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THE USE OF PHOTOPROTECTANTS TO INCREASE THE EFFICACY OF *Metarhizium anisopliae* s.s. AGAINST *Rhipicephalus microplus* ENGORGED FEMALES EXPOSED TO UV-B RADIATION

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The use of entomopathogenic fungi to control *Rhipicephalus microplus* is considerably impaired by adverse abiotic factors, such as ultraviolet (UV) radiation, mainly the UV-B spectrum. This study was sought to evaluate the influence of additives on the bioefficacy of *Metarhizium anisopliae* sensu stricto IP 119 by mitigating deleterious effects caused by UV-B radiation to conidial survival. IP 119 conidia were produced on potato dextrose agar medium plus yeast extract and suspended in aqueous solution (0.01% Tween 80), mineral oil-in-water emulsion (5% or 10%), or titanium dioxide (TiO_2) solution (2.5% or 5%). Engorged females of *R. microplus* were collected, cleaned, weighed, and distributed by weight as homogeneously as possible in groups of ten. Some groups were treated topically with 2 µL of each conidial suspension [1×10^8 conidia mL^{-1}], and then exposed (3.9 or 5.4 kJ m^{-2}) or not to UV-B radiation. Other groups (not exposed to UV-B) were treated with control solutions (without conidia): 10% oil emulsion, 5% TiO_2 or aqueous solution. Another group of ticks was not treated with fungi, but exposed to 5.46 kJ m^{-2} UV-B. Finally, a control group free of fungus and not exposed to UV-B was also included. A total of 20 groups was tested (one group for each condition). The following biological parameters of *R. microplus* engorged females were evaluated: oviposition period, weigh of egg mass, percentage of hatch, egg production and nutrient indices, and percent control. Engorged females treated with conidia prepared in 10% oil emulsion (regardless the UV-B dose) or in 5% oil emulsion (exposed to 5.46 kJ m^{-2}) had the lowest production of eggs (0.0161 g to 0.0471 g). Additionally, the shortest oviposition period (2.2 days to 2.7 days) and the lowest egg production index (6.3% to 10.8%) were reported from females treated with conidia suspended in 10% oil emulsion, irrespective of UV-B radiation doses. The percent control of females treated with conidia suspended in oil emulsion (5% or 10%) were the highest, with a range of 70.3% to 96.9%. On the other hand, the percent tick control from groups treated with conidia mixed with TiO_2 solution was as low as the groups treated with conidia suspended in aqueous solution (10.3% to 30.4%). We conclude that mineral oil remarkably affords UV-B protection to conidia and increases their efficacy against *R. microplus*; TiO_2, however, does not provide benefits for conidia exposed to UV-B radiation on the cuticle of *R. microplus* engorged female.

Keywords: Entomopathogenic fungi, photoprotection, conidial formulation, cattle tick.
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