

RESUMO - MICROBIOLOGIA E IMUNOLOGIA

**PRELIMINARY ANALYSIS OF CHEMICAL ELEMENTS INVOLVED IN THE
INFECTION OF AEDES AEGYPTI LARVAE BY METARHIZIUM ANISOPLIAE**

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This study aimed to identify and analyze the chemical elements involved in the infectious process of *Aedes aegypti* larvae exposed to the entomopathogenic fungus *Metarhizium anisopliae* using Scanning Electron Microscopy (SEM) with Energy-Dispersive X-ray Spectroscopy (EDS). *Ae. aegypti* larvae were treated

with 0.03% Tween 80 (control group), with *M. anisopliae* isolate CG153 (105 and 107 conidia/mL), and a group remained untreated (naive). 24, 48, and 72 hours post-infection, the larvae were fixed in glutaraldehyde solution (2.5%, pH 7.2) and stored at -4° C. The process continued with three washes in 0.1M sodium cacodylate buffer (CS) for 10 minutes each, fixation in osmium tetroxide for one hour, followed by three additional washes in 0.1M CS. Next, the samples were dehydrated in an ascending alcohol series (7.5%, 15%, 30%, 50%, 70%, 80%, 90%, and 100%) for ten minutes each. After this process, the samples were dried in CO₂ and coated with carbon. For image visualization and SEM-EDS analysis, the JEOL JSM-6390LV scanning electron microscope (JEOL BRAZIL©, São Paulo, Brazil), from the FIOCRUZ microscopy platform, and the Phenom ProX microscope (Thermo Fisher Scientific©) from the Multiuser Ultrastructure Laboratory (LMU) at the Federal Rural University of Rio de Janeiro (UFRRJ) were used. A preliminary analysis demonstrated that the naive control group exhibited a composition rich in carbon (C) and oxygen (O), essential elements for the natural development of the larvae, as well as elements such as phosphorus (P), nitrogen (N), and sulfur (S), necessary for metabolism and cellular structure. The presence of aluminum (Al) indicated possible contamination from the stubs supporting the samples. In the groups treated with 0.03% Tween 80, the chemical composition remained similar to the naive group, with no significant changes in the basic elements (C, O, N, P, and S). This suggests that 0.03% Tween 80 did not cause relevant alterations in the larvae's structure or metabolism, maintaining a chemical profile close to the naive control. On the other hand, the groups infected with *M. anisopliae* showed remarkable changes. After 24 hours at a concentration of 107 conidia/mL, there was a marked increase in C (69.6%) and a reduction in N (4.1%), suggesting that the fungus altered the organic composition of the larvae and interfered with protein metabolism. Furthermore, oxygen content decreased to 23.3% by weight, possibly due to the high oxygen consumption by metabolic processes involved in the immune response. In the groups treated for 48 and 72 hours, the elements P and S showed slight increases, reflecting an immune response by the larvae, mobilizing energy reserves and structural proteins to resist the infection. The 0.03% Tween 80 emulsifier did not significantly affect the larvae's chemical composition, while the entomopathogenic fungus *M. anisopliae*

substantially altered chemical elements involved in the metabolism and organic structure of *Ae. aegypti* larvae. A more detailed SEM-EDS analysis will be conducted to better understand the interaction between *Ae. aegypti* larvae and *M. anisopliae*, contributing to the development of mosquito control strategies.

Palavras-chave: sem; x-ray spectrometry; chemical elements; immune response.