

DEVELOPMENT OF A NATURAL INSECT REPELLENT FOR PROLONGED EFFECTS BASED ON A NANOTECHNOLOGICAL MATRIX: EVALUATION OF EFFECTIVENESS, SAFETY AND SENSORY ACCEPTABILITY



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Problem



Mosquito-borne diseases affect millions of people worldwide each year.

Aedes aegypti => dengue, chikungunya, yellow fever and Zika viruses.

Repellent use is preventive action => DEET - adverse effects



► Solution

► Natural repellents - essential oils of citronella = effective and safe

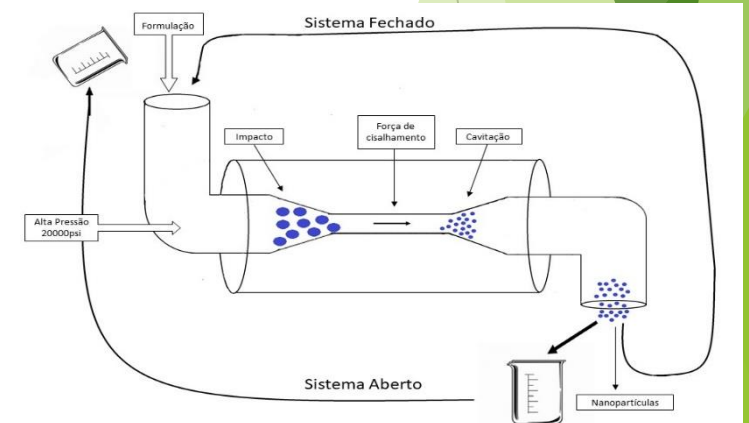
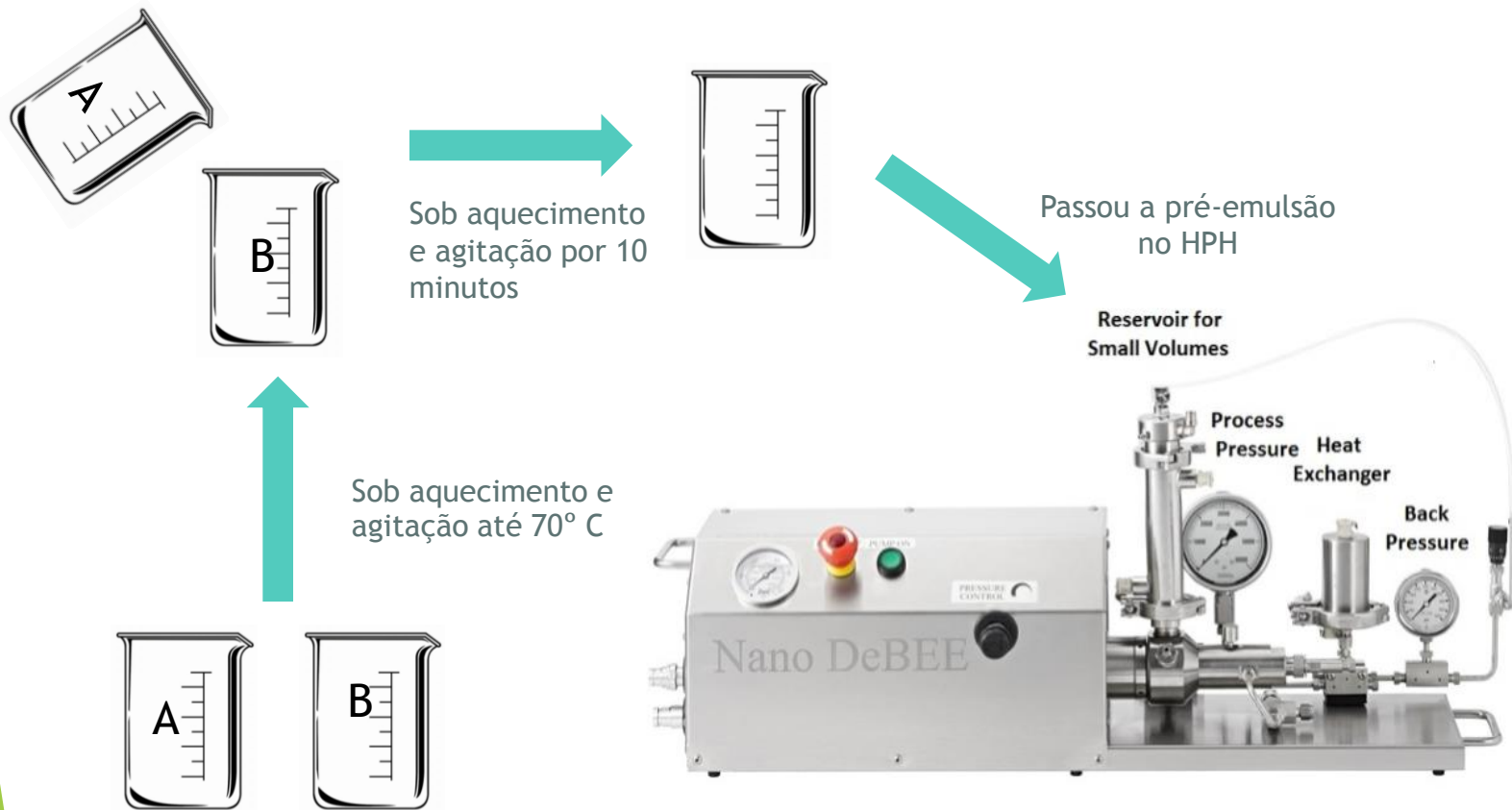
► Encapsulating - nano-matrix formulation (prolong their repellent action time and decrease the characteristic odor). Easy to use day by day

Steps:

- ▶ 1) Obtain and characterize the citronella nanoparticles
- ▶ 2) Study the accelerated stability of citronella nanoparticles
- ▶ 3) Evaluate the permeation / safety of nanoparticles conveyed in formulations
- ▶ 4) Evaluate the *in vivo* effectiveness of repellency in the Peet-Grady Chamber.
- ▶ 5) Analyze odor quality and acceptability by evaluating olfactory analysis

What was done so far

► Lipid nanocarriers formulations



► Characterization

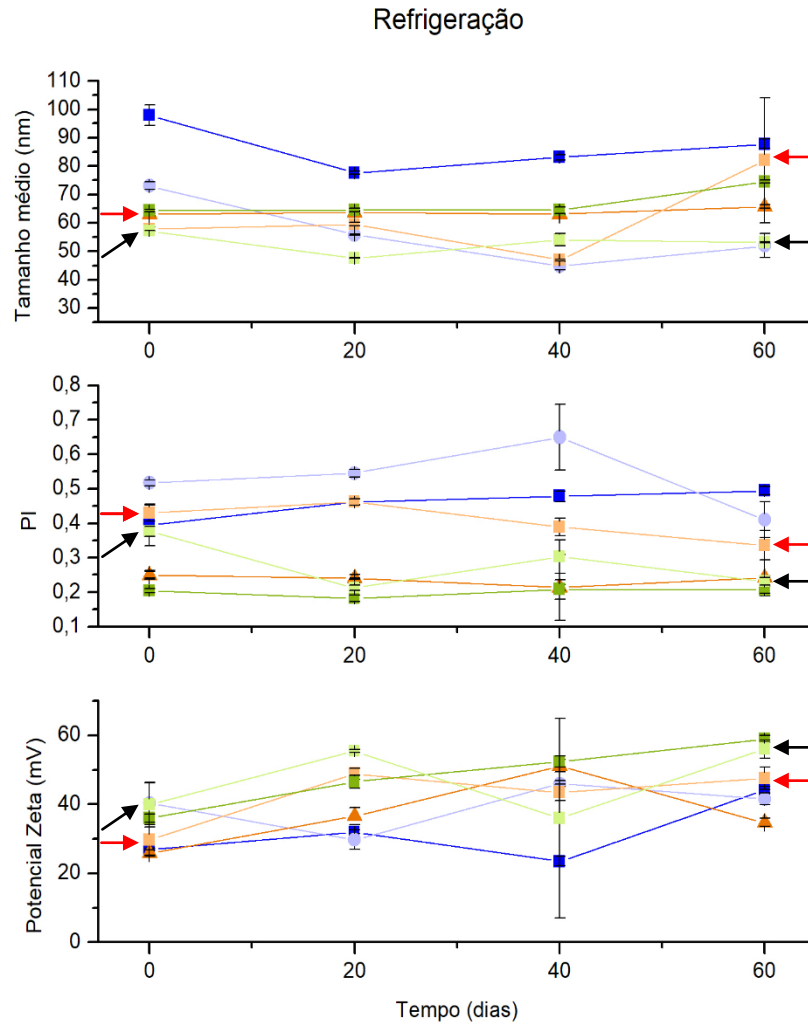
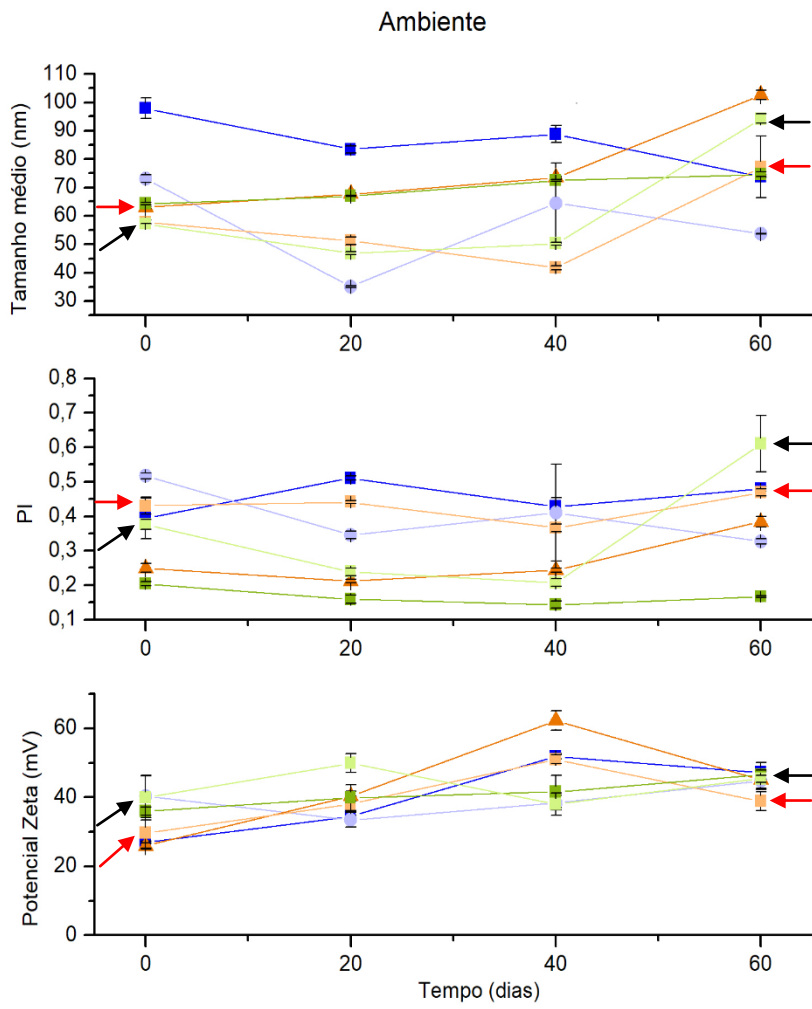
Medium size

Particle size distribution (dynamic light scattering and laser diffraction)

pH and conductivity

Zeta potential

► Preliminary Stability assay - Lipid nanocarriers formulations



■ CCTA 1
 ● CCTA 2
 ▲ CCTA 3
 ■ CCTA 4
 ■ CCTA 5
 ■ CCTA 6

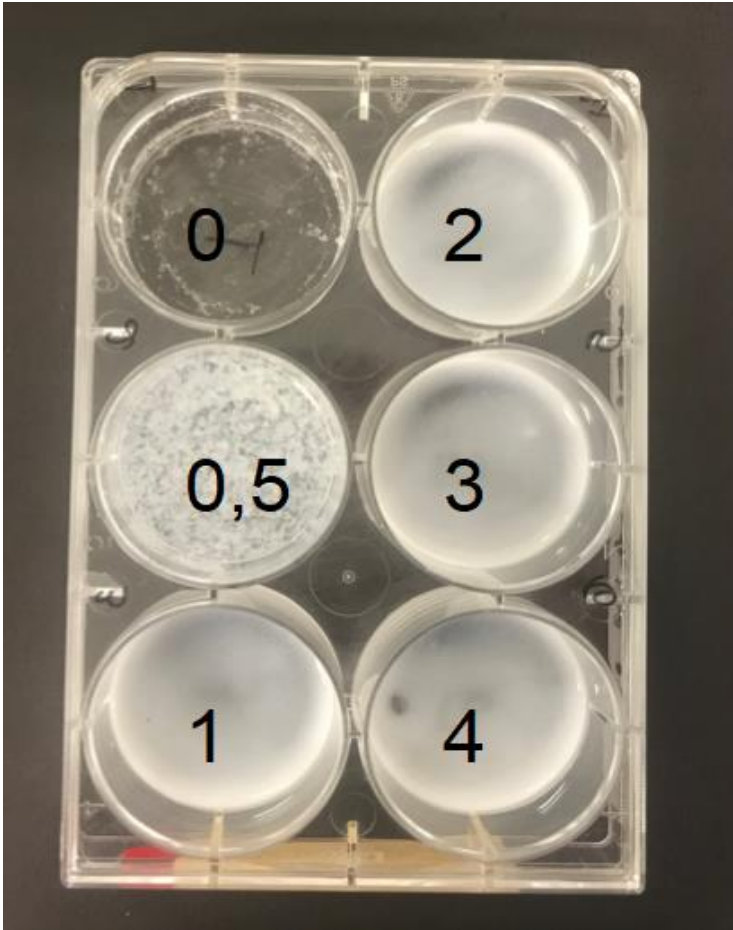
■ CCTA 1
 ● CCTA 2
 ▲ CCTA 3
 ■ CCTA 4
 ■ CCTA 5
 ■ CCTA 6

► Release assay

Stable nanostructures loading

Citronella oil, retaining it up to 8 hours,

The release was evaluated by means of the decay of the concentrations of the CO markers, analyzed by high performance liquid chromatography.

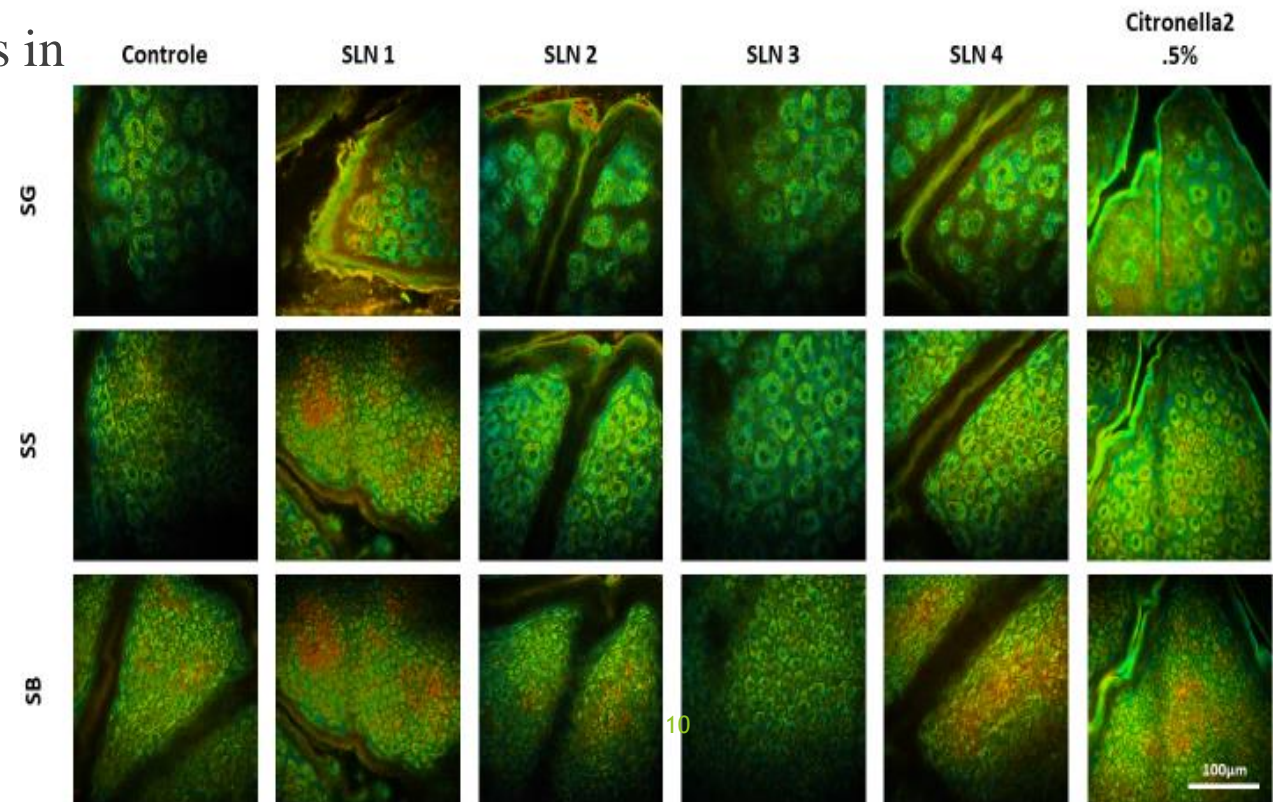


► Preliminar Safety test

- Fluorescence Lifetime Imaging Microscopy (FLIM) -
DermaInspect Multiphoton Microscope

Tissue metabolic changes can be measured as changes in
NAD (P) H or FAD fluorescence lifetime

- SLN1 (anionic)
- SLN2 (anionic+ CITRONELA)
- SLN3 (anionic + Poloxamer)
- SLN4 (anionic + Poloxamer + CITRONELA)
- ONLY Citronella 2.5%



What's next

► *in vivo* efficacy test – (Peet-Grady chamber)

► Citronella oil



- ▶ **Sensory analysis**
- ▶ long-lasting
- ▶ triangular test: select the participants
- ▶ check olfactory sensitivity to analyze odor potency

Under development



THANK YOU!

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