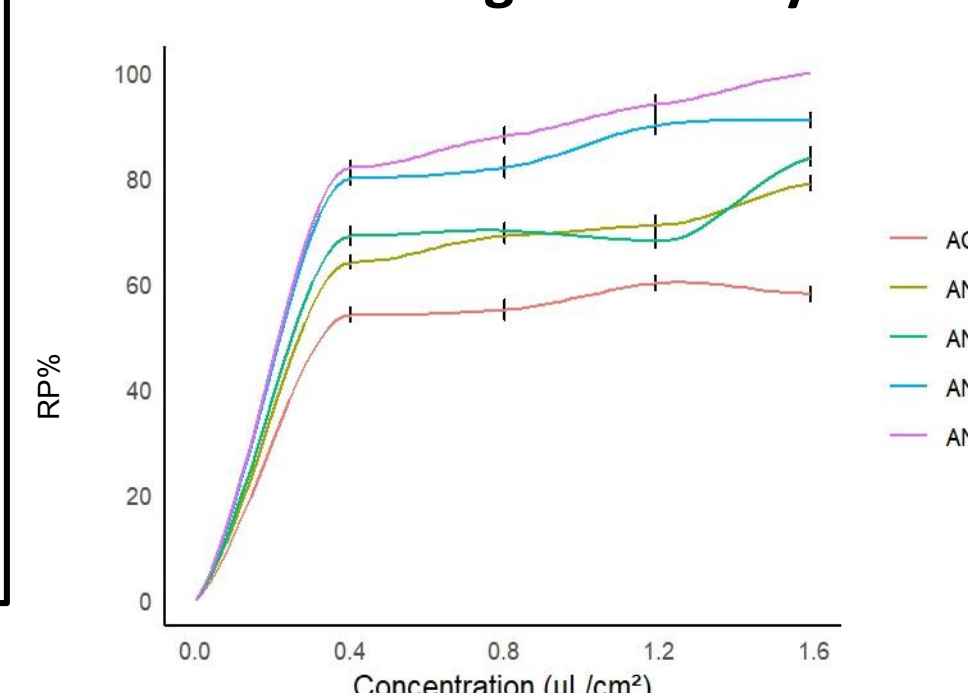
#### Bio efficacy evaluation results



#### Contact toxicity



#### Fumigant toxicity



#### Repellency percentage

### CONCLUSION

- Bio efficacy of ACNEs is higher than pure ACEO
- Smaller droplet size always showed higher toxicity
- ACEO and ACNEs have an impact on the antioxidant defense system of *S. oryzae*
- EO based NEs is leading to the development of sustainable, eco-friendly and effective alternatives to conventional pesticides

### FUTURE WORK / REFERENCES

- Evaluation the efficacy ACEO/NEs as an aerosol for potential commercial product development and evaluation of the persistence of the ACEO/NEs.

- Campolo, O. *et al.* (2017) 'Citrus peel essential oil nanoformulations to control the tomato borer, Tuta absoluta: chemical properties and biological activity', *Scientific Reports*, 7(1), p. 13036. Available at: <https://doi.org/10.1038/s41598-017-13413-0>.
- Rajkumar, V. *et al.* (2020) 'Structural characterization of chitosan nanoparticle loaded with Piper nigrum essential oil for biological efficacy against the stored grain pest control', *Pesticide Biochemistry and Physiology*, 166, p. 104566. Available at: <https://doi.org/10.1016/j.pestbp.2020.104566>.